PRO-GRACE
PROMOTING A PLANT GENETIC RESOURCE COMMUNITY FOR EUROPE

Funded by the European Union

What has been achieved in PRO-GRACE? I. Inventory of PGR information not represented in EURISCO

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PGR Conservation, Management and Utilization

Diverse actors & stakeholders, objectives, priorities

Heterogeneity of living, biological material

Multiplicity of conservation and management strategies

Evolution of the field and new opportunities

Variation in technical protocols

Regulatory, legal, ethical frameworks

Environmental, socio-economic pressures

PGR Science: Data Domains

Cross-cutting data

Passport data; fundamental characterization and evaluation data; phytosanitary data; Image/ media; collecting missions/ ecogeographic surveys; legal documentation; ABS compliance records; policy agreement (meta)data

Ex situ-specific data

Seed health and viability; storage data; regeneration data; management and inventory data; distribution data; safety duplication data

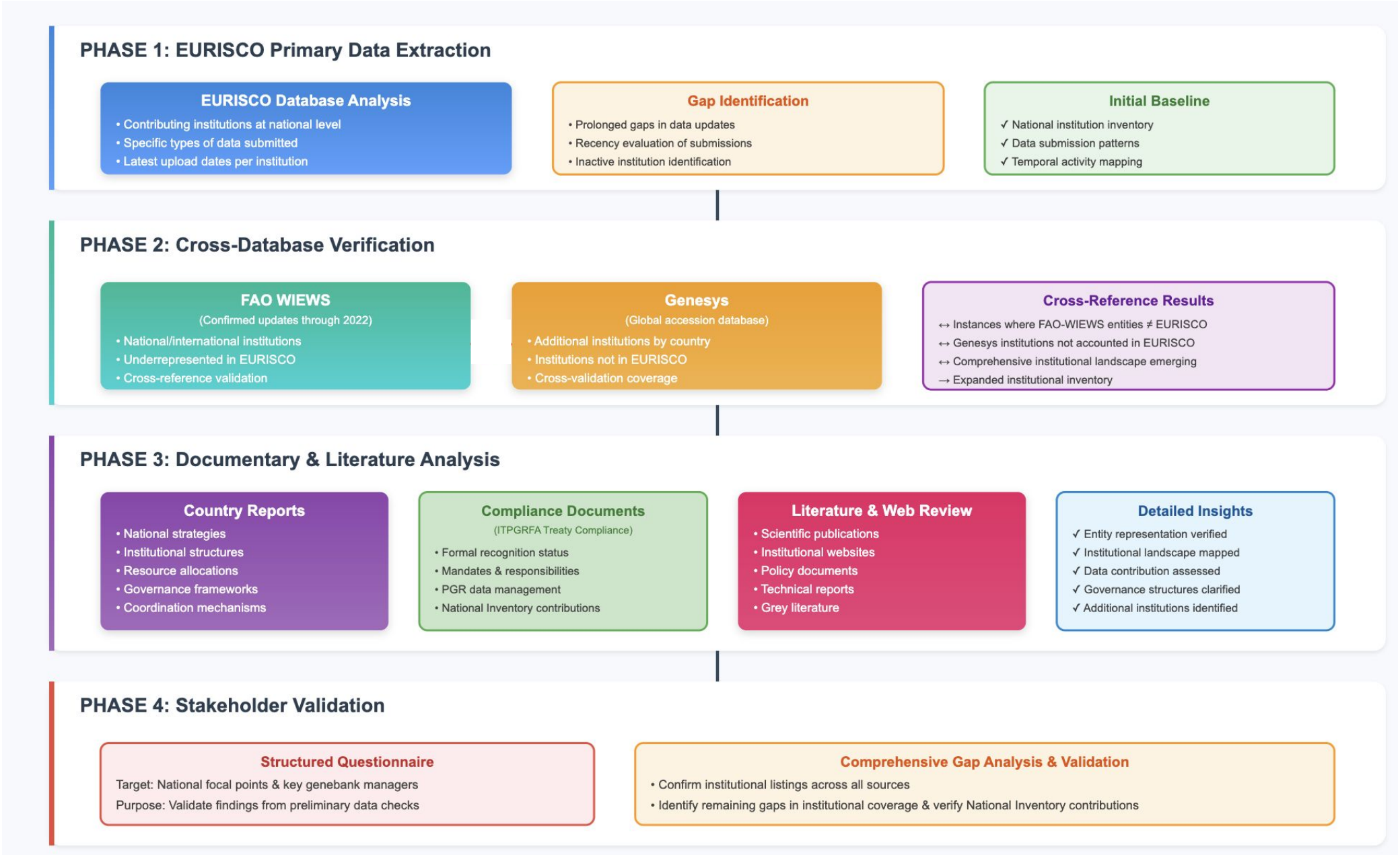
In situ- and on-farm -specific data

Population size/ abundance data; population structure and demography data; threats and risk assessment data; habitat/ site condition data; associated species and ecological interactions; reproductive biology; Land tenure and management regime data; conservation interventions data; monitoring and trend data; informal seed system (exchange) data; community seed bank/ local repository data; traditional knowledge, cultural and ethnobotanical use data; farmer variety description data; community agreements and protocols (meta)data

