

Standard Descriptors and EURISCO Development

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Abstract: The paper gives information about both the genesis, and a survey of, the descriptors used for the documentation of plant genetic resources held in *ex situ* crop collections. The first international documentation standards were developed by the FAO in the 1950s. In 1974, a specific body for plant genetic resources, the IBPGR (International Board for Plant Genetic Resources), was established within the FAO. Since the 1970s, the descriptor lists for main crop collections have been developed, including passport descriptor sets. For the most part, the passport descriptors were common to all crops, with only slight differences. In 1997, the first attempt to create a standard set of descriptors resulted in 24 passport descriptors developed by FAO and IPGRI (International Plant Genetic Resources Institute) working in cooperation. In 2001, the official Multi-Crop Passport Descriptor list (MCPD) was published, including a revised standard set of 28 descriptors. The European *ex situ* crop catalogue (EURISCO) enlarged the standard set of passport descriptors by adding 6 additional fields in 2002; and another 2 new descriptors were added in November of 2008. A global level of data compatibility is preferred; therefore projects aimed at world-wide utilization and standardization of systems, such as GRIN-Global, and Accession-Level Information System (ALIS), are supported.

Keywords: documentation; European crop catalogue; *ex-situ* collection; plant genetic resources

The need to develop a standard means of communication or dictionary of terms was obvious from the beginning of work with plant genetic resources (PGR) on an international level. Many important agreements and conventions stress the importance of information exchange. Some examples are: the Convention on Biological Diversity (CBD), particularly its Clearing House Mechanism (CHM); the Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture; and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), as well as others.

From the start, the descriptor lists were used for: systematic work with crop collections; as a tool for orientation in breeders' collections from the 1930s and 1940s; or as manuals for the evaluation of collections, as well as the documentation of materials collected by expeditions.

The first international standards were implemented in descriptor lists, which were developed by FAO for the comparable description of traits within PGR crop collections. Already by the 1950s and 60s, FAO had acknowledged the importance of the study of plant genetic resources, and simultaneously of the threat of genetic erosion.

IBPGR descriptor lists

The International Board for Plant Genetic Resources (IBPGR) was established within the FAO in 1974. Since its beginning, it concentrated on the development of common rules and methodologies for work with PGR. The descriptor lists were compiled with the first part including passport standards which were composed of accession information, taxonomy, and collecting data. The second part, the characterization and evaluation,

consisted of agronomic characteristics, phenology, environmental adaptability, as well as biochemical and economic characteristics. The third part was devoted to germplasm maintenance, storage, regeneration, distribution, and use of the germplasm.

The first IBPGR/FAO descriptor list was published in 1977, for cultivated potato PGRFA collections. In the period 1977 to 1985, descriptors were published for main field crops. Their first part consisted of a set of 25 to 27 passport descriptors, but the descriptor sets were slightly different for different crops. Descriptor lists specify the name of the descriptor, the method of scoring, or a link to the relevant lookup table and the proposed field name.

Eastern European activities

The Eastern portion of Europe was once politically separated, but the germplasm activities there were also intensive. Parallel with the IBPGR descriptor lists, international COMECON descriptor lists were developed. In 1988, a universal standard set of 33 descriptors, valid for all crops, the COMECON Passport Descriptors, was compiled (ROGALEWITZ 1988). This document, based on IBPGR descriptor lists, was published by the Working Group on Documentation which was composed of specialists from IPK Gatersleben, VIR St. Petersburg, IIPR Sadovo, IHAR Radzikow, and RICP Prague. The working group's efforts were aimed at the creation of the central international PGR database, and the common passport portion was the prerequisite for standardization. The Eastern Europe's period of separation ended in 1989, and activities were re-directed into an integrated European platform.

IPGRI descriptors

IBPGR was transformed into an independent International Plant Genetic Resources Institute (IPGRI) in 1994, and is currently known as Bioversity International. More than 120 international descriptor lists were published for cultivated species and genera, many in bilingual versions under IPGRI and FAO cooperation. IPGRI international descriptor lists consist of passport, management, environment and site, characterization, as well as

evaluation descriptors. The passport part is composed of a set of descriptors valid for all crops. Most of the IPGRI descriptor lists are freely available from the Bioversity International webpage.

Multi-crop passport descriptors

The need to establish standards for information exchange across crops was obvious in the context of crop database development and the advancements in information technologies. The common passport part of the existing IPGRI descriptors was the basis for the multi-crop passport set of descriptors. A meeting of European documentation specialists in Budapest in the autumn of 1996 accelerated the formulation of the IPGRI/FAO Multi-Crop Passport Descriptors (MCPD).

The first draft version of the multi-crop passport descriptors, released for comments in February 1997, included 24 descriptors in total (18 proposed by IPGRI and 6 by FAO). The second revised standard version, composed of 28 descriptors (26 from IPGRI, 2 from FAO), was published in December 2001. The standard passport descriptor set includes basic information: accession data (holding institute code, accession number, accession name and synonyms, other numbers, taxonomy, country of origin, status, donor and breeder information, pedigree, acquisition date, etc.); collecting data (collecting number, date, institute, collecting source type, geographic coordinates, description of collecting site, etc.); storage information (type of storage, localization of safety duplication); and remarks related to any passport field. The list of MCPD defines the standard descriptor names and their fixed sequence numbers of 1 to 28, provides an explanation of the content, coding schemes, field names, and clarifications of field content. In particular, the coding schemes or the defined lookup tables for countries (ISO-3166 three-letter enlarged version) and institutions (FAO INSTCODE) are used as important international standards.

