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# Passport data: Gaps, pitfalls and data quality

EURISCO training workshop 2023  
12–14 September 2023, Plovdiv, Bulgaria

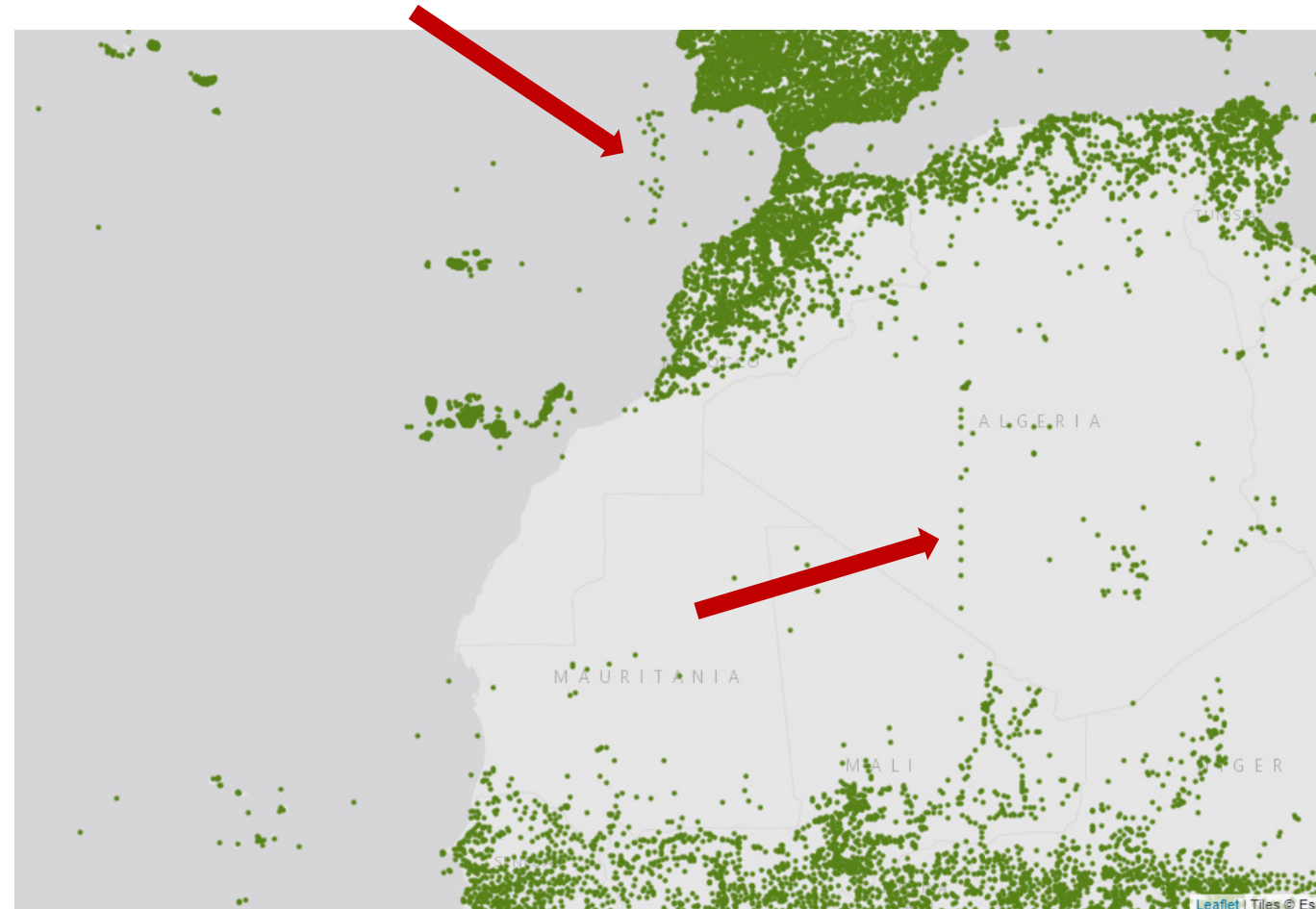


# Data quality

- Definition
  - The ability of data to fulfil the purpose for which it is intended
  - Fitness for use of the information provided
- Metrics for measuring data quality, for example
  - Correctness
  - Completeness
  - Reliability
  - User expectation conformity

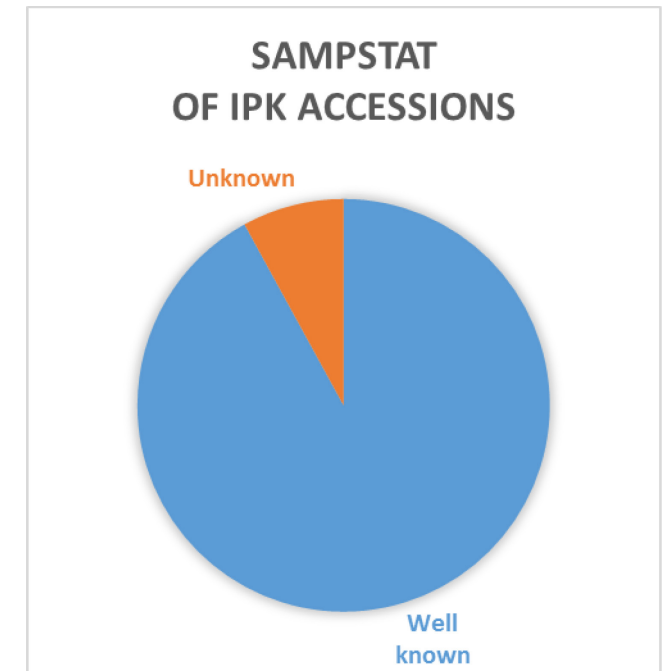
# Correctness

- This is quite a laborious task
- ... e.g. “sea food”



# Completeness

- Valuable information
- Better chance to fill gaps by querying donor databases
- ... but not always a gap!