Research-oriented (utilization) data

Genomic data, epigenetic data, cytogenetic data, transcriptomic, proteomic, metabolomic data, High-throughput phenotyping and image data; pre-breeding and breeding data

Inventory of PGR information not represented in EURISCO: Methodology



EURISCO: Current Scope

any plant-derived genetic material that holds present or potential value for food and agriculture (**food crops, forages, wild-and-weedy species, including cultivars, landraces, farmers' varieties, breeding lines, genetic stocks and research material, https://eurisco.ipk-gatersleben.de**)

genetic materials that are, in principle, **"professionally managed"** and, crucially, **"accessible"** to request by users, i.e., accessions maintained by genebanks and similar institutes that can reliably distribute samples, typically through formal agreements such as the SMTA.

Shaw et al., 2023
Kotni et al., 2023
Kreide et al., 2019
Weise et al., 2017

Every accession listed in EURISCO corresponds to conserved seeds or plants that users can, in principle, obtain (potentially available).

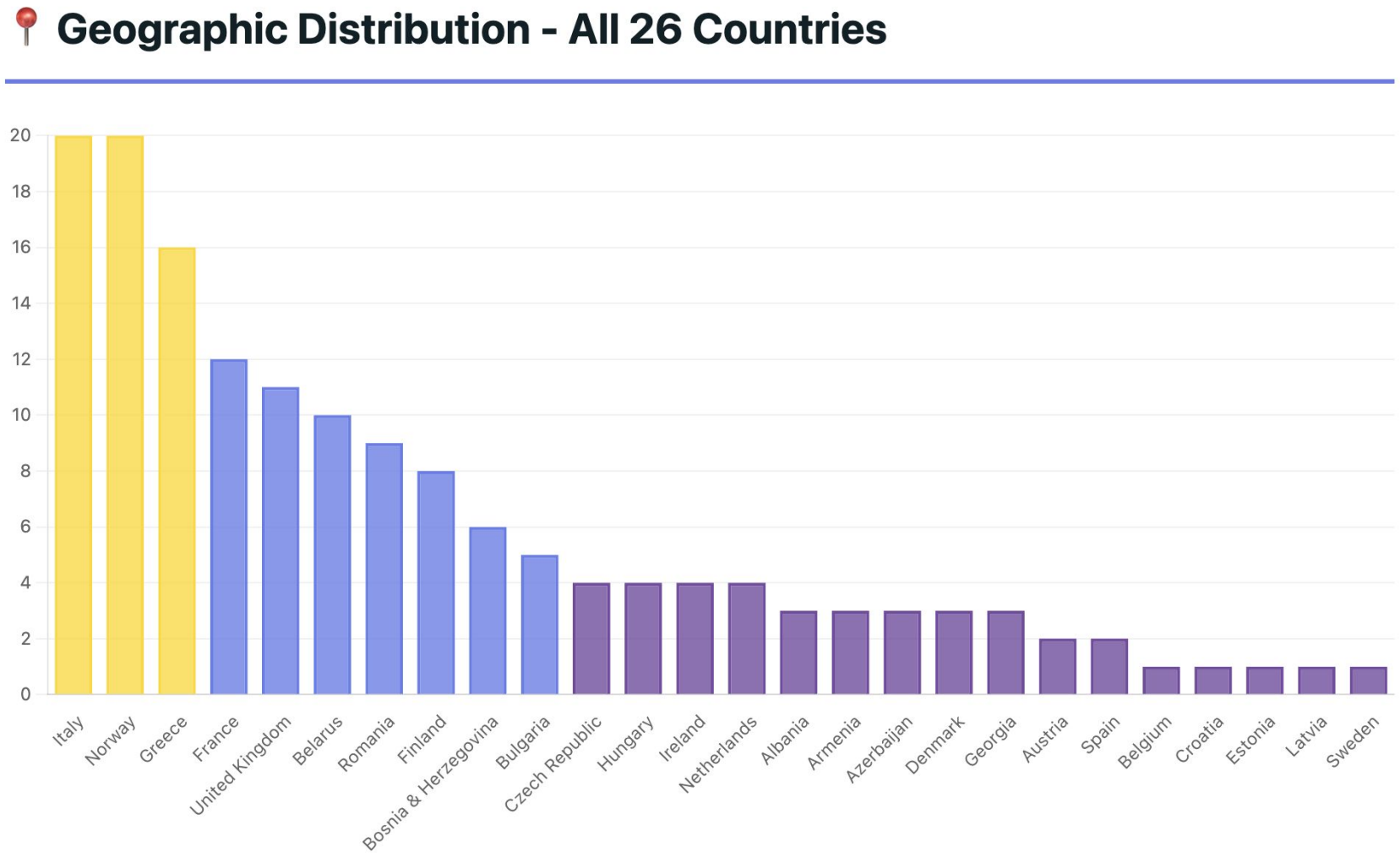
Inventory of PGR information not represented in EURISCO

