

Crop wild relative checklist and inventory descriptors v.1

Bioversity International and University of Birmingham



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University of Birmingham is one of the leading research-based universities in the United Kingdom (UK). The School of Biosciences (within the College of Life and Environmental Sciences) has been a leading teaching and research centre for plant genetic resources (PGR) conservation and sustainable use since the 1960s. Over 600 students from more than 150 countries have been awarded post-graduate degrees in Conservation and Utilization of Plant Genetic Resources and over 250 students have been awarded PhDs for research in PGR conservation and plant breeding. The School plays a leading international role in crop wild relative and landrace conservation planning and implementation and has extensive expertise in geographic information system (GIS) and genetic diversity analyses, and in the application of phenomics and genomics techniques.

Cover photo: *Solanum lichtensteinii*, a secondary wild relative of eggplant, *S. melongena*, which has potential to confer drought tolerance to the crop. Photo courtesy of Livhuwani Auldrean Nkuna, South African National Biodiversity Institute, SANBI.

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PREFACE

The present list of descriptors for the standardized development of crop wild relative (CWR) checklists and inventories is based on results from a series of international projects that progressively worked to improve information management related to CWR conservation and use.

A list of core descriptors for CWR *in situ* conservation was first published in 2013 (Thormann *et al.*, 2013), based on the results of the European Union (EU) funded project '*European crop wild relative diversity assessment and conservation forum*' (PGR Forum), which had developed the Crop Wild Relative Information System and Crop Wild Relative Markup Language (Kell *et al.*, 2008; Moore *et al.*, 2008), and the global multi-country project '*In situ conservation of crop wild relatives through enhanced information management and field application*', supported by the Global Environmental Facility (GEF) through the United Nations Environmental Programme (UNEP).

Further work on the CWR descriptors was then carried out in the EU funded project '*Novel characterization of crop wild relative and landrace resources as a basis for improved crop breeding*' (PGR Secure), and the CWR checklist and inventory descriptors were further refined during the SADC CWR project '*In situ conservation and use of crop wild relatives in three ACP countries of the SADC region*', co-funded by the EU and implemented through the ACP-EU Co-operation Programme in Science and Technology (S&T II) by the African, Caribbean and Pacific (ACP) Group of States.

During these latter two projects, exemplar National CWR Conservation Strategies and National Strategies and Action Plans for CWR Conservation and Sustainable Use were developed. The creation of checklists and inventories of CWR are the first steps towards a national strategy and the descriptor list presented here aims to facilitate the compilation of these lists in a standardized way. They are compatible with Bioversity's crop descriptor lists, the 'FAO/Bioversity List of Multi-Crop Passport Descriptors V.2.1' (Alercia *et al.*, 2015) and IUCN standards used for undertaking Red List assessments (<http://www.iucnredlist.org/technical-documents>).

We hope that these descriptors will help to facilitate and streamline the collection of data needed as a basis for developing national CWR conservation and sustainable use strategies. Any suggestions for improvement on this version (v.1) of the checklist and inventory descriptors will be highly appreciated by Bioversity International and University of Birmingham.

INTRODUCTION

Crop wild relatives are wild plant taxa that are related to crops – including those cultivated for food, fodder and forage, medicinal, aromatic, ornamental, industrial and environmental uses – and are potential sources of traits for crop improvement (Maxted *et al.*, 2006, 2008). CWR have been used increasingly by plant breeders since the early 20th century and have provided vital genetic diversity for crop improvement – for example, resistance to pests and diseases, tolerance of environmental conditions such as drought, heat stress and flooding, and nutritional, flavour, colour, texture and handling qualities (Maxted and Kell, 2009). The transfer of traits from wild species has been so widespread that most modern cultivars of crops contain some genes derived from a wild relative (Hajjar and Hodgkin, 2007).

Given their importance for agricultural research and development, their conservation is of utmost importance (Hunter and Heywood, 2011). In particular, *in situ* conservation can counter genetic erosion and allow the continued evolution of adaptive traits, as well as the maintenance of the breadth of genetic diversity present in the many CWR species – a basis for enhancing the adaptation of crops to new and changing agro-environments (Maxted *et al.*, 1997).

To ensure effective and efficient *in situ* conservation of CWR, it is necessary to prepare strategies and action plans (Dulloo *et al.*, 2017). An essential step in conservation planning is the prioritization of CWR species, for which a checklist has to be created – a list of CWR taxa found in a defined geographic unit (usually a country or region), which comprises a list of taxon names and authorities. This checklist can then be supplemented with information required to prioritize the taxa (e.g. the socio-economic value of the related crops, the actual and potential utilization value of the CWR for crop improvement, its distribution, and its Red List status) resulting in an annotated checklist. Finally an inventory is produced which is a list of priority CWR taxa and ancillary information (e.g. information used to prioritize the checklist, species biology, and current conservation actions) (Maxted *et al.*, 2013).

This set of descriptors aims to facilitate the collection of key information in a standardized and comparable format for the development of CWR checklists and inventories. For each descriptor, a brief explanation of content and type of required data is provided to assist in the computerized compilation and analysis of the data.

USING THE DESCRIPTORS

Some indications are provided below for the use of the descriptors in databases or spread sheets. An Excel template (Thormann *et al.*, 2017) has been developed to support the collation of data using the CWR checklist and inventory descriptors and is available for download from Dataverse at <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/B8YOQL>.