## IPK

HOR 9866

**Passport data**

Accession numbers: HOR 9866  
 Current scientific name: *Hordeum vulgare* L. convar. *deficiens* (Steud.) Mansf. var. *decorticatum* Körn.  
 Biol. status: Traditional cultivar/landrace  
 Life form: spring type  
 Availability: unrestricted available  
 Genebank subcollection: GTR  
 Acquisition form: unknown  
 Acquisition date:  
*Other Numbers:*  
 USDA, National Small Grain Collection Aberdeen: PI 283410

**Geographic data**

Country of origin: SUN (\*Union of Soviet Socialist Republics)

**Donor**

Designation	Country	Donor number	FAO Code
Weltsortiment Beltsville	United States of America	CI 11977	
USDA, National Small Grain Collection Aberdeen	United States of America	PI 283410	USA029
CSIRO, Div. Plant Industry Canberra	Australia	C.P.I. 22817	

**Other Numbers:**  
 USDA, National Small Grain Collection Aberdeen: PI 283410

## USDA

PI 283410

**Hordeum vulgare L. subsp. vulgare**

Collected from:	Former Soviet Union
Maintained by:	National Small Grains Collection
NPGS received:	1962
PI assigned:	PI 283410
	National Center for Genetic Resources Preservation

*But country of origin  
 "Former Soviet Union" does not  
 explain the Ethiopian genetic  
 background*

**Names and identifiers**

Type:	Collector identifier
Cooperator:	CSIRO

Type:	Site identifier
Group:	CIHO
Comment:	Barley Cereal Investigation (CI) number.

Type:	Site identifier
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**Source History**

- Accession was donated. 02-Oct-1962.
- Donors:
  1. [CSIRO](#)
- Accession was collected. Former Soviet Union

# User expectation conformity

## Country of origin

### MCPD 2.1 says:

„13. Country of origin (ORIGCTY)  
3-letter ISO 3166-1 code of the country in which the sample was originally collected (e.g. landrace, crop wild relative, farmers' variety), bred or selected (breeding lines, GMOs, segregating populations, hybrids, modern cultivars, etc.).”

### Descriptor of EURISCO says:

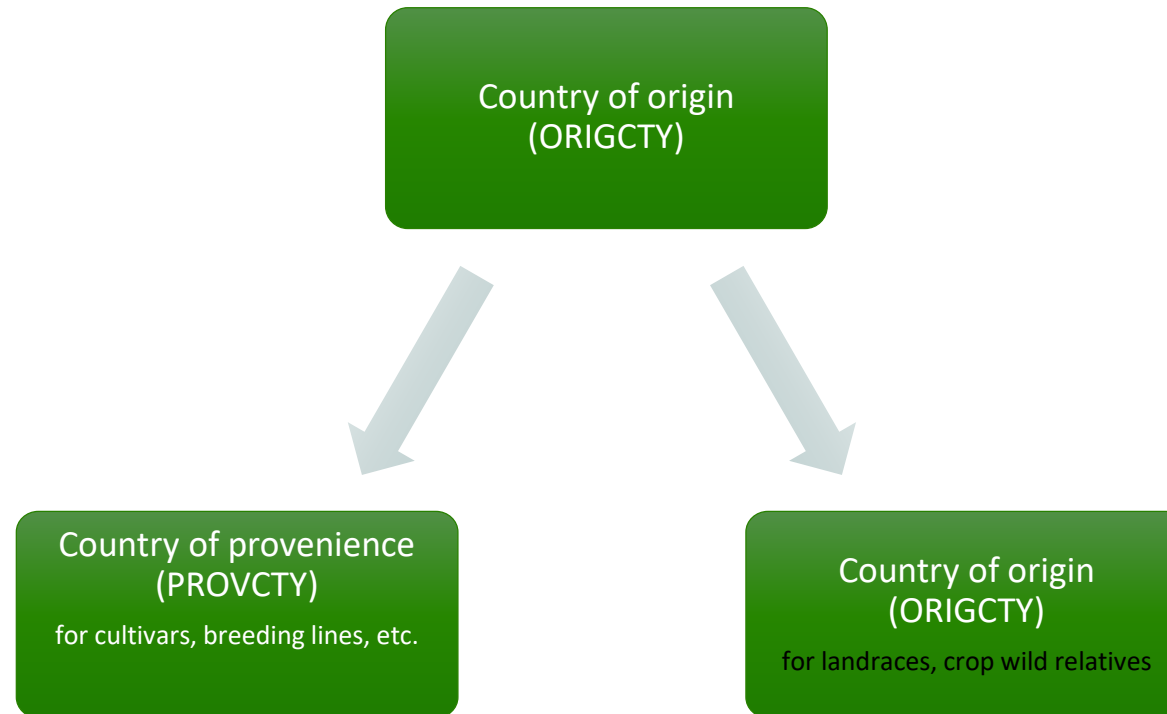
“13. Country of origin (ORIGCTY)  
3-letter ISO 3166-1 code of the country in which the sample was originally collected.”

### What the users understand:

“Country of origin (ORIGCTY)  
3-letter ISO 3166-1 code of the country which the sample came from.”