Approx. 157 institutions

26 Countries

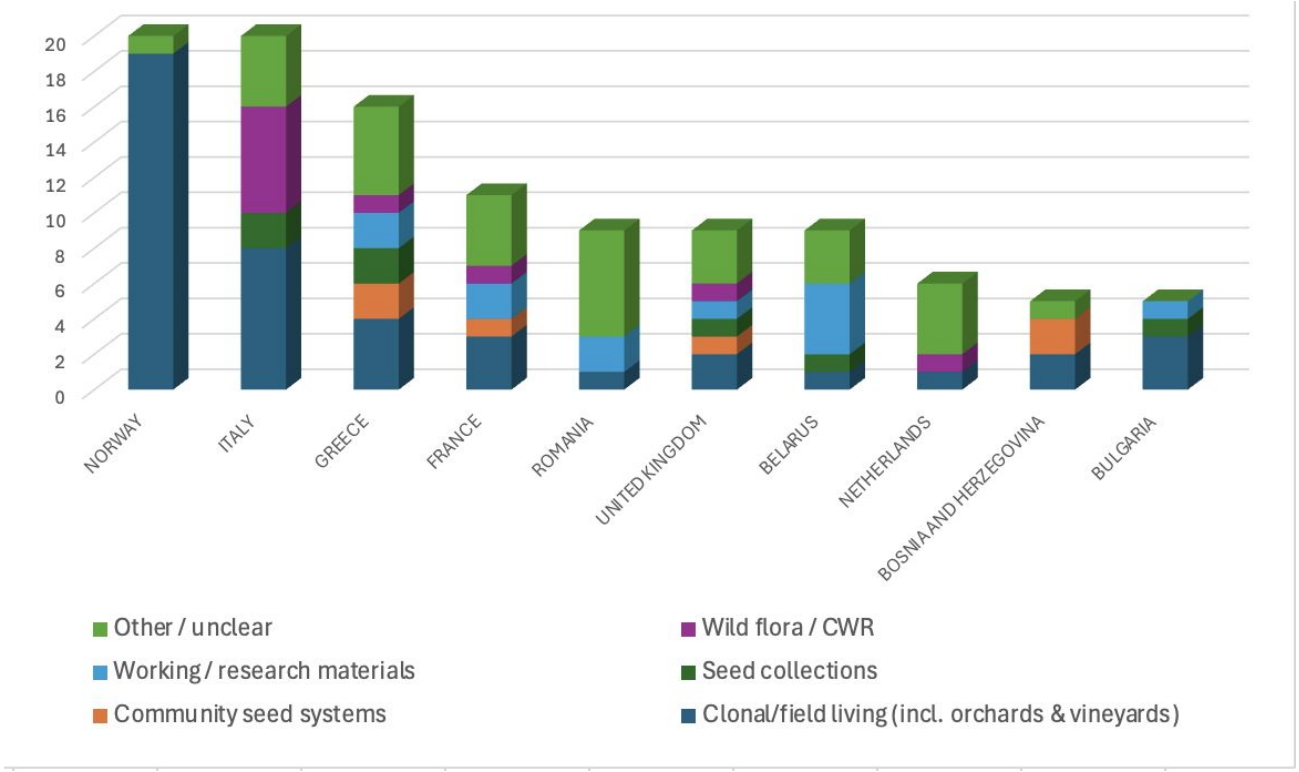
Governmental/Public Research: 80 (51.0%)
University: 23 (14.6%)
NGO/CSO: 22 (14.0%)

Inventory of PGR information not represented in EURISCO



Inventory of PGR information not represented in EURISCO

Collection type



Research/ Working Collections

Initial Material Acquisition

Materials acquired for specific research objectives and experimental purposes

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Active Research & Experimentation

Breeding lines multiplied, recombined, and modified based on ongoing projects

↓

Fluid Inventory Management

Lines retained, discontinued, or replaced as studies conclude

↓

Informal Data Storage

Information stored in departmental archives, spreadsheets, or scattered databases

↓

Limited Long-term Conservation

Material at risk when projects end or researchers retire

Botanical gardens and arboreta

Different Documentation Standards

Botanical protocols don't translate to agricultural passport data systems

Varying Collection Types

Living collections (short-term, public displays, exhibit plantings) vs. germplasm accessions for distribution

Limited Administrative Support

No clear benefits perceived for documenting plants in national PGR programs

Institutional Mission Mismatch

Research/education focus vs. agricultural breeding material distribution

Proposed considerations when including certain collections:

1. **Working collections/ research materials**
   - Must be unique/non-redundant
   - Established breeding/research value required
   - Minimum passport data standards mandatory
   - Must commit to (S)MTA agreements for sharing
   - Sufficient infrastructure (e.g., secure storage, regeneration protocols, staffing) to ensure the collection's long-term physical maintenance.

