



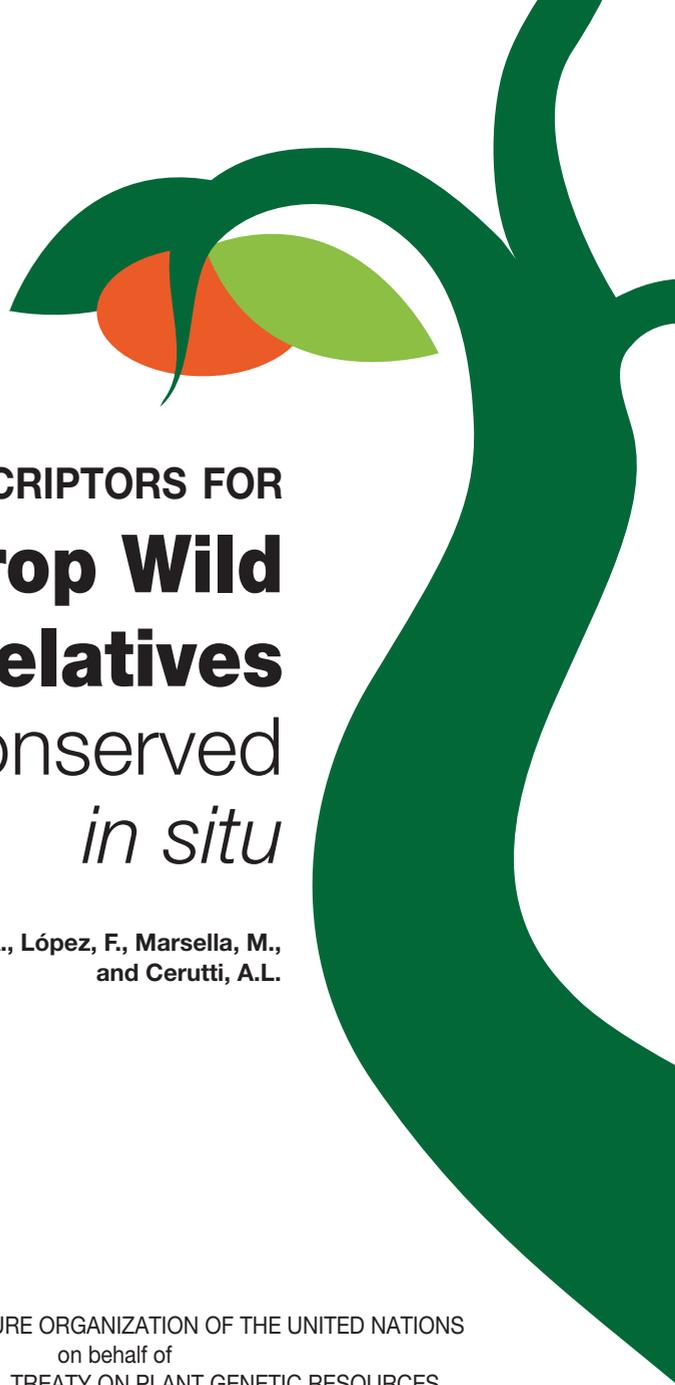
Food and Agriculture
Organization of the
United Nations



The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE



DESCRIPTORS FOR
**Crop Wild
Relatives**
conserved
in situ



DESCRIPTORS FOR
**Crop Wild
Relatives**
conserved
in situ

**Alercia, A., López, F., Marsella, M.,
and Cerutti, A.L.**

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
on behalf of
THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE
Rome, 2021

Required citation:

Alercia, A., López, F., Marsella, M., and Cerutti, A.L. 2021. *Descriptors for Crop Wild Relatives conserved in situ (CWRI v.1)*. Rome, FAO on behalf of the International Treaty on Plant Genetic Resources for Food and Agriculture. <https://doi.org/10.4060/cb3256en>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-133946-6

© FAO, 2021



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition."