# User expectation conformity

IPK approach



# Passport data validation

- Syntactic (and semantic) checks during data import in EURISCO
  - For example, check for correct status codes or well-formed coordinates (LAT 0-90, LON 0-180)
  - No check if coordinates point to land or water
  - No check if coordinates are within origin country
  - No check for correct taxonomic terms → but suggestions during import
- What to do?
  - GIS systems (e.g. DIVA-GIS, QGIS)
  - Taxonomic repositories (e.g. World Flora Online, Catalogue of Life)
- Online tools for data validation available
  - For example, by Genesys
  - <https://validator.genesys-pgr.org/>



# Passport data validation

## How to use the passport data validation tool?

See this short video to learn the basics: <https://youtu.be/LR9F1P94Gc>

- **Source taxonomy databases:** The tool checks data against the GRIN-Global Taxonomy database (version 1.9.6.2) maintained by USDA-ARS. See [GRIN Taxonomy for Plants](#).
- **Data source:** This tool is able to parse CSV data.

### Validated columns

Only the following MCPD columns will be checked for taxonomic data: **GENUS, SPECIES, SPAUTHOR, SUBTAXA, SUBTAUTHOR**.

Geo tests require **DECLATITUDE, DECLONGITUDE** and **ORIGCTY** for country border check and suggested coordinate fixes.

Other columns will be included in the output, but not processed.

## Submit data for validation

### 1. Copy-paste data from Excel:

Select the range of cells (including headers) in Excel and paste the data in to the textbox.

```
PUID;NICODE;INSTCODE;ACCENUMB;COLLNUMB;COLLCODE;COLLNAME;COLLINSTADDRESS;COLLMISSID;GENUS;SPECIES;SPAUTHOR;SUBTAXA;SUBTAUTHOR;CROPNAME;ACCENAME;ACQDATE;ORIGCTY;COLLSITE;LATITUDE;DECLATITUDE;LONGITUDE;DECLONGITUDE;COORDUNCERT;COORDDATUM;GEOREFMETH;ELEVATION  
;COLLDATE;BREDCODE;BREDCNAME;SAHPSTAT;ANCEST;COLLSRC;DONORCODE;DONORNAME;DONORNUMB;OTHERNUMB;DUPLSITE;DUPLINSTNAME;STORAGE;REMARKS;ACCEURL;HLSSSTAT;AEGISSTAT;HISTORIC  
10.25642/IPK/GBIS/93764;DEU;DEU146;BRA 3044;;;;;Brassica;fruticulosa;Cirillo;;;;;1997----;ITA;Sicilien, Isola di Filicudi -Eolie (Messina);;;;;;;;;;;;;99;ITA038;;DEU146:K 10144;NOR051;13;https://gbis.ipk-gatersleben.de/gbis21/faces/pages/detail.jsf?akzessionId=93764;1;0;0  
10.25642/IPK/GBIS/74287;DEU;DEU146;BRA 3043;;;;;Brassica;fruticulosa;Cirillo;;;;;1992----;;;;;;;;;;;;;;99;ESP002;;DEU146:K 8821;NOR051;13;https://gbis.ipk-gatersleben.de/gbis21/faces/pages/detail.jsf?akzessionId=74287;1;0;0  
10.25642/IPK/GBIS/74283;DEU;DEU146;BRA 2991;;;;;Brassica;fruticulosa;Cirillo;;;;;1992----;;;;;;;;;;;;;;99;ESP002;;DEU146:K 8817;NOR051;13;https://gbis.ipk-gatersleben.de/gbis21/faces/pages/detail.jsf?akzessionId=74283;1;0;0  
10.25642/IPK/GBIS/36486;DEU;DEU146;BRA 998;;;;;Brassica;fruticulosa;Cirillo;subsp. fruticulosa;;;;;1978----;;;;;;;;;;;;;;99;ESP002;;4068-76;"ESP002:4068-76;DEU146:K 4907";NOR051;13;https://gbis.ipk-gatersleben.de/gbis21/faces/pages/detail.jsf?akzessionId=36486;1;0;0  
10.25642/IPK/GBIS/36308;DEU;DEU146;BRA 3836;;;;;Brassica;fruticulosa;Cirillo;subsp. fruticulosa;;;;;2001----;ITA;;;;;;;;;;;;;;99;ITA038;;DEU146:K 10666;NOR051;13;https://gbis.ipk-gatersleben.de/gbis21/faces/pages/detail.jsf?akzessionId=36308;1;0;0
```

### 2. Configure CSV settings

Auto-detect CSV settings

#### Separator character:

Tab  Comma  Semicolon  Space  Other /

The separator character in CSV separates "columns".

#### Escape character:

If the quote character is used in column text, it must be escaped: "This is a [column]"

#### Decimal mark:

Dot (n is approximately 3.14159)  Comma (n is approximately 3,14159)

A decimal mark is a symbol used to separate the integer part from the fractional part of a number. PI is 3 [decimal-mark] 14159.

### 3. Other options

Options below are specific to validators, try them out.

#### Flag non-current taxa:

Yes  No

### 4. Preview or Download

Tick the box if you want to download results as CSV file. Leave unticked to see results in the browser.

Download results as CSV

Validate Taxonomic data

Validate Country of Origin

Classify Land or Water

# Passport data validation - taxonomy

**How to interpret results?**

**"\_parsed" columns**  
For numeric values these columns contain the value as parsed by the program. See if setting a different decimal mark character helps.