2. **Non-PGRFA materials**
   - Must demonstrate agricultural/research value
   - There is documented usage in breeding, genetic mapping, or foundational research that underpins improvements in PGRFA.
   - The material aligns with broader interpretations of PGR under the CBD or ITPGRFA, which acknowledge any plant-derived material of value for agriculture or research
   - Availability of passport data

Proposed considerations when including certain collections:

3. Botanical Gardens and Arboreta

- contains species or accessions with present or potential value for food and agriculture
- The garden or arboretum maintains passport data
- A system (e.g., a living collection database) is in place to update records over time as plants are added, removed, or relocated within the facility.
- Regeneration or repropagation protocols exist for species that require periodic renewal to ensure they remain viable and accurately identified.
- Able to distribute plant material (e.g., seeds, cuttings, grafts) under appropriate MTAs or similar guidelines.
- Meets regulatory obligations related to plant collection, introduction, and exchange (e.g., CITES for endangered species, the Nagoya Protocol on ABS).
- No unresolved intellectual property, ownership, or provenance issues that would conflict with open documentation in EURISCO.
- The NI or equivalent authority supports the inclusion of the botanical garden/arboretum collection, recognizing its importance for national PGR strategies or biodiversity conservation objectives.

Proposed considerations when including certain collections:

4. Geographical Coverage (overseas or extraterritorial materials)

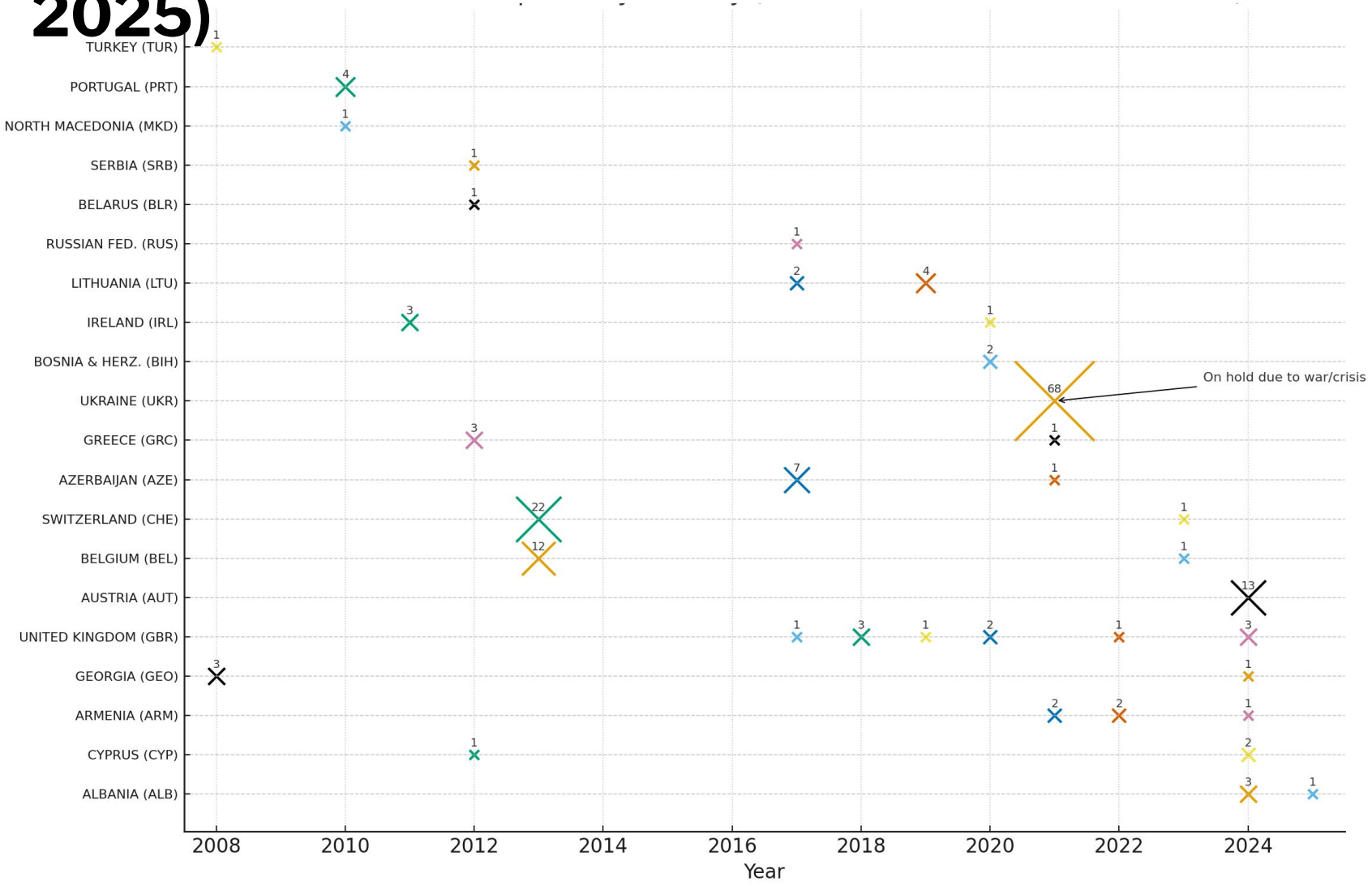
- The collection is officially managed or supported by a European country's national program, or by an institute under European jurisdiction.
- International treaties and relevant bilateral agreements do not prohibit the documentation or exchange of these materials.
- The overseeing entity in the overseas territory is prepared to adhere to EURISCO data standards and protocols.
- As with in-country collections, a minimum threshold of passport data exists.
- Materials from overseas territories bring distinct genetic diversity (e.g., from different agroecological zones) that complements European-based collections.