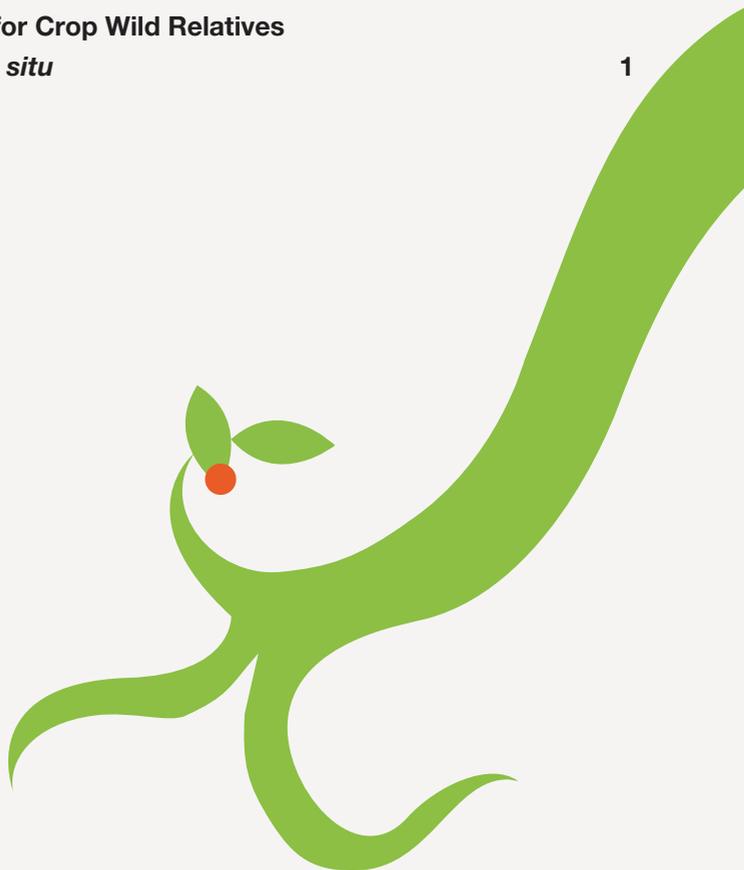
Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org.

CONTENTS

Foreword	v
Acknowledgements	vii
Contributors	ix
Descriptors for Crop Wild Relatives conserved <i>in situ</i>	1







FOREWORD

One of the main factors adversely affecting the conservation, use, monitoring and reporting of information on Plant Genetic Resources for Food and Agriculture (PGRFA) is the lack of access to data and inefficient exchange of information. This is, in large part, due to the different approaches to data management and documentation, which have prevented the creation of a unique language to share data despite the many attempts, so far, to do so.

This lack of standardization had prevented the PGRFA community from exchanging PGRFA data worldwide and had, for years, been one of the main challenges for the effective conservation and sustainable use of plant material. These gaps represent a barrier to the sharing of information in the scientific community and to the development of value-added services for plant breeders, researchers and organizations working on agricultural biodiversity. If crop wild relatives (CWR) *in situ* resources are to be conserved and sustainably used, it is fundamental to bring their information into an accessible standardized format to secure a consistent data compilation and management.

To meet these challenges, the Secretariat of the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) undertook to address the gaps and the lack of coherence in the documentation methods for plant resources, in particular for Crop Wild Relatives (CWR) conserved under *in situ* conditions, through the development of an international standard. It has developed an international language for CWR *in situ* data that will enable countries to compile and exchange data held by different national and international organizations, advanced research institutes and other bodies. Compilation and data exchange for on-farm managed cultivated PGRFA is not addressed in this document.

This technical paper is an additional tool by which the Secretariat seeks to strengthen capacities of Contracting Parties and National Programmes on the implementation of the International Treaty. The List of Descriptors will help users to understand how CWR *in situ* information can be documented and integrated in their institutional workflow, including what data need to be provided and how to do it.

The accomplishment of this undertaking was possible thanks to the work of experts, technical staff and national focal points of the Treaty involved in the consultations and related discussions over this year. Special thanks to the support of the members of the Core Advisory Group who provided scientific guidance to the development process of this List of Descriptors. The financial support provided by the Government of Germany,

which made it possible for us to undertake this project is acknowledged and highly appreciated.

We hope that this material meets the needs of researchers and users of CWR material and the broader plant genetic resources community, and that it will also contribute to the way plant genetic resources for food and agriculture are documented and exchanged at the global level.

A handwritten signature in black ink, consisting of several overlapping loops and lines, positioned above the name and title.

Kent Nnadozie
Secretary

**International Treaty on Plant Genetic Resources
for Food and Agriculture (ITPGRFA)**
Food and Agriculture Organization of the United Nations (FAO)

ACKNOWLEDGEMENTS

This technical paper has been developed and published thanks to the project “*Development of a globally agreed list of descriptors for in situ Crop Wild Relatives Documentation*”, funded by the Federal Ministry of Food and Agriculture of Germany.