**"\_check" and "\_distance" columns**  
Columns highlighted Yellow were injected into your dataset at most appropriate positions. They contain the results of the validation run.

- OK means that a 100% match was found in the taxonomic databases, the data is valid.
- blank (empty) cell means the system could not find a decent match in the taxonomic databases and offers no suggestion.

**"\_distance" columns**  
"ORIGCTY\_distance" column contains distance between lat/lon to the nearest point on the border of the specified country.

**"\_fix" columns**  
"DECLATITUDE\_fix" and "DECLONGITUDE\_fix" columns contain adjusted coordinates (flipped, swapped) that fall within specified "ORIGCTY".

**Results**

PUID	NICODE	INSTCODE	ACCENUMB	COLLNUMB	COLLCODE	COLLNAME	COLLINSTADDRESS	COLLHISSID	GENUS	GENUS_check	SPECIES	SPECIES_check	GRINTAX_speciesId	GRINTAX_speciesCurrent	SPAUTHOR	SPAUTHOR_check	SUBTAXA	SUBTAXA_check	SUBTAUTHOR	SUBTAUTHOR
10.25642/IPK/GBIS/93764	DEU	DEU146	BRA 3044						Brassica	OK	fruticulosa	OK	318774	true	Cirillo	OK				
10.25642/IPK/GBIS/74287	DEU	DEU146	BRA 3043						Brassica	OK	fruticulosa	OK	318774	true	Cirillo	OK				
10.25642/IPK/GBIS/74283	DEU	DEU146	BRA 2991						Brassica	OK	fruticulosa	OK	318774	true	Cirillo	OK				
10.25642/IPK/GBIS/36486	DEU	DEU146	BRA 998						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/263058	DEU	DEU146	BRA 2836						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/74285	DEU	DEU146	BRA 2835						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/94934	DEU	DEU146	BRA 1887	12946	DEU146		ITA-97		Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/94925	DEU	DEU146	BRA 1811	12937	DEU146		ITA-97		Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/77885	DEU	DEU146	BRA 1810	5	DEU146		ESP-91		Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/36939	DEU	DEU146	BRA 1727						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/36518	DEU	DEU146	BRA 1039						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/69108	DEU	DEU146	K 9372	6			ITA-94/1		Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/46542	DEU	DEU146	BRA 3042						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		
10.25642/IPK/GBIS/1747919	DEU	DEU146	BRA 2961						Brassica	OK	fruticulosa	OK	318775	true	Cirillo	OK	subsp. fruticulosa	OK		

# Passport data validation – origin country

## How to interpret results?

### "\_parsed" columns

For numeric values these columns contain the value as parsed by the program. See if setting a different decimal mark character helps.

### "\_check" and "\_distance" columns

Columns highlighted yellow were injected into your dataset at most appropriate positions. They contain the results of the validation run.

- **OK** means that a 100% match was found in the taxonomic databases, the data is valid.
- *blank (empty)* cell means the system could not find a decent match in the taxonomic databases and offers no suggestion.

### "\_distance" columns

"ORIGCTY\_distance" column contains distance between lat/lon to the nearest point on the border of the specified country.

### "\_fix" columns

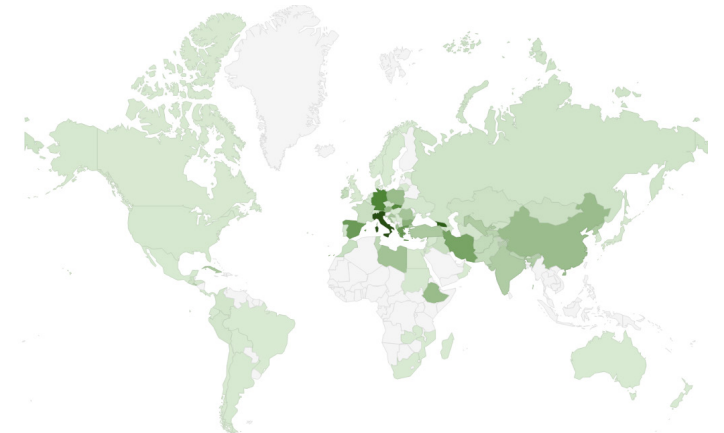
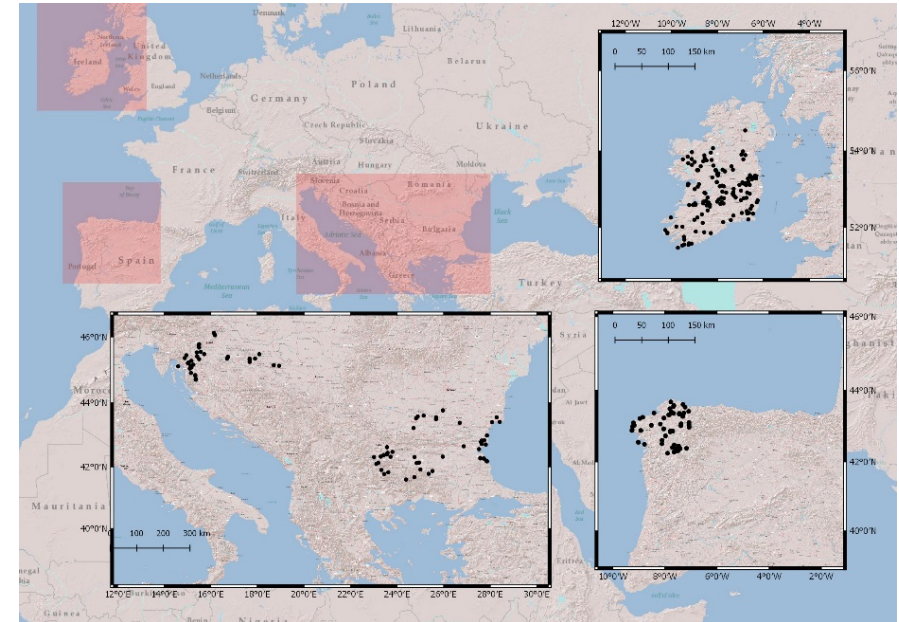
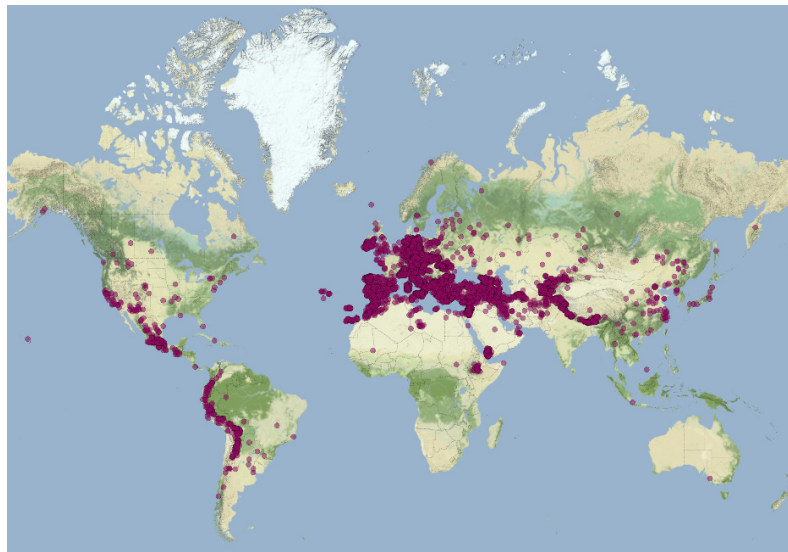
"DECLATITUDE\_fix" and "DECLONGITUDE\_fix" columns contain adjusted coordinates (flipped, swapped) that fall within specified "ORIGCTY".

