Food and Agriculture Organization of the United Nations

The International Treaty ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Data required for the assignation of Digital Object Identifiers in the Global Information System v.2

08 March 2017

This document describes data to be provided when registering Plant Genetic Resources for Food and Agriculture (PGRFA) in the Global Information System (GLIS) through service that assigns Digital Object Identifiers (DOIs). It does not include detailed formatting instructions, which will be provided by the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of FAO in forthcoming technical documentation; nor does it provide guidelines on the use of DOIs, which are addressed in a separate document[1]. This document builds upon the results of the Global Survey on Descriptors required for PGRFA[2].

Upon registration in GLIS, the PGRFA should physically exist, although provisions are made to maintain record of material that is no longer available.

Based on the information contained in this document, additional training material will be developed along with a few more use cases. The first use case for genebanks is provided in Table 1 as an example.

To facilitate the contribution of information to GLIS reducing the burden on participating institutions, collaboration agreements with other existing data management systems will be established to harvest relevant data wherever possible.

In the following, references are made to DOIs of other PGRFAs related to the one being registered. Obviously, in order to specify such DOIs, the corresponding PGRFA must have been registered in advance. Descriptors associated to the DOI in GLIS are grouped into the following classes[3].

1. CORE DESCRIPTORS

These descriptors are essential for GLIS to offer its core functions. Some of them are fundamental for the registration of material (*Mandatory descriptors*). Others, although not mandatory, should be provided whenever available to support GLIS's more advanced functions.

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[1] *Guidelines for the optimal use of Digital Object Identifiers as permanent unique identifiers for germplasm samples,* 2017. FAO: http://www.fao.org/plant-treaty/areas-of-work/global-information-system/guidelines/en/
[2] Report and Analysis of the Global Survey on Descriptors required for PGRFA material, 2015. FAO: http://www.fao.org/3/a-bp470e.pdf
[3] These classes form an objective classification intended to enhance data quality through helping the registrant to enter correct data. They do not correspond to any subjective classification by "importance" of the descriptors. A mandatory descriptor is not necessarily any more "important" than a highly recommended or additional descriptor. For example, the name of a variety or the country of provenance of a sample may be considered critically important; but they are not always known or applicable and therefore cannot be treated as mandatory.

> **1a.   Mandatory descriptors**. Values for these descriptors must be provided for every PGRFA material in GLIS. The holder is not given the option to enter "unknown", "not applicable" or "other", or to leave the field empty; the PGRFA cannot be registered until valid values have been entered for all mandatory fields.

> **1b.   Highly recommended descriptors**. These descriptors may not be always available. Valid values must be entered if known, but missing values are allowed.

2. Additional descriptors. These descriptors are relevant in the appropriate context, depending on the values assigned to some core descriptors; values should be provided if available and applicable. Missing values are allowed.

1a. MANDATORY DESCRIPTORS

M01.   Organization/individual conserving the PGRFA
Specify the organization, individual or legal entity conserving the PGRFA   by selecting the first applicable form among the following:

1   FAO-WIEWS Institute code[1] (use this if you are acting for an organization and your organization is registered in WIEWS)   *[INSTCODE][2]*
2   Your PID from Easy-SMTA (use this if you have a PID but not a FAO-WIEWS Institute code)
3   Organization name and address (use this if you are acting for an organization and your organization does not have a FAO-WIEWS Institute code or a PID). For *in situ* material this may be the protected area authority, or the owner of the area where material is conserved.
4   Individual name and address (use this if you are acting as an individual in your own right and you do not have a PID)

M02.   PGRFA unique identifier
The identifier that you use to identify your PGRFA material to distinguish it from other PGRFA conserved by you. Specify precisely one identifier for the material. Make sure that it is unique among the PGRFA conserved by you, and sufficient to enable you to identify the PGRFA when you see this identifier, for example if a future GLIS user contacts you or your successor about it.[3]

For example, it could be an accession ID *[ACCENUMB]*, Selection ID, Derivative name, Population ID, Seed lot ID, Catalogue entry, or any other designation specific to the material.

M03.   Date   *[ACQDATE]*
Date on which you became the holder of the PGRFA. Date fragments are also accepted, e.g. when only year or year and month are defined.

M04.   Method[4]
Considering the date given for the previous field (Date), what event occurred on that date that resulted in you becoming the PGRFA holder?