- Descriptors that correspond to multi-crop passport descriptors (MCPD) (Alercia *et al.*, 2015) are marked in the text as [MCPD] to provide consistent coding schemes for common passport descriptors across crops.
- The code 'NA' where the data are not applicable or 'Unknown' where the data are unknown should be used to avoid blank fields.
- One-to-many relationships can exist between a CWR and crop. For example, there can be more than one crop that a CWR is related to, more than one potential breeding use of the CWR for multiple crops, or more than one Gene Pool or Taxon Group concept. Related crops are therefore reported separately for the Gene Pool and Taxon Group concept, the use in breeding for crop improvement, and the socio-economic value of the related crop.
- Following MCPD standards (Alercia *et al.*, 2015), semi-colons are used to separate multiple entries in every case where it is applicable.
- A 'Remarks' field is included for every descriptor group in case the user wishes to add any kind of note, including information that could potentially be missing from version 1 of this descriptor list.

1. Taxon

Nomenclature of the CWR taxon occurring in the geographic area of the checklist/inventory.

1.1 Scientific name

1.1.1 Family

Taxon family, in Latin. Initial uppercase letter required.

1.1.2 Genus

Genus name for taxon, in Latin. Initial uppercase letter required.

[MCPD]

1.1.3 Species

Specific epithet portion of the scientific name in lowercase letters.

[MCPD]

1.1.4 Species authority

The authority for the species name.

[MCPD]

1.1.5 Subtaxon

Subtaxon can be used to store any additional taxonomic identifier. The following abbreviations are allowed: 'subsp.' (for subspecies); 'convar.' (for convariety); 'var.' (for variety); 'f.' (for form); 'Group' (for 'cultivar group').

[MCPD]

1.1.6 Subtaxon authority

Subtaxon authority at the most detailed taxonomic level.

[MCPD]

1.1.7 Taxonomic reference

The taxonomic reference(s) used. Multiple entries are separated by a semicolon (;) without space. Example: *Mansfeld's World Database of Agricultural and Horticultural Crops*; *GRIN Taxonomy for Plants*.

1.2 Synonyms

Synonym(s) of the taxon, in Latin. Multiple entries are separated by a semicolon (;) without space. Enter 'NA' (not applicable) or 'Unknown' if there are no synonyms or if synonymy was not checked.

1.3 Common name

Name(s) of the taxon in colloquial language (if applicable). Multiple entries are separated by a semicolon (;) without space. If no common name is known, enter 'Unknown'.

1.3.1 Language of common name

Language(s) of the common name(s) (*Standard: ISO 639-2*). Provide the ISO code. Multiple entries are separated by a semicolon (;) without space.

1.4 Taxon remarks

Additional remark(s) regarding the taxon. If remarks refer to specific taxon descriptors, prefix remarks with the descriptor name they refer to and follow by a colon (:). For example, *SYNONYMS: GRIN Taxonomy used to identify synonyms*. Remarks referring to different descriptors are separated by semicolons (;) without space.

2. Gene Pool

Details about the crop(s) to which the taxon is related and the Gene Pool(s) (Harlan and de Wet, 1971) or Taxon Group(s) (Maxted *et al.*, 2006) to which the taxon belongs. See Annex I for explanations and definitions.

2.1 Related crop

The scientific name(s) of the crop(s) to which the taxon is related, in Latin. Multiple entries are separated by a semicolon (;) without space.

2.2 Common crop name

[MCPD]

The common name(s) of the crop(s) to which the taxon is related. Multiple entries are separated by a semicolon (;) without space.

2.3 Crop use

The use type(s) of the crop(s) to which the taxon is related according to Level 1 states adapted from Cook (1995). Multiple entries are separated by a semicolon (;) without space.

- 1 Food – Food, including beverages, for humans only. Subcategories could include: cereals/seeds; beans/pods; roots/tubers; leaf/flower/salad vegetables; bulbs/stem vegetables; fruits (sweet); fruits (savoury) (note: these can be recorded in the ‘Gene Pool remarks’ field)
- 2 Food additives – Processing agents and other additive ingredients which are used in food preparation. Subcategories could include: herbs; species; flavourings (note: these can be recorded in the ‘Gene Pool remarks’ field)
- 3 Animal food – Forage and fodder for vertebrate animals only
- 4 Materials – Woods, fibres, cork, cane, tannins, latex, resins, gums, waxes, oils, lipids etc. and their derived products
- 5 Fuels – Wood, charcoal, petroleum substitutes, fuel alcohols etc.
- 6 Medicines – Both human and veterinary
- 7 Environmental uses – Examples include intercrops and nurse crops, ornamentals, barrier hedges, shade plants, windbreaks, soil improvers, plants for revegetation and erosion control, waste water purifiers, indicators of the presence of metals, pollution, or underground water
- 8 Unknown
- 99 Other (specify in the ‘Gene Pool remarks’ field)

2.4 Concept type

Concept type(s) to which the taxon belongs. Permitted values are: Gene Pool, Taxon Group, and Unknown. Multiple entries are separated by semicolons (;) without space.

2.5 Concept level

Concept level(s) to which the taxon belongs. Permitted values are: 1A, 1B, 2, 3 (for both Gene Pool and Taxon Group), 4, 5 (for Taxon Group only), and Unknown. Multiple entries are separated by a semicolon (;) without space.

2.6 Concept reference