## Results

PUID	HICODE	INSTCODE	ACCENUMB	COLLNUMB	COLLCODE	COLLNAME	COLLINSTADDRESS	COLLHISSID	GENUS	SPECIES	SPAUTHOR	SUBTAXA	SUBTAUTHOR	CROPHAME	ACCENAME	ACQDATE	ORIGCTY	ORIGCTY_check	ORIGCTY_distance	COLLSITE	LATITUDE	DECL
10.25642/IPK/GBIS/93764	DEU	DEU146	BRA 3044						Brassica	fruticulosa	Cirillo					1997----	ITA			Sizilien, Isola di Filicudi - Eolie (Messina)		
10.25642/IPK/GBIS/74287	DEU	DEU146	BRA 3043						Brassica	fruticulosa	Cirillo					1992----		OK				
10.25642/IPK/GBIS/74283	DEU	DEU146	BRA 2991						Brassica	fruticulosa	Cirillo					1992----		OK				
10.25642/IPK/GBIS/36486	DEU	DEU146	BRA 998						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1978----		OK				
10.25642/IPK/GBIS/263058	DEU	DEU146	BRA 2836						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				2001----	ITA					
10.25642/IPK/GBIS/74285	DEU	DEU146	BRA 2835						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1992----		OK				
10.25642/IPK/GBIS/94934	DEU	DEU146	BRA 1887	12946	DEU146		ITA-97		Brassica	fruticulosa	Cirillo	subsp. fruticulosa		cavolo di stagione [verrucular name]		1997----	ITA	ERROR: java.lang.IllegalArgumentException: Latitude 38399360*100.0°N is out of range (±90°).		Insel Vulcano, nördlich Sizilien	382359N	38.39
10.25642/IPK/GBIS/94925	DEU	DEU146	BRA 1811	12937	DEU146		ITA-97		Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1997----	ITA			Insel Ustica, nördlich Sizilien		
10.25642/IPK/GBIS/77885	DEU	DEU146	BRA 1810	5	DEU146		ESP-91		Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1992----	ESP	ERROR: java.lang.IllegalArgumentException: Latitude 41649360*100.0°N is out of range (±90°).		Spanien, Region: Katalonien, Sammelort: Malgrat de Mar	413859N	41.64
10.25642/IPK/GBIS/36939	DEU	DEU146	BRA 1727						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1987----	ITA	ERROR: java.lang.IllegalArgumentException: Latitude 38015028*100.0°N is out of range (±90°).		San Ambrogio, Prov. de Palermo, Sizilien	380059N	38.01
10.25642/IPK/GBIS/36518	DEU	DEU146	BRA 1039						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1976----		OK				
10.25642/IPK/GBIS/69108	DEU	DEU146	K 9372	6			ITA-94/1		Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1994----	ITA	ERROR: java.lang.IllegalArgumentException: Latitude 38215028*100.0°N is out of range (±90°).		Insel Ischia, Golf von Neapel, Ort: Parco, am Rande der Macchie	381859N	38.31
10.25642/IPK/GBIS/46542	DEU	DEU146	BRA 3042						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				1988----		OK				
10.25642/IPK/GBIS/1747919	DEU	DEU146	BRA 2961						Brassica	fruticulosa	Cirillo	subsp. fruticulosa				20080513	ITA			Sizilien, Messina		