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[4] http://www.fao.org/wiews
[5] Italicized terms in square brackets refer to the equivalent descriptor in the FAO/Bioversity Multi-Crop Passport Descriptors (MCPD, v2.1): http://www.bioversityinternational.org/e-library/publications/detail/faobioversity-multi-crop-passport-descriptors-v21-mcpd-v21/)
[6] GLIS will register an error if you attempt to register a second PGRFA with the same PGRFA unique identifier; and a warning if this unique identifier duplicates any other identifier you have registered for another PGRFA.
[7] Note: this is a key field whose value determines what context-specific descriptors are applicable. It has no equivalent in the MCPD because all genebank accessions have the same value. Some specific examples are

Choose one of the following:

1. **Acquisition**: you acquired the PGRFA from someone else. In this case descriptor M03 above should contain the date you acquired it. A few examples for illustration:
   - You are a genebank manager and you acquired a new accession (from any source, *ex situ* or *in situ*).
   - You are a farmer and you bought a variety from the local market or obtained it from some other source.
   - You are a breeder or other researcher and obtained the PGRFA from a collaborator, genebank or any other source outside your own breeding or research programme.

2. **In-house copy**: you created the PGRFA by subsampling or taking a harvest from another material that is under your management, with the intent that the new PGRFA should be, as far as possible, a genetic copy of the parent, and you wish to register a new DOI for the new PGRFA rather than use the DOI of the parent. In this case, descriptor M03 above should contain the date you took the material or harvest from the parent. Some examples:
   - As a genebank manager you want to be completely open and publicly transparent about the management of accessions in your genebank, and therefore choose to assign different DOIs to each PGRFA of each accession.
   - You are a breeder or researcher using DOIs as the basis of interoperability between your and your collaborators' databases, and you need the specific material (DNA sample, leaf tissue, seed lot, etc.) transferred between you and your collaborators to be identifiable and linked in both databases.

3. **In-house variant**: you created the PGRFA by subsampling or taking a harvest from another material that is under your management, where the parental sample is genetically variable (such as a segregating population and/or physical mixture), and the PGRFA you are registering is a genetic subset of the variability present in the parent. In this case, descriptor M03 above should contain the date you subsampled or harvested the new PGRFA from the parent. A few examples for illustration:
   - You found that the parental material was a mixture of distinctive types, and selected one of those distinct types to be the PGRFA that you are registering.
   - You found that the parental material was continuously variable in one or more traits, and selected one type to be the PGRFA that you are registering.
   - To enhance the genetic purity of the parental material, you subjected it to one or more generations of purification methods such as single-seed descent, single-plant selection, forced self-pollination or the creation of dihaploid plants.
   - You attempted to create a PGRFA that is a genetic copy of its parent, but, based on comparing the DNA or traits of the parent and offspring sample, you discover that genetic drift and/or selection has significantly changed the composition of the offspring sample, and you therefore decide it needs a different DOI.

4. **Novel distinct PGRFA**: the PGRFA is a novel variety or breeding or research material that you have created from one or more parental samples under your management, distinct from its parents, through a process that includes at least one innovative step such as crossing, mutation, or genetic modification. In this case, descriptor M03 above should contain the date you first harvested the novel distinct material that you are registering. Some examples:
   - You deliberately cross-pollinated two or more parents or induced a mutation, and selected a new variety from them.
   - You attempted to create a sample that is a genetic copy of its parent, but, based on comparing the DNA or traits of the parent and offspring sample, you discover that

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given by way of illustration, but these are not exhaustive: you are not expected to try to fit your case into these examples, and GLIS will not record the specific details.

there has been unintended cross-pollination from a different variety or a mutant has arisen naturally, and you therefore decide it needs a different DOI.

5 **Observation - Natural**: you hold the PGRFA material *in situ* and it appeared on your land without your intervention. In this case, descriptor M03 above should contain the date you first observed it on your land.

6 **Inherited**: the PGRFA is one that you have inherited from your predecessor in title. In this case, descriptor M03 above should contain the date you inherited it. A few examples for illustration:

- You have taken on the role of managing a research collection and you don't know how your organization acquired or created the PGRFA.
- You are a farmer and the PGRFA is a traditional variety which you have been maintaining on-farm since you became responsible for the farm.