The ultimate decision to incorporate these institutions rests at the national level.
Several considerations may limit the inclusion of certain collections in a country's NI,

- legibility,
- legal or jurisdictional constraints,
- regulatory barriers
- unclear or restricted germplasm access, and institutional restrictions.

Nevertheless, countries that see strategic value in bringing additional legible collections into their NI, whether for improving overall data visibility and access, strengthening conservation efforts, ensuring compliance with the ITPGRFA, or enhancing local and collaborative research and breeding, are more likely to take the necessary steps for inclusion.

Last Accessions Update by Country (As of February 2025)



Example: Greece

National Inventory	FAO WIEWS code	Institute name	No. of accessions	Last accessions update
GRC (Greece)	GRC001	Cereal Department, Institute of Plant Breeding and Genetic Resources, Thermi - Thessaloniki, Greece	181	2012-08-07
GRC (Greece)	GRC005	Greek Genebank, Institute of Plant Breeding and Genetic Resources, Thermi - Thessaloniki, Greece	5355	2012-08-07
GRC (Greece)	GRC010	Vine Department, Institute of Olive Trees, Subtropical Plants and Viticulture, Lykovrisi - Athens, Greece	567	2012-08-07
GRC (Greece)	GRC012	Deciduous Fruit Trees Department, Institute of Plant Breeding and Genetic Resources, Naousa, Greece	181	2021-04-12

1 - 4

GRC005 last update in EURISCO was in 2012 with 5,355 accessions, while its actual holdings have since nearly tripled to 15,000 accessions (https://ipgrb.gr/greek-genebank/)

Data type and quality gaps (As of February 2025)

Metadata

- PUID/DOI: Only about 14.21% of the more than 2 million *ex situ* accessions
- Taxonomic discrepancies
- Geographical coordinates: the completeness of critical geographical coordinate descriptors across all datasets currently ranges only from 13.22% to 13.63%,

C&E Data

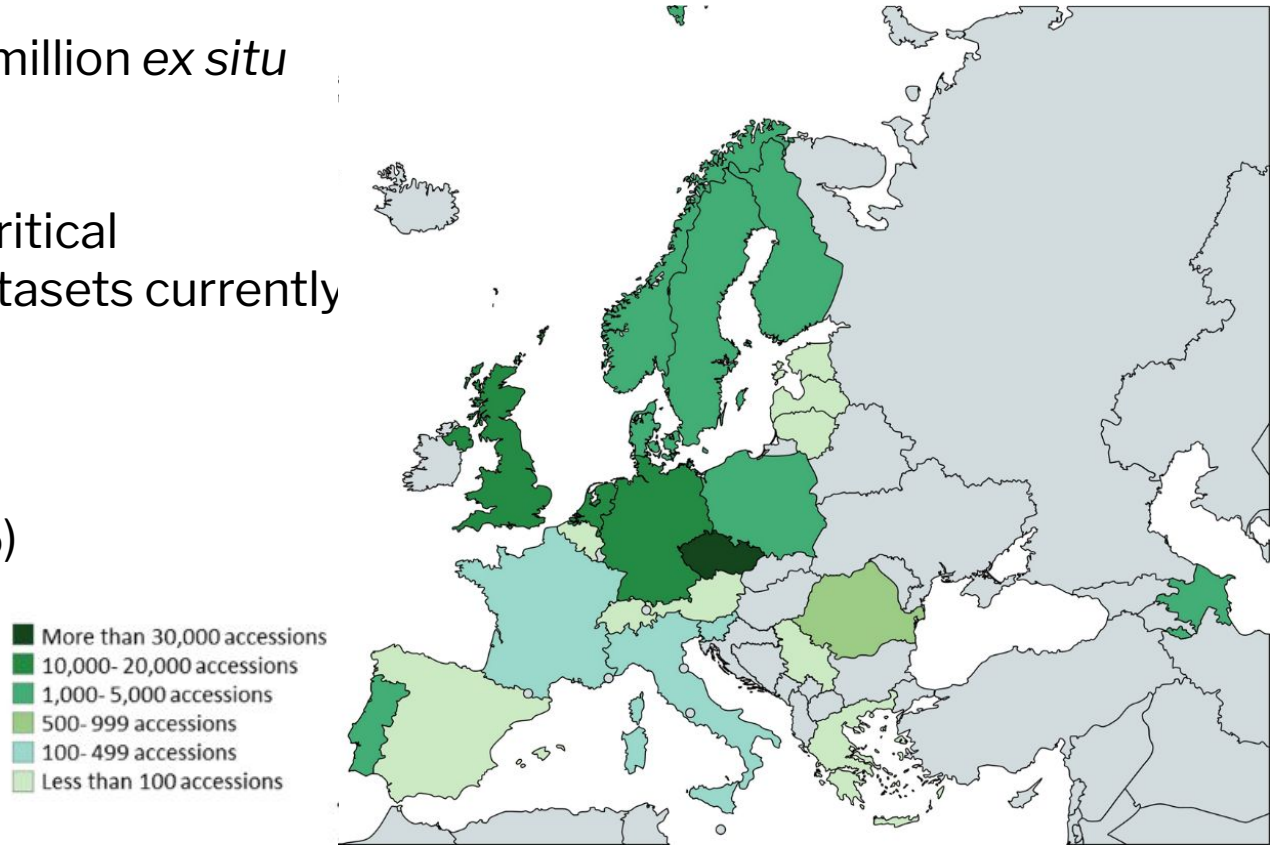
- Limited coverage: Only ~91,779 accessions (4.4%)
- 21 out of 43 member nations
- Lack of standardization