The Secretariat of the International Treaty of FAO acknowledges all the institutions and individuals who have contributed to the accomplishment of this work.

Our very special thanks go to the experts who participated in the various consultations, round tables and training workshops for their valuable inputs and suggestions.

This publication also benefited from the valuable review by members of the Core Advisory Group of the project, specially selected for the validation of the survey results whose names are listed under the *List of Contributors* below. They are acknowledged for their significant support, guidance and advice.

Finally, we thank all the national focal points of the International Treaty and individuals who provided important inputs in the consultation process and for the improvement of this publication.

We are grateful to the colleagues of the Treaty Secretariat and other technical staff of FAO for their contribution to the development of this document. Thanks to Adriana Alercia, Francisco López, Marco Marsella, Ana Laura Cerutti and Gerardo Francione for their direct inputs and active coordination of the project.

Kent Nnadozie, Secretary of the International Treaty, held the overall responsibility for this publication.



CONTRIBUTORS

Core Advisory Group

Barbieri Rosa Lia, Embrapa- CENARGEN, Brazil

Bernhardt Nadine, Julius-Kühn Institute, Germany

Bounisch Maria, Julius-Kühn Institute, Germany

De Maio Pablo, Universidad Nacional de Catamarca, Argentina

Dulloo Mohammad Ehsan, The Alliance of Bioversity International and CIAT, Mauritius

Endresen Dag, GBIF and University of Oslo, Norway

Germeier, Christoph, Julius-Kühn Institute, Germany

Hassan Neveen, National Gene Bank, Egypt

Iriondo José M., King Rey Juan Carlos University, Spain

Mathur Prem Narain, Alliance of Bioversity International and CIAT; and Kirkhouse Trust, India

Maxted Nigel, University of Birmingham, United Kingdom of Great Britain and Northern Ireland

Zhang Zongwen, The Alliance of Bioversity International and CIAT, China

Survey Experts

Argentina	Bertero Daniel, Universidad de Buenos Aires Gonzales Juan Antonio, Fundación Miguel Lillo
Armenia	Avagyan Alvina, Scientific Centre of Vegetables and Industrial Crops
Australia	Humphries Alan, SARDI Norton Sally, Australian Grains Genebank - Agriculture Victoria
Bangladesh	Salam Md. Abdus, Bangladesh Agriculture Research Council
Belgium	Vandelook Filip, Meise Botanic Garden
Bhutan	Dorji Rinchen, National Biodiversity Centre, Ministry of Agriculture and Forests Tshering Wang, National Biodiversity Centre
Bolivia (Plurinational State of)	Bonifacio Alejandro, Fundación PROINPA
Brazil	Clement Charles, Instituto Nacional de Pesquisas da Amazonia (INPA) Fragomeni Simon Marcelo, Embrapa Gomes Pádua Juliano, Embrapa Guiducci Filho Edson, Embrapa Heiden Gustavo, Embrapa Clima Temperado Pinto de Lemos Eurico Eduardo, Universidade Federal de Alagoas (Ufal) Ribeiro de Castro Ana Cecilia, Embrapa Agroindustria Tropical Santos Sandra Aparecida, Embrapa Pantanal Sosinski Júnior Ênio Egon, Embrapa
Canada	Diederichsen Axel, Agriculture and Agri-Food Canada Smith Tyler, Agriculture and Agri-Food Canada
Chile	Salazar Suao Erika, Instituto de Investigaciones Agropecuarias (INIA)
Colombia	Parra Quijano Mauricio, Universidad Nacional de Colombia – Agronomía