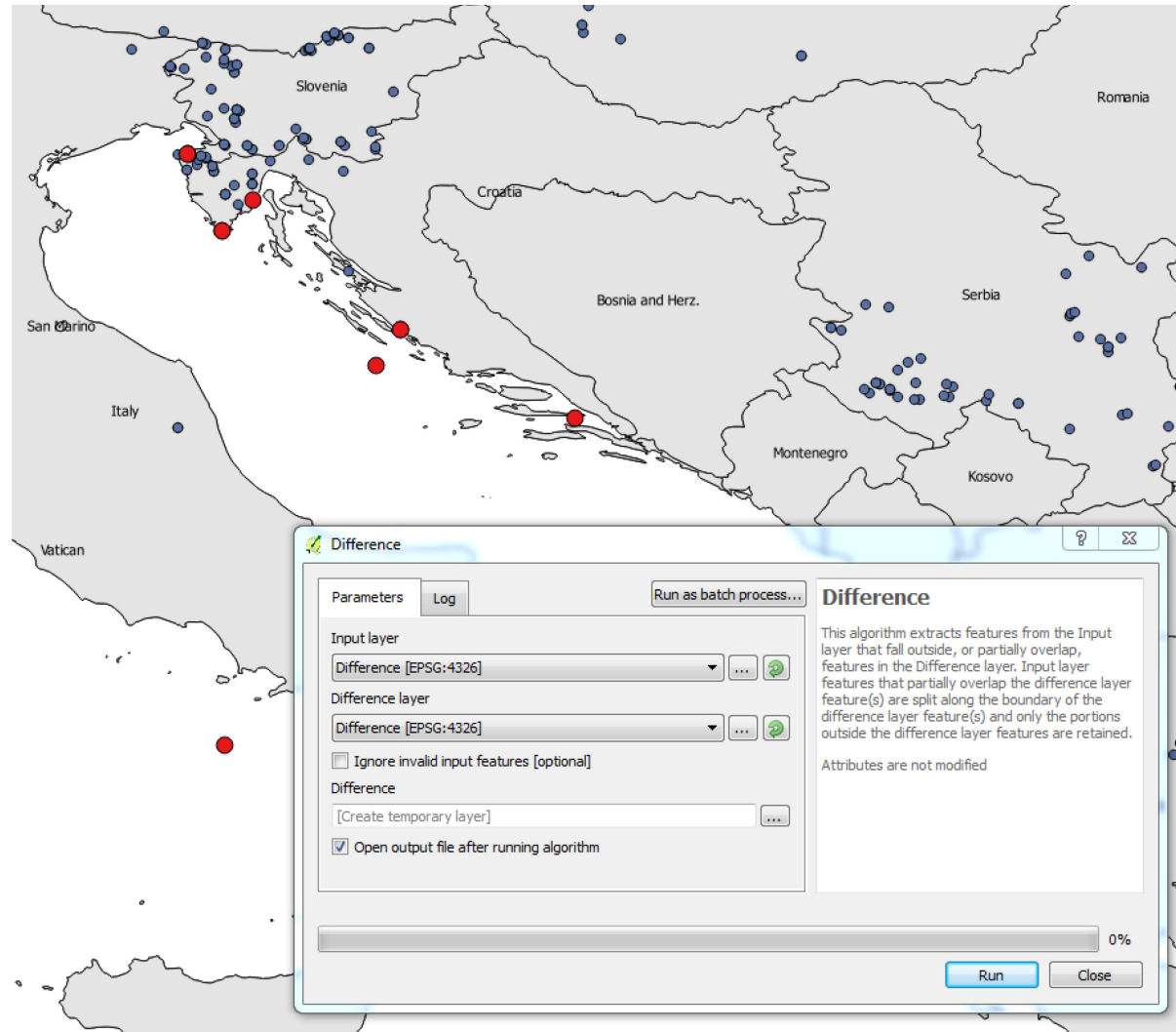
# Correctness of information

Visualising your accessions



# Correctness of information

Finding „sea food“



## Correctness of information

- Some useful links for handling georeferencing data
  - <http://www.capfitogen.net/en/>
  - <https://validator.genesys-pgr.org/>
  - <https://www.latlong.net/>
  - <https://coordinates-converter.com/>
  - <http://www.geo-locate.org/web/WebGeoref.aspx>

# Completeness of information

- 45 passport data descriptors in EURISCO-MCPD
  - 4 mandatory
  - 41 optional
- Often, only limited information about certain accessions
- Some descriptors only sparsely populated
- In many cases, information available in the respective information systems, but not in EURISCO

▼ National inventory

National Inventory Code **BGR**  
National Inventory **Bulgaria**

▼ Holding institute

*How to get access to germplasm:*  
*EURISCO does not provide the possibility to order accessions directly. The requests should be addressed to the holding institutions. For addresses and contact details you can check the [FAO-WIEWS](#) database. The ECPGR Secretariat ([l.maggioli@cgiar.org](mailto:l.maggioli@cgiar.org)) can also be contacted for further information.*

Institute Code **BGR001** ([Contact details on FAO-WIEWS website](#))  
Institute Name **Institute for Plant Genetic Resources 'K.Malkov', Sadovo, Plovdiv district, Bulgaria**

▼ Accession

Accession Number **1982-HOR-VU-84**  
Accession Names **Cernomorec**  
Crop Names **barley**  
MLS Status **unknown**  
AEGIS Status **unknown**

▼ Taxonomy

Genus **Hordeum**  
Species **vulgare**  
Species Authority **L.**  
Subtaxa **convar. distichon var. nutans**  
Subtaxa Authority **(Rode.) Alef.**