In situ CWR Passport Data

- 11 countries

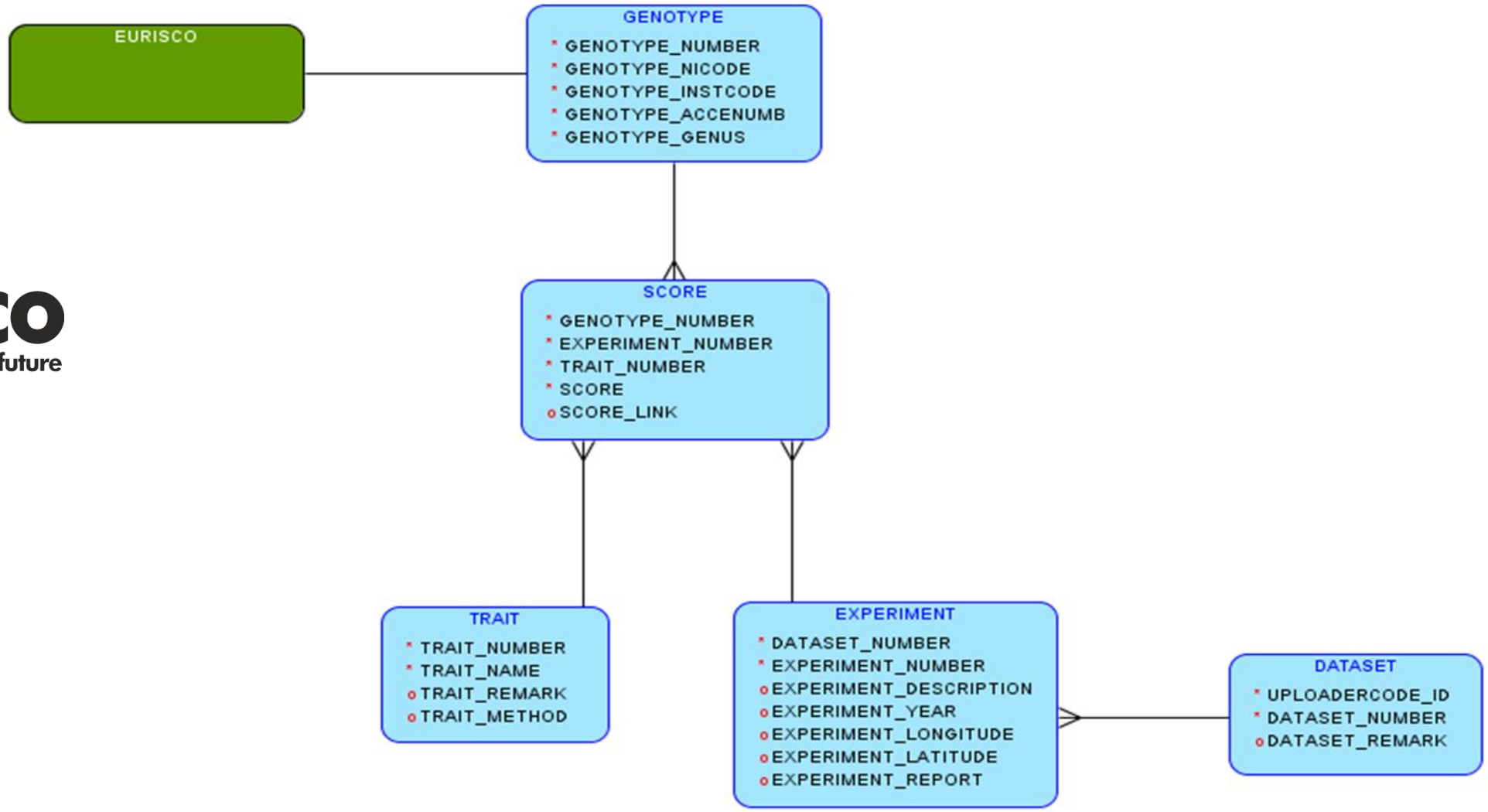
Landraces inventory (On-farm)

Multi-omics Data



Map illustrating the countries (in different shades of green) that have submitted characterization and evaluation (C&E) data to EURISCO.