Costa Rica	Bonilla Nevio, INTA
Czechia	Holubec Vojtěch, Crop Research Institute
Ecuador	Monteros Altamirano Álvaro Ricardo, Instituto Nacional de Investigaciones Agropecuarias (INIAP) Tapia Bastidas César, Instituto Nacional de Investigaciones Agropecuarias (INIAP)
El Salvador	Galán Pablo, Asociación Jardín Botánico La Laguna Morales Herrera Aura Jasmín, Centro Nacional de Tecnología Agropecuaria y Forestal (CENTA)
Estonia	Annamaa Külli, Estonian Crop Research Institute Holtsmann Külliki, Ministry of Rural Affairs
Eswatini	Mbingo Musa Maxwell, National Plant Genetic Resources Centre
Finland	Fitzgerald Heli, University of Helsinki Kiviharju Elina, Luke
France	Bazile Didier, CIRAD Didier Audrey, Ministère de l'Agriculture et de l'Alimentation
Germany	Guarino Luigi, Global Crop Diversity Trust Obreza Matija, Global Crop Diversity Trust Thormann Imke, Federal Office for Agriculture and Food Weise Stephan, IPK Gatersleben
Ghana	Aboagye Lawrence Misa, CSIR-Plant Genetic Resources Research Institute
Greece	Aravanopoulos Filippou, Aristotele University of Thessaloniki Avramidou Evangelia, Imfe Elgo Demeter Mellidou Ifigeneia, Institute of Plant Breeding Hao-Demeter Merkouropoulos Georgios, Hellenic Agricultural Organisation-Demeter Mylona Photini, HAO-DEMETER, Institute of Plant Breeding & Genetic Resources Ralli Parthenopi, Hellenic Agricultural Organization-Demeter, Institute of Plant Breeding and Genetic Resources Tzatzani Thiresia-Teresa, Hellenic Agricultural Organization-Demeter

Guatemala	Hernández de La Parra, Mauricio, Ministerio de Agricultura, Ganadería y Alimentación (MAGA)
India	Gupta Veena, ICAR-NBPGR Pandravada SR, NBPGR Regional Station, Hyderabad Pradheep K, ICAR-NBPGR Sivaraman Nivedhitha, ICAR-NBPGR Tripathi Kuldeep, ICAR-NBPGR, New Delhi
Israel	Mayzlish Gati, Einav Israel Gene Bank Singer Alon, Israel Plant Gene Bank, Agricultural Research Organization - The Volcani Center
Italy	Negri Valeria, Università degli Studi di Perugia Ricardo Dias Sonia, FAO
Jordan	Abulaila Khaled, National Agricultural Research Center (NARC) Al Sane Khalidoun, National Agricultural Research Center (NARC)
Kenya	Fadda Carlo, Alliance of Bioversity and CIAT Nyamongo Desterio Ondieki, Genetic Resources Research Institute - Kenya Agricultural and Livestock Research Organization (KALRO)
Lebanon	Chéhadé Ali, Institut de Recherches Agronomiques Libanais (IRAL)
Malawi	Mponya Nolipher, Malawi Plant Genetic Resources Centre
Mali	Sidibé Amadou, Institut d'Economie Rurale
Malta	Fresta Louis, Plant Protection Directorate, Veterinary and Phytosanitary Regulation Department, Ministry for the Environment, Sustainable Development and Climate Change
Mexico	Orjuela Restrepo Maria Andrea, Conabio
Mongolia	Noov Bayarsukh, Institute of Plant and Agricultural Science

Morocco	Amri Ahmed, International Center for Agricultural Research in the Dry Areas (ICARDA) El Bahloul Yasmina, Institut National de la Recherche Agronomique (INRA) Sahri Ali, INRA
Netherlands	Kik Chris, CGN van Zonneveld Maarten, World Vegetable Center
Nicaragua	Cajina Acevedo Néstor, Instituto Nicaragüense de Tecnología Agropecuaria
Norway	Rasmussen Morten, NIBIO - Norwegian Genetic Resource Center
Oman	Alsaady Nadiya, Oman Animal and Plant Genetic Resources Center
Pakistan	Ahmad Shakeel, Pakistan Agricultural Research Council Siddiqui Sadar Uddin, PARC-NARC-BCI
Papua New Guinea	Komolong Birte, PNG National Agricultural Research Institute
Peru	Amasifuen Guerra Carlos Alberto, Instituto Nacional de Innovación Agraria Ingar Elliott Vanessa, Ministerio del Ambiente
Poland	Dostatny Denise F., Plant Breeding and Acclimatization Institute - National Centre for Plant Genetic Resources Forycka Anna, Institute of Natural Fibres and Medicinal Plants Podyma Wieslaw, Plant Breeding and Acclimatization Institute
Serbia	Mikic Sanja, Institute of Field and Vegetable Crops Terzić Sreten, Institute of field and vegetable crops
Slovakia	Hauptvogel Pavol, National Agricultural and Food Centre - Research Institute of Plant Production
Sweden	Palmé Anna, NordGen Weibull Jens, Board of Agriculture