▼ Acquisition/storage

no data found

▼ Collection

no data found

▼ Donor

no data found

▼ Breeder

no data found

▼ Other

Other Numbers **BGR001:82105243**

# Completeness per descriptor (whole EURISCO)

Descriptor	Completeness [%]
<b>GENUS</b>	<b>100</b>
<b>NICODE</b>	<b>100</b>
<b>INSTCODE</b>	<b>100</b>
<b>ACCENUMB</b>	<b>100</b>
SPECIES	98.52
STORAGE	95.65
SPAUTHOR	92.13
CROPNAME	81.83
ACQDATE	77.52
SAMPSTAT	72.27
MLSSTAT	68.60
ACCEURL	58.08
COLLSRC	57.36
ORIGCTY	55.92
AEGISSTAT	54.70

Descriptor	Completeness [%]
ACCENAME	46.99
DONORNUMB	46.60
DUPLSITE	42.95
DONORNAME	42.48
BREDCODE	37.17
BREDNAME	35.38
DUPLINSTNAME	33.40
ANCEST	30.38
DONORCODE	25.76
SUBTAXA	22.12
COLLNUMB	21.52
COLLSITE	21.24
COLLDATE	20.40
HISTORIC	20.24
COLLCODE	19.08

Descriptor	Completeness [%]
COLLNAME	15.41
OTHERNUMB	14.42
ELEVATION	13.45
LATITUDE	12.94
LONGITUDE	12.92
DECLATITUDE	12.87
DECLONGITUDE	12.87
SUBTAUTHOR	12.31
PUID	11.05
REMARKS	6.24
COLLMISSID	4.49
COORDDATUM	1.50
COORDUNCERT	0.94
GEOREFMETH	0.63
COLLINSTADDRESS	0.50

as of 2023-08-30



## Passport completeness index (PCI)

- Following van Hintum et al., Quality indicators for passport data in *ex situ* genebanks, *Plant Genetic Resources*, 9(3):478-485, 2011; adapted to EURISCO-MCPD 2
- Index between 0 (lowest quality) and 10 (highest quality)
- 60% of score independent of population type
- 40% of score depending on population type

# Passport completeness index (PCI)

Independent of population type

Descriptor	Score	Condition	Remark
NICODE	0		mandatory
INSTCODE	0		mandatory
ACCENUMB	0		mandatory
GENUS	0		mandatory
PUID	40		
SPECIES	90	if GENUS is not null	
SPAUTHOR	5	if GENUS+SPECIES are not null	
SUBTAXA	45	if GENUS+SPECIES are not null	
SUBTAUTHOR	5	if GENUS+SPECIES+SUBTAXA are not null	
CROPNAME	45		
ACQDATE	30		
SAMPSTAT	80		
DONORCODE	50		
DONORNAME	0 or 20	if DONORCODE is null	
DONORNUMB	50 or 20	if DONORCODE is null	
OTHERNUMB	35		
DUPLSITE	30		
DUPLINSTNAME	0 or 15	if DUPLSITE is null	
STORAGE	20		
REMARKS	0		
ACCEURL	40		
MLSSTAT	15		
AEGISSTAT	15		
HISTORIC	5		

# Passport completeness index (PCI)

Depending on population type

	Wild/weedy		Landrace		Breeding/research material		Cultivar		Other/unknown	
Descriptor	Score	Condition	Score	Condition	Score	Condition	Score	Condition	Score	Condition
COLLNUMB	60		40		0		0		20	
COLLCODE	40		30		0		0		20	
COLLNAME	0 or 20 if COLLCODE null		0 or 15 if COLLCODE null		0		0		0 or 10 if COLLCODE null	
ACCENAME	0		50		80		160		40	
ORIGCTY	75		75		35		35		35	
COLLSITE	20 or 70 if LATITUDE/LONGITUDE null		15 or 45 if LATITUDE/LONGITUDE null		0		0		10 or 20 if LATITUDE/LONGITUDE null	
LATITUDE	60 if LONGITUDE not null		40 if LONGITUDE not null		0		0		15 if LONGITUDE not null	
LONGITUDE	60 if LATITUDE not null		40 if LATITUDE not null		0		0		15 if LATITUDE not null	
GEOREFMETH	5		5		0		0		5	
ELEVATION	20		15		0		0		5	
COLLDATE	30		30		0		0		10	
BREDCODE	0		0		115		85		10	
BREDNAME	0		0		0 or 55 if BREDCODE null		0 or 40 if BREDCODE null		0 or 10 if BREDCODE null	
ANCEST	0		10		150		100		40	
COLLSRC	30		50		20		20		25	

# Development of completeness

	EURISCO AC meeting 2016	EURISCO AC meeting 2018	EURISCO AC meeting 2021	ECPGR SC meeting 2023
Accs. with collecting information	587,391	796,298	841,625	862,437
No. of different collecting sites	91,808	106,301	112,961	112,929
Accs. with geographic coordinates	188,456 (32 % of accessions with collecting information)	166,984 (21% of accessions with collecting information)	215,424 (26% of accessions with collecting information)	266,476 (31% of accessions with collecting information)
Accs. with donor information	1,161,631	1,178,522	1,199,810	1,200,514
Accs. with country of origin	960,334	1,075,327	1,136,236	1,164,578
Accs. with AEGIS flag	28,901	47,049	65,267	70,426
Accs. with PUID	0	32,651	226,936	230,645

## Gaps in EURISCO

- Still gaps in EURISCO
- For example, discrepancies between crop databases and EURISCO