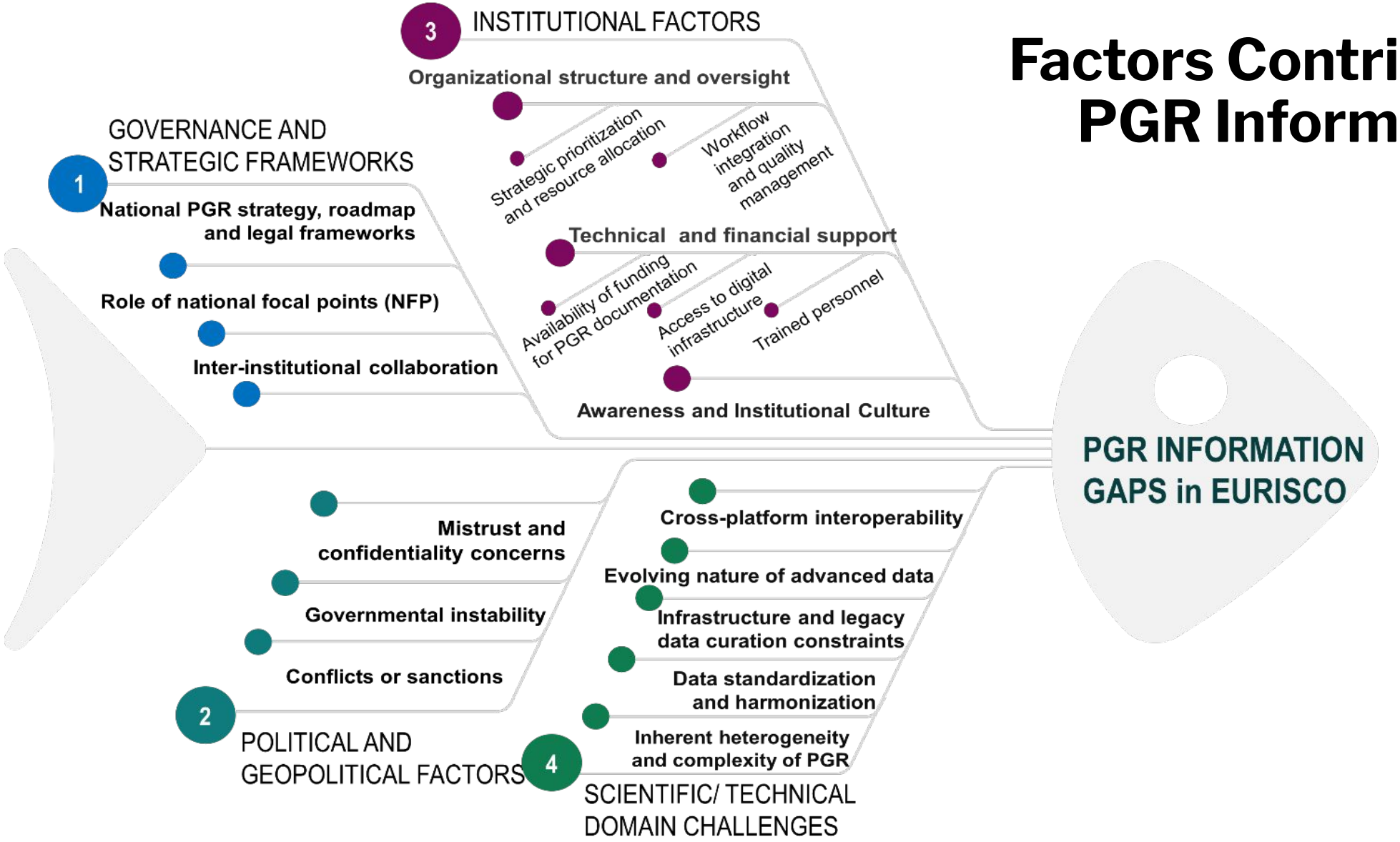
EURISCO's C&E Data Structure



eurisco
Finding seeds for the future

Shaw et al., 2023
Kotni et al., 2023
Kreide et al., 2019
Weise et al., 2017

Factors Contributing to the PGR Information Gaps in EURISCO



s or comprehensive national
en becomes informal,
which leads to substantial
ssions to EURISCO.

at insufficient legislative
ons significantly hinder
the chronic
able accessions.

ciple that each country retains
ernments decide what to share,
ıd how often to update. However,
eate intentional or unintentional
litical and geopolitical conditions.