Switzerland	Sylvain Aubry, Federal Office for Agriculture
Uganda	Mulumba John Wasswa, Plant Genetic Resources Centre - National Agricultural Research Organization
United Kingdom of Great Britain and Northern Ireland	Müller Jonas V., Royal Botanic Gardens Kew
Uruguay	Gaiero Paola, Universidad de la República Rivas Latorre Mercedes María, Universidad de la República, Rocha
United States of America	Brenner David, USDA ARS Plant Introduction Station Ragone Diane, National Tropical Botanical Garden
Zambia	Kamusaki Womba Peggy, Zambia Agriculture Research Institute Ng'uni Dickson, Zambia Agriculture Research Institute Sampa Sumini, Zambia Agriculture Research Institute Tembo Masiye, National Plant Genetic Resources Centre



DESCRIPTORS FOR CROP WILD RELATIVES CONSERVED *IN SITU* (CWRI v.1)

18 December 2020

This list of passport Descriptors for Crop Wild Relatives conserved *in situ* (CWRI v.1) has been developed taking the *Core Descriptors for in situ conservation of CWR v.1*¹ published by Bioversity International in 2013 as the starting point. It also builds on recent experiences conducted by the Secretariat of FAO's International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in the context of the development of its Global Information System (GLIS), as well as on the inputs of international projects such as the Farmer's Pride.

The CWRI passport descriptors proposed here constitute the minimum initial list for CWR *in situ* data exchange. They are the result of consultations conducted with the support of the national focal points of the International Treaty and selected international partners and experts, as reported in the 'Contributors' section. A global survey was conducted in early 2020 and the inputs of more than 107 experts from 87 institutions in 48 countries have been analysed and taken into consideration. We are also thankful to all the scientists that have served in the Core Advisory Group (12 members) for their valuable support in setting the direction of the research and taking a prominent role in the validation of the results.

The list is intended to be a user-friendly data exchange tool for which data should be available worldwide. Its wide adoption and use will facilitate and streamline the collection of data needed for documenting *in situ* CWR in a consistent way.

For each descriptor, this tool provides a brief explanation of content, its coding scheme, and a suggested field name. Nevertheless, on-farm management of plant material is not addressed in this document. It is to be noted that suggested mandatory descriptors are **highlighted**.

The standard descriptor list for CWR *in situ* documentation developed and validated at the global level through this project is an evolving document. The future modification or addition of further descriptors should not be precluded when more data would become available. These CWRI descriptors are designed to facilitate the compilation and exchange of CWR *in situ* passport data. They are also designed to contribute to the further development of the Global Information System (GLIS) and support the conservation and utilization of CWR throughout the world. Furthermore, they aim to be compatible with the 'Digital Object Identifiers for food crops - Descriptors and guidelines of the Global Information System' (Alercia *et al.* 2018).

¹ *Core descriptors for in situ conservation of crop wild relatives v.1.*

The Secretariat of the International Treaty welcomes any suggestions for the improvement on this first version (*v.1*) of Descriptors for *in situ* conservation of CWR and can be sent to the Secretary of the International Treaty pgfra-Treaty@fao.org.

MANDATORY DESCRIPTORS

1. **Genus**
2. **Species**
6. **Country of occurrence**
13. **Observation date**
14. **Population identifier**
18. **Managing institute, legal entity or individual name**

** Descriptors numbers belonging to the list published in 2013 are included in parentheses (x.x.x) next to the descriptor's name.*

1. **Genus** (1.1.1) (GENUS)

Genus name for taxon.

2. **Species** (1.1.2) (SPECIES)

Specific epithet portion of the scientific name. If unknown, 'sp.' is allowed.

3. **Species authority** (1.1.3) (SPAUTHOR)

Provide the authority for the species name. It is recommended to use the Catalogue of life.

4. **Subtaxon** (1.1.4) (SUBTAXA)

Subtaxon can be used to store any additional infraspecific epithet. The following abbreviations are allowed: 'subsp.' (for subspecies); 'var.' (for botanical variety); 'f.' (for form). It is recommended to use the Catalogue of life.

5. **Subtaxon authority** (1.1.5) (SUBTAUTH)

Subtaxon authority at the most detailed taxonomic level.



6. Country of occurrence (2.1.1) (ORIGCTY)

Country where the CWR population was observed or inventoried. Use the Three-letter ISO 3166-1 code of the country where the site is located.