M05. Genus or crop name

Specify either or both of the scientific taxon or common name as follows:

1 **Genus** *[GENUS]*
   The generic epithet of the scientific name.

2 **Common name of crop** *[CROPNAME]*
   Common name of the crop, e.g. 'malting barley', 'macadamia', 'maïs'. More than one common name may be provided.

1b. HIGHLY RECOMMENDED DESCRIPTORS

R01. Targets

One or more URLs where further information about the PGRFA can be obtained. This should be the specific page containing information on the PGRFA rather than a web site's landing page[1]. Examples of such URLs are:

1 A URL to your own web site page were you have published information about the PGRFA
2 A URL to any other public data repository where you have placed your data
3 A URL to e-journals, online datasets or other online resources where you have published experimental results using the PGRFA. If a DOI of such resource is available, please provide it in the canonical URL form http://doi.org/{DOI} (e.g. http://doi.org/10.123445/67890).

R02. DOI(s) of progenitor(s)

If you know the DOI of the PGRFA orPGRFA materials from which your PGRFA was derived, specify it here. What the progenitor is depends on how you obtained or created your PGRFA (see M04 above):

- If the method is *Acquisition*, this is the DOI of the PGRFA conserved by the provider. This will be known only if the provider had previously obtained a DOI for his/her PGRFA.
- If the method is *In-house copy*, this is the DOI of the parental PGRFA from which you created your copy.
- If the method is *In-house variant*, this is the DOI of the variable material from which you selected your new PGRFA.

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[8] For example, https://www.genesys-pgr.org/acn/id/596419 should be entered instead of https://www.genesys-pgr.org

- If the method is *Novel distinct PGRFA*, list the DOIs of any materials that you used to create this novel distinct PGRFA. DOIs can be specified for all direct ancestral materials, regardless of the precise relationship between the ancestral DOIs and the DOI of your novel distinct PGRFA. The relationship can include any type or combination of innovation and selection.

R03. Biological status   *[SAMPSTAT]*

This describes the conditions of provenance of the PGRFA. It follows the MCPD classification. This and descriptor M04 Method above determine what context-specific descriptors (see later on) are applicable.

R04. Additional taxonomic category

Provided genus is specified in M05 above, finer levels of classification should be given if known:

1 **Species**   *[SPECIES]*
Specific epithet of the scientific name
2 **Species authority**   *[SPAUTHOR]*
Authority for the specific epithet
3 **Subtaxa**   *[SUBTAXA]*
Any additional infra-specific taxon: subspecies, variety, form, Group
4 **Subtaxon authority**   *[SUBTAUTHOR]*
Authority for the subtaxon at the most detailed level

R05. Names   *[ACCENAME]*

One or more registered names or other designations, such as the name of a landrace, traditional variety or modern cultivar, or some other name or designation used to identify a breeder's selection or elite line or variety. This should not duplicate information provided in M02.

R06.   Other identifiers   *[OTHERNUMB]*

Any other identifiers that have been assigned to identify the PGRFA. It does not include identifiers for other PGRFA materials that you believe maybe similar to this PGRFA.

R07. MLS status   *[MLSSTAT]*

The status of the PGRFA with regard to the Multilateral System of Access and Benefit-Sharing (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture.

0.   Not available under the MLS
1.   Available under the MLS; may be further specified as follows:
1.1 The PGRFA is of a crop listed in Annex I and is under the management and control of a Contracting Party to the Treaty and in the public domain
1.2 The PGRFA is in an international collection under Article 15 of the Treaty
1.3 The holder received the PGRFA with an SMTA
1.4 The holder has voluntarily placed the PGRFA in the MLS
1.5 The PGRFA is derived from, and distinct from, material previously received from the MLS, is still under development and not yet ready for commercialization, and may be made available at the discretion of the developer, with an SMTA.

R08.   Physical existence

This is available only post registration. If a PGRFA is permanently lost after being registered, the PGRFA holder should record the fact by changing this descriptor value to "Historical".

    1 Available (default)
    2 Historical

2. ADDITIONAL DESCRIPTORS

2.1   Context: material you acquired from someone else

These descriptors apply when method is *Acquisition* (see M04). Their use is particularly encouraged when the provider's DOI (see R02) is unknown[1], to provide an alternative link back to the provider's PGRFA material. In future, GLIS will attempt to reconcile missing DOIs by using the information provided here.