EURISCO descriptors

EURISCO is the European PGR *ex situ* Catalogue and is available on the internet. A revised MCPD version was used as a basic element of the EURISCO descriptors, which were specified in June 2002. There are 6 additional descriptors to MCPD:

4 descriptors are designated for non-standard institutions (for institutes of donor, breeder, collector, safety duplicate not included in FAO INSTCODE); one descriptor for URL of the relevant web available PGR information, and one descriptor for the country of the national inventory. Additional descriptors are numbered 0 and 29 to 33. At the time of its origin, EURISCO altogether included 34 passport descriptors; four of them were mandatory (national inventory code, holding institution code, genus, and accession number), because their combination creates a unique accession identifier within the EURISCO system.

EURISCO catalogue

The European *ex situ* crop catalogue (EURISCO) originated as a result of the EU's 5th Framework Programme project EPGRIS (European Plant Genetic Resources Infra-Structure). The Catalogue represents a "one-stop shop" for passport information preserved within European collections. It was posted on the web in September of 2003. At that time, 31 National Focal Points (NFP) representing 35 national PGR inventories provided passport information on approximately 882 038 genetic resources.

Currently, the EURISCO Catalogue holds information on roughly 1 126 818 records received from 38 NFPs, representing 41 countries.

The system consists of two parts. The first is an internal module, which is designed for data upload by the providers (NFPs). Data is delivered via an automatic update mechanism from one accredited contact point per country. Data quality is being tested automatically, before final upload into the system; lastly, error reports, highlighting incorrect records are generated. Each country has full responsibility and sovereign rights to decide on the data's availability, accuracy, and the upload frequency of its national inventory.

The second part was designed as a public web-search application. Since the end of the EPGRIS project in October 2003, EURISCO's development was reduced; despite the fact that the user-friendliness of the application was not very high. Bioversity and ECPGR (European Cooperative Programme for Plant Genetic Resources) took-over the responsibility for further EURISCO development and maintenance. Recently, considerable improvements in function, speed, and layout of the public web-tool were made.

New EURISCO descriptors

The EURISCO Catalogue, a comprehensive and centralised database for the European region, could also be used as an information service, related to the International Treaty on PGR (ITPGR). In November 2008, two new descriptors (34 and 35) were implemented into the standard set: the Multilateral System Status (MLSSTAT) relevant to Annex 1 of the ITPGR; and the AEGIS Status (AEGISSTAT), designating implementation into the European Genebank Integrated System.

These last two new descriptors are as follows:

34 – MLS Status (MLSSTAT)

The coded status of an accession, with regard to the Multilateral System (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture. It provides information on whether the accession is included in the MLS (0 – not part of the MLS; 1 – part of the MLS). If the MLS status is unknown, the field stays empty.

35 – AEGIS Status (AEGISSTAT)

The coded status of an accession, with regard to the European Genebank Integrated System (AEGIS). Provides information on whether the accession is conserved for AEGIS (0 – not part of AEGIS; 1 – part of AEGIS). If the AEGIS status is unknown, the field stays empty.

Future EURISCO descriptors

Separate from the standard passport descriptors, a set of descriptors was drafted, relating to the Standard Material Transfer Agreement (sMTA) which is a reporting mechanism to the Governing Body, in accordance with Article No. 17 of the ITPGR. Currently, the data flow via EURISCO to the Governing Body has not been agreed upon, but its position as a European central information system provides an optimal background for the reporting mechanism. The draft includes 7 sMTA-related descriptors providing: institution code, sMTA number, date, the total number of transferred accessions, the number of accessions per genus, means of utilization, and a comment. The sMTA reporting mechanism will not trace the detailed transfer of accessions. It will map the numbers of samples used and record the type of utilization in the Multilateral System of the ITPGR.

It is envisaged that EURISCO will be a comprehensive information source, including characterization and evaluation data, as well. A module for processing the characterization and evaluation data should be developed, and relevant standards designed for those descriptors. There is a question, however, of how to manage EURISCO in relation to parallel Central Crop Databases, which already contain the first characterization and evaluation data. The inclusion of *in situ* and on-farm data into EURISCO also needs to be discussed; consequently, there will be a need for new standard descriptors. Recently, the new Crop Wild Relatives (CWR) Global Portal was launched by Bioversity International, with the support of the UNEP-GEF project, which is an entry point for information on crop ancestors; but the accession data level has not yet been reached.

CONCLUSION

Bioversity International, as a representative of the CGIAR network, has responsibility for PGR standards on the global level, together with the FAO. Their activities are targeted at promoting the universal ability to comprehend different information systems. The Bioversity Programme, “Understanding and managing biodiversity”, particularly Project F07 “Biodiversity Information”, is involved in the development of Global-ALIS (Accession Level Information System), a large data portal allowing data retrieval from distributed sources. EURISCO is one of the segments of the system, along with SINGER (CGIAR crop collections documentation system) and GRIN-Global (developed by USDA/ARS). All of these systems are implemented into the GIGA project, which

will create a framework for crop data exchange on a global level; including an ordering mechanism, and a MLS reporting mechanism to the International Treaty. The Global Crop Diversity Trust provides financial support to all of these world-wide projects.

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