7. Location of occurrence site (2.1.2) (OCCURSITE)

Location information below the country level that describes the site where the population sample was observed, inventoried, or collected, preferably in English. This might include the distance in km and direction from the nearest town, village, or map grid reference point, (e.g. 7 km south of Curitiba in the state of Parana).

7.1 Name of the location or nearest place

Name of the site location or nearest place to site (village, town, city or landmark). The name used may also be created to indicate a place that may not have proper names (e.g. the junction of two named roads).

7.2 Distance to site [km]

Distance in km from nearest named place to site.

7.2.1 Type of distance

- 1 Road distance
- 2 Straight distance

7.3 Direction from nearest named place

Direction of site from nearest named place in degrees relative to North.

8. Latitude of occurrence site (Decimal degrees) (2.1.3.1) (DECLATITUDE)

Latitude of the site expressed in decimal degrees. Positive values are North of the Equator; negative values are South of the Equator (e.g. -44.6975).

9. Longitude of occurrence site (Decimal degrees) (2.1.3.2) (DECLONGITUDE)

Longitude of the site expressed in decimal degrees. Positive values are East of Greenwich Meridian; negative values are West of the Greenwich Meridian (e.g. -120.9123).

10. Coordinate datum (2.1.3.4) (COORDDATUM)

The geodetic datum or spatial reference system in which the coordinates given in decimal latitude and decimal longitude are based (e.g. WGS84, ETRS89, NAD83).

11. Elevation of site [mas] (2.1.4) (ELEVATION)

Elevation of site expressed in meters above sea level. Negative values are allowed.

12. Site protection (2.4) (SITEPROT)

Indicate whether the site is under any legal or official legislation. Follow IUCN Guidelines available at <https://portals.iucn.org/library/node/30018>

13. **Observation date** [YYYY-MM-DD] (3.1.1) (OBSDATE)

The most recent date the population was observed.

14. **Population identifier** (3.1.2) (POPID)

The identifier (sequential number or code) that you use to identify your population. Each distinct population should be given a population unique identifier.

15. **Collecting number** (3.2.3) (COLLNUMB)

Original identifier assigned by the collector(s) to the sample/specimen deposited in the genebank.

16. **Status of occurrence site** (3.2.4) (POPSRC)

Status of the occurrence site of the population.

10 **Wild** (11 Forest or woodland, 12 Shrubland, 13 Grassland, 14 Desert or tundra, 15 Aquatic habitat)

20 **Farm or cultivated area** (21 Field, 22 Orchard, 23 Backyard, kitchen or home garden, 24 Fallow land, 25 Pasture, 28 Park)

60 **Weedy, disturbed or ruderal habitat** (61 Roadside, 62 Field margin)

99 **Other** (for example coastal habitats, elaborate in REMARKS field)

17. **Biological status of the population** (SAMPSTAT)

The coding scheme proposed can be used at different levels of detail, either by using the general codes (in **boldface**), such as 100 or 200, or by using the more specific codes such as 110, 120 or 130.

100 **Wild**
110 Natural
120 Semi-natural/wild
130 Semi-natural/sown

200 **Weedy**

999 **Other** (elaborate in REMARKS field)

18. **Managing institute, legal entity or individual name** (MNGINSTNAME)

Name and address of the institute, legal entity, herbarium, or individual responsible of the population (e.g. protected area authority, nature reserve manager, national park manager, private landowner, etc.).

18.1 **Managing institute or individual address** (MNGINSTADDRESS)

19. **Name of the institute or individual holding *ex situ* samples** (INSTNAME)
Name and address or code of the institute, legal entity, herbarium, or individual where collected population samples are deposited (e.g. local or national genebank, or herbarium). If the Managing institute has collected material, the holding institute name and address should be the same as the Managing institute.

19.1 **Address of the holding organization or individual** (INSTADDRESS)

20. **Code of the institute or herbarium holding *ex situ* samples** (3.2.5.2)
FAO WIEWS institute code or Index Herbariorum code of the institute where the *ex situ* accession/specimen is maintained.

20.1 **FAO WIEWS institute code** (<http://www.fao.org/wiews>) (INSTCODE)

20.2 **Index Herbariorum code** (HERBCODE)
(<http://sweetgum.nybg.org/science/ih/>)

21. **Accession/specimen number** (3.2.5.1)
This is the unique identifier for accessions or specimens collected (e.g. genebank, herbarium, etc.) and is assigned when a sample/specimen is entered into the collection.