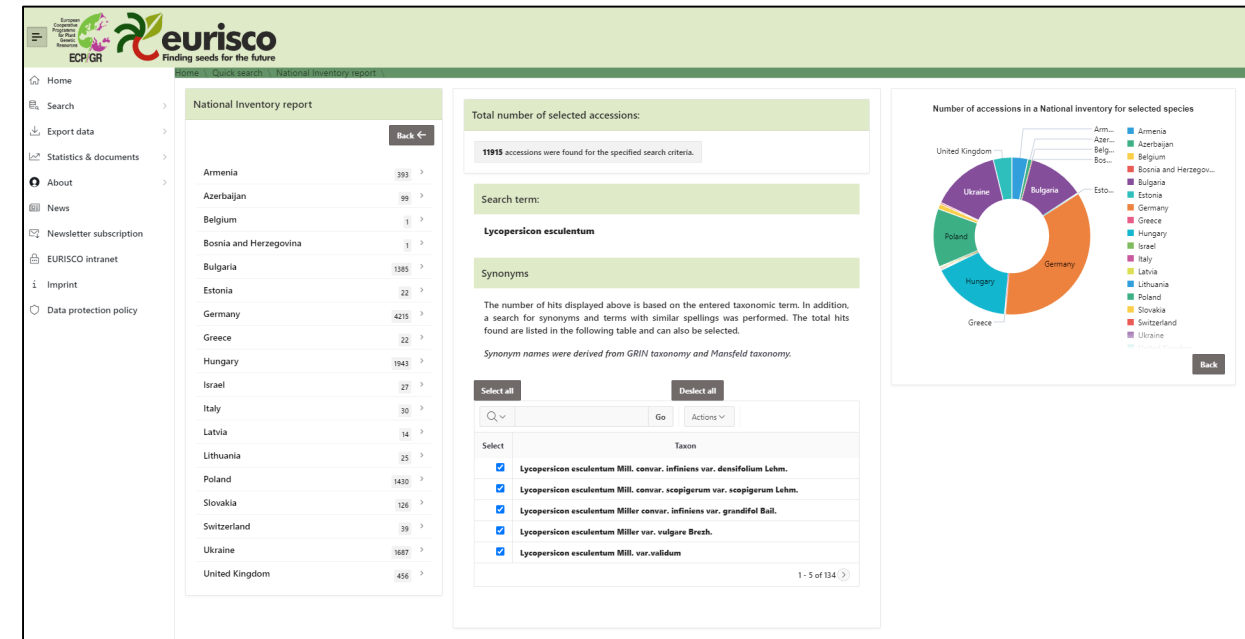
ECCDB	Total number of accessions in ECCDB	Number of ECCDB accessions missing from EURISCO	Proportion of ECCDB accessions missing from EURISCO
ECPGR Perennial Medicago Database	7,928	499	6%
ECPGR Pisum Database	32,503	10,880	33%
ECPGR Vicia faba Database	12,475	7,301	59%
ECPGR Trifolium Database	17,089	1,421	8%

# Challenges on passport data - taxonomy

- Challenges
  - Data from >400 institutes
    - Different taxonomic schools, opinions, traditions
    - No uniform scientific names, e.g. different author abbreviations
    - Misspellings
  - Knowledge on data background needed for searches
    - For example, *Solanum lycopersicum* L. vs. *Lycopersicon esculentum* Mill.
- Improvement of taxonomic search
  - Automatic mapping against public repositories
  - Identification of synonym candidates
    - GRIN, Mansfeld  
+ taxonomic terms accepted in EURISCO (based on user feedback)
  - Obtaining more complete search results
  - However, limited to available data!

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- Rework of the search interface
  - Allows to include synonyms
  - Shows the distribution of matching types
  - Significant performance improvement



The screenshot shows the EURISCO National Inventory report for *Lycopersicon esculentum*. The interface includes a navigation menu on the left, a table of accessions by country, a search results summary, a search term input field, a list of synonyms, and a pie chart showing the distribution of accessions by country.

Country	Accessions
Armenia	393
Azerbaijan	99
Belgium	1
Bosnia and Herzegovina	1
Bulgaria	1385
Estonia	22
Germany	4215
Greece	22
Hungary	1943
Israel	22
Italy	30
Latvia	14
Lithuania	25
Poland	1430
Slovakia	126
Switzerland	39
Ukraine	1687
United Kingdom	456

Total number of selected accessions: 11915 accessions were found for the specified search criteria.

Search term: *Lycopersicon esculentum*

Synonyms:  
*Lycopersicon esculentum* Mill. conv. *infinitum* var. *densifolium* Lehm.  
*Lycopersicon esculentum* Mill. conv. *scopigerum* var. *scopigerum* Lehm.  
*Lycopersicon esculentum* Miller conv. *infinitum* var. *grandifol* Bail.  
*Lycopersicon esculentum* Miller var. *vulgure* Breda.  
*Lycopersicon esculentum* Mill. var. *validum*

Number of accessions in a National Inventory for selected species (Pie Chart):  
Germany (4215), Hungary (1943), Poland (1430), United Kingdom (456), Bulgaria (1385), Ukraine (1687), Israel (22), Greece (22), Estonia (22), Slovakia (126), Switzerland (39), Armenia (393), Azerbaijan (99), Belgium (1), Bosnia and Herzegovina (1), Latvia (14), Lithuania (25), Italy (30).

# Questions

- Where are the difficulties?
- How can the EURISCO coordination support?
- What additional support would be useful?