A01.   Provider's location   *[DONORCODE], [DONORNAME]*

Location or name of the person or organization that provided the PGRFA to you, following equivalent rules to M01).

A02.   Provider's PGRFA unique identifier   *[DONORNUMB]*

Unique identifier used by the provider to identify the PGRFA under the provider's management.

A03.   Country of provenance[2]   *[ORIGCTY]*

The country in which the PGRFA material was either collected or bred or selected, or the first country in the known history of the PGRFA.

2.2   Context: material previously collected from *in situ* conditions

These descriptors apply to all PGRFA that you hold *ex situ* and that were previously collected from *in situ* conditions, either collected by you or your organization, or collected by someone else and subsequently transferred to you.

A04.   Collector's location   *[COLLCODE], [COLLNAME], [COLLINSTADDRESS]*

Location of the home base of the person(s) or organization(s) that originally collected the PGRFA from *in situ* conditions, following equivalent rules to location to M01.

A05.   Collector's PGRFA unique identifier   *[COLLNUMB]*

Identifier assigned by the collector(s) to the PGRFA collected.

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[9] And especially encouraged when information on provenance is not available through a target (R01), for example, a page in Genesys.

[10] Equivalent in some cases to the "country of origin". Country of provenance is used here with a practical definition applicable to PGRFA that avoids potential confusion with country of origin as defined in the Convention on Biological Diversity.

A06. Collecting mission identifier *[COLLMISSID]*

If the PGRFA was collected as part of an organized collecting mission during which other PGRFA materials were collected, and the collectors assigned a code to identify the mission, specify that mission identifier here.

A07. Location where the PGRFA was collected *[COLLSITE]*

Location information below the country level that describes where the PGRFA was collected. This might include the distance in kilometres and direction from the nearest town, village or map grid reference point, (e.g. "7 km South of Curitiba in the state of Parana").

A08. Latitude *[LATITUDE / DECLATITUDE]*

Latitude of the location where the PGRFA was collected.

A09. Longitude *[LONGITUDE / DECLONGITUDE]*

Longitude of the location where the PGRFA was collected.

A10. Uncertainty *[COORDUNCERT]*

Uncertainty of the latitude/longitude coordinates of the location where the PGRFA was collected. This value is typically provided by georeferencing software.

A11. Geodetic *datum* *[COORDDATUM]*

The geodetic *datum* or spatial reference system upon which the latitude/longitude coordinates of the collecting location are based.

A12. Georeferencing method *[GEOREFMETH]*

The method used to estimate latitude/longitude coordinates of the location where the PGRFA was collected.

A13. Elevation *[ELEVATION]*

Elevation of collecting site expressed in metres above sea level.

A14. Collecting date *[COLLDATE]*

Date on which the PGRFA was collected. Date fragments are also accepted when only year or year and month are known.

A15. Collecting source *[COLLSRC]*

A description of the nature of the location where the PGRFA was collected. It follows the MCPD classification.

2.3   Context: material bred

These descriptors apply to all PGRFA that were bred with human intervention and have information on how it was bred, whether by you or by someone else, *in situ* or *ex situ*.

A16. Breeder's location *[BREDCODE], [BREDNAME]*

Location where the material was bred, following equivalent rules to M01.

A17.   Ancestry   *[ANCEST]*

The pedigree (e.g. 'Hanna/7*Atlas//Turk/8*Atlas') or other description of the ancestry of the PGRFA and how it was bred (e.g. 'mutation found in Hanna', or 'cross involving amongst others Hanna and Irene').