21.1 ***Ex situ* accession number** (ACCENUMB)

21.2 **Herbarium specimen number** (SPECNUMB)

22. **Conservation actions in place** (3.5) (CONSACTION)
Indication whether conservation actions related to the population are in place. Use the IUCN classification scheme for conservation actions in place (available from https://nc.iucnredlist.org/redlist/content/attachment_files/dec_2012_guidance_conservation_actions_in_place_classification_scheme.pdf) (adapted).

- 0 No conservation actions
- 1 Monitoring and Planning
- 2 Land/Water Protection and Management
- 3 Species Management
- 4 Education and Legislation
- 99 Other (elaborate in REMARKS field)

23. **MLS status of the material**

(MLSSTAT)

The status of the *ex situ* accession of the CWR population with regards to the Multilateral System of Access and Benefit-sharing of the International Treaty, if available.

0 Not available under the MLS

1 Available under the MLS

24. **Links to associated information** (URL)

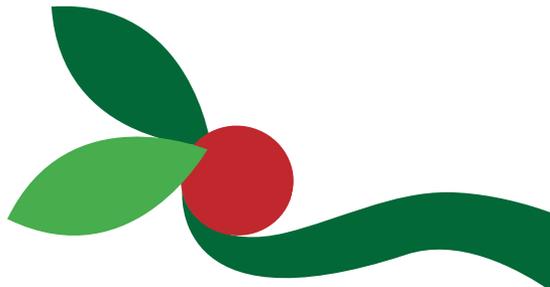
(LINKS)

One or more URLs where further information about the CWR can be found. Multiple values are separated by a semicolon without space.

25. **Remarks**

(REMARKS)

The Remarks field is used to add notes or to elaborate on descriptors with value 99 or 999 (= Other). Prefix remarks with the field name they refer to and a colon (:) without space (e.g. SITESTAT:riverside). Distinct remarks referring to different fields are separated by semicolons without space.



OPEN QUESTION

Global Unique Identifier

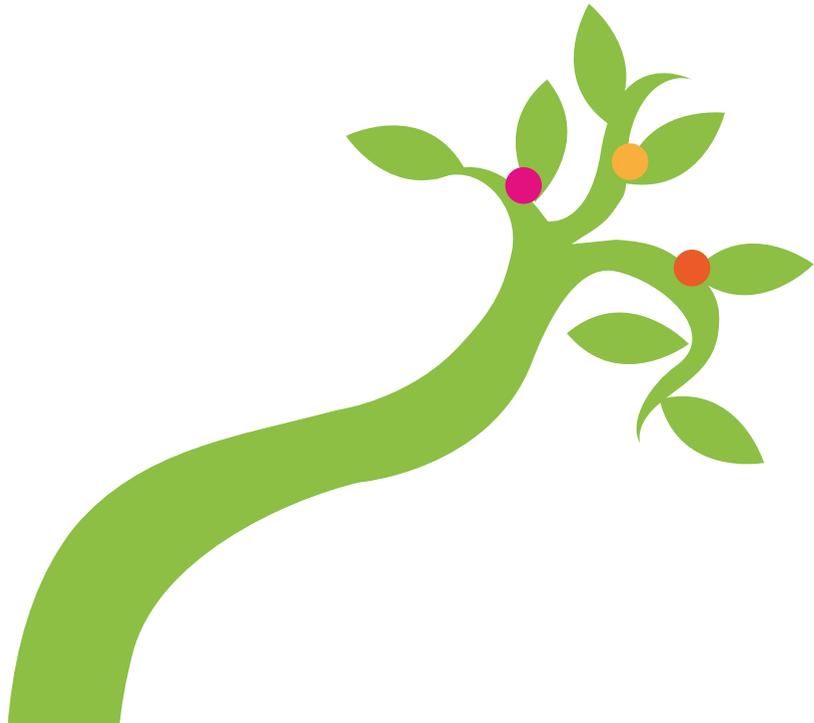
Various experts indicated that the use of a global unique and persistent identifier (PUID) would be useful to build automatic services to integrate CWR *in situ* data and to enable the desired linkages between populations and other genotype entities across different information systems.