Examples:

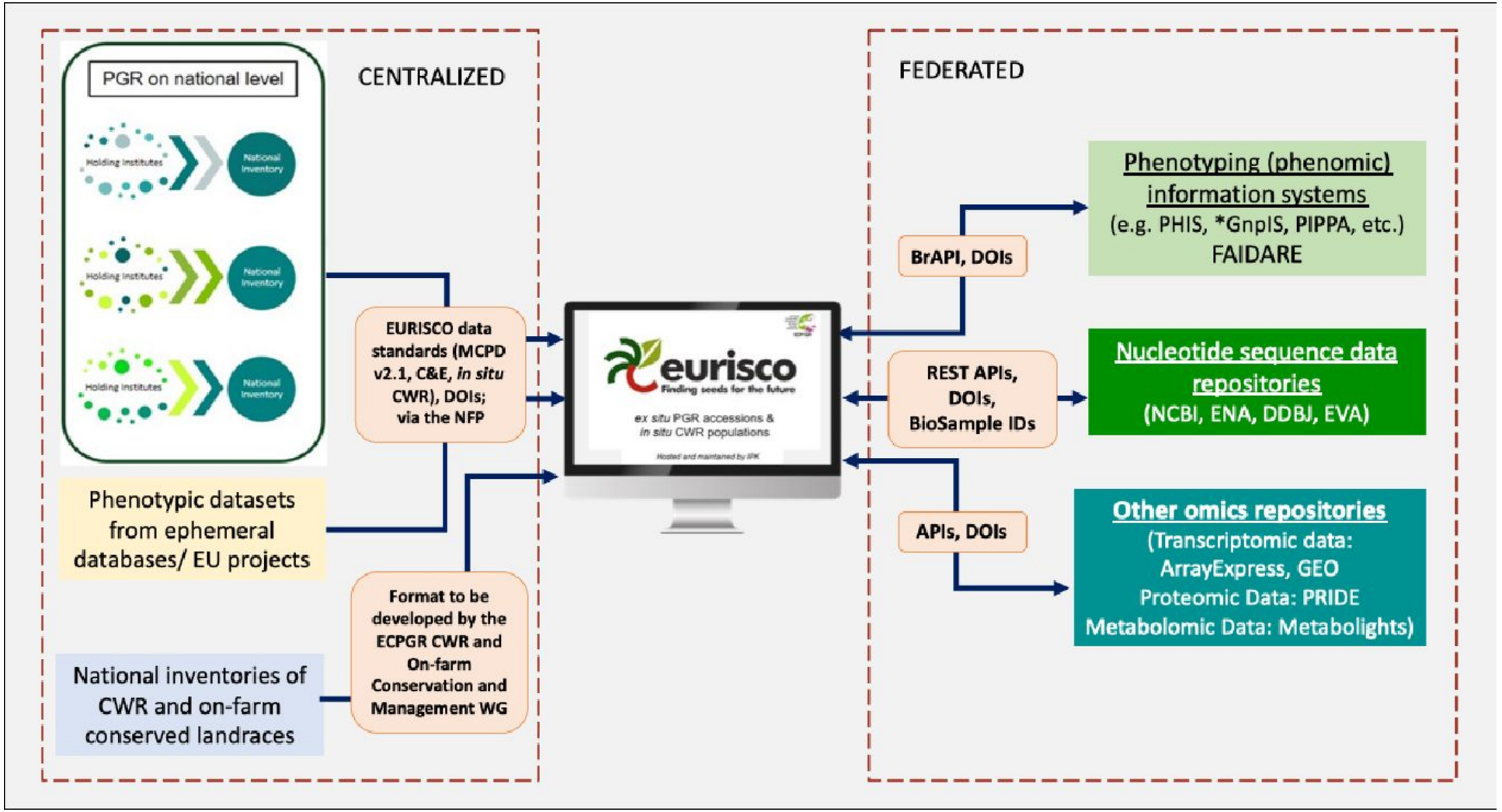
- Ukraine
- Russia and Belarus
- Bosnia and Herzegovina

ine PGR documentation as an
pport this commitment with
staff, and efficient documentation
e typically comprehensive,
dated.

Diverse reproductive systems, life cycles, adaptive traits, taxonomic breadth, and germplasm types require different management, descriptors, and characterization

the evolutionary and dynamic nature of PGR means that information needs evolve over time as scientific understanding advances and new technologies emerge, which may result in temporal gaps in older collection data

Proposed hybrid federated model for EURISCO



Way Forward

- Strengthening Intracountry Coordination and Prioritization
- Address Data Gaps and Ensure Metadata Completeness
- Enhance C&E Data Integration and Capture Project-Derived Phenotypic Data
- Link PGR Data with Omics and Other Advanced Research Tools
- Emphasize User Consultation, Training, and Community Capacity Building

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