Table 1. Use case for genebanks: Mapping to MCPD V.2.1 descriptors

1. CORE DESCRIPTORS		
1a. MANDATORY DESCRIPTORS		
GLIS descriptor	**GLIS Description**	**MCPD equivalent for genebanks**
M01. Organization/individual conserving the PGRFA	The location where the PGRFA is maintained	Institute Code [INSTCODE]
M02. PGRFA unique identifier	The identifier that you use to identify your PGRFA material to distinguish it from other PGRFA conserved by you	Accession Number [ACCENUMB]
M03. Date	Date on which you became the holder of the PGRFA	Acquisition date [ACQDATE]
M04. Method	Considering the date given for field M03 ('Date'), what event occurred on that date that resulted in you becoming the PGRFA holder	N/A
M05. Genus or crop name	Genus or common crop name. Specify one or both	Genus [GENUS] Common crop name [CROPNAME]
1b. HIGHLY RECOMMENDED DESCRIPTORS		
R01. Targets	One or more URLs where further information about the PGRFA can be obtained	N/A
R02. DOI(s) of progenitor(s)	The DOI of the PGRFA or PGRFA materials from which your PGRFA was derived	N/A
R03. Biological status	This describes the conditions of provenance of the PGRFA	Biological status of accession [SAMPSTAT]
R04. Additional taxonomic category	Species: Specific epithet of the scientific name Species authority: Authority for the specific epithet Subtaxa: Any additional infra-specific taxon: subspecies, variety, form, Group Subtaxon authority: Authority for the subtaxon	Species [SPECIES] Species authority [SPAUTHOR] Subtaxon [SUBTAXA] Subtaxon authority [SUBTAUTHOR]
R05. Names	One or more registered names or other designations, such as the name of a landrace, traditional variety or modern cultivar, or some other name or designation used to identify a breeder's selection or elite line or variety	Accession Name [ACCENAME]

R06. Other identifiers	Any other identifiers that have been assigned to identify the PGRFA material. It does not include identifiers for other materials that you believe maybe similar to this PGRFA.	Other identifiers associated with the accession *[OTHERNUMB]*
R07. MLS status	The status of the PGRFA with regard to the Multilateral System of Access and Benefit-Sharing (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture	MLS status of the accession *[MLSSTAT]*
R08. Physical existence	Describes whether the PGRFA is still available or permanently lost after being registered	N/A
2. ADDITIONAL DESCRIPTORS		
2.1 Context: material you acquired from someone else		
A01. Provider's location	Location or name of the person or organization that provided the PGRFA to you	Donor institute code *[DONORCODE]* Donor institute name *[DONORNAME]*
A02. Provider's PGRFA unique identifier	Unique identifier used by the provider to identify the PGRFA under the provider's management	Donor accession number *[DONORNUMB]*
A03. Country of provenance	The country in which the PGRFA material was either collected or bred or selected, or the first country in the known history of the PGRFA.	Country of origin *[ORIGCTY]*
2.2 Context: material previously collected from *in situ* conditions		
A04. Collector's location	Location of the home base of the person(s) or organization(s) that originally collected the PGRFA from *in situ* conditions	Collecting institute code *[COLLCODE]* Collecting institute name *[COLLNAME]* Collecting institute address *[COLLINSTADDRESS]*
A05. Collector's PGRFA unique identifier	Identifier assigned by the collector(s) to the PGRFA collected	Collecting number *[COLLNUMB]*
A06. Collecting mission identifier	The identifier, if any, of the mission during which the PGRFA was collected	Collecting mission identifier *[COLLMISSID]*
A07. Location where PGRFA was collected	Location information below the country level that describes where the PGRFA was collected	Location of collecting site *[COLLSITE]*
A08. Latitude	Latitude of the location where the PGRFA was collected	Latitude of collecting site *[DECLATITUDE]* *[LATITUDE]*

A09. Longitude	Longitude of the location where the PGRFA was collected	Longitude of collecting site [DECLONGITUDE] [LONGITUDE]
A10. Uncertainty	Uncertainty of the latitude/longitude coordinates of the location where the PGRFA was collected	Coordinate uncertainty [COORDUNCERT]
A11. Geodetic *datum*	The geodetic *datum* or spatial reference system upon which the latitude/longitude coordinates of the collecting location are based	Coordinate datum [COORDDATUM]
A12. Georeferencing method	The method used to estimate latitude/longitude coordinates of the location where the PGRFA was collected	Georeferencing method [GEOREFMETH]
A13. Elevation	Elevation of collecting site	Elevation of collecting site [ELEVATION]
A14. Collecting date	Date on which the PGRFA was collected	Collecting date of sample [COLLDATE]
A15. Collecting source	A description of the nature of the location where the PGRFA was collected	Collecting/acquisition source [COLLSRC]
2.3 Context: material bred		
A16. Breeder's location	Location where the material was bred	Breeding institute code [BREDCODE] Breeding institute name [BREDNAME]
A17. Ancestry	The pedigree (genealogy) :or other description of the ancestry of the PGRFA and how it was bred	Ancestral data [ANCEST]