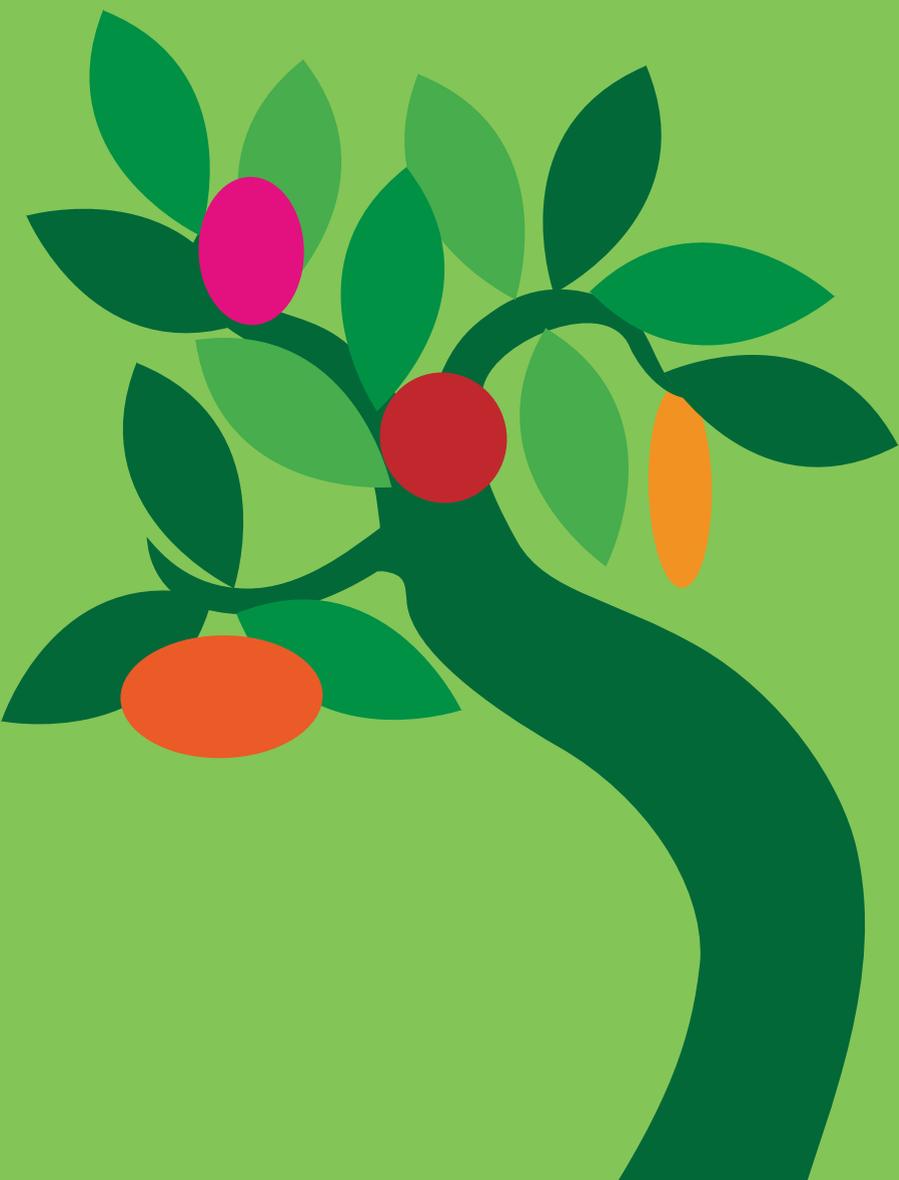
The Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA) facilitates the assignment of a persistent unique identifier (PUID), in the form of a Digital Object Identifier (DOI) to the Global Information System (GLIS) users, free of charge (<https://ssl.fao.org/glis>). The Secretariat is also available to provide training and support required by stakeholders for the adoption of DOIs.

DOIs go beyond the concatenation of fields and offer advanced services that would, for instance, facilitate the identification of germplasm safety duplicated in *ex situ* conditions (i.e. genebank or herbarium), or allow a flexible access to information associated to the CWR. Although different PUID technologies exist, DOIs have been selected as the best option by a panel of experts in 2015.

- X. **Persistent Unique Identifier** (PUID)
It is any persistent unique identifier assigned to the population so it can be unambiguously referenced at the global level and the information associated with it harvested through automated means. Report one PUID for each population. For *ex situ* material DOIs have been adopted since 2017.









FOR MORE INFORMATION CONTACT:

International Treaty on Plant Genetic Resources for Food and Agriculture
pgrfa-treaty@fao.org
www.planttreaty.org and www.fao.org/plant-treaty/en

Food and Agriculture Organization of the United Nations
Rome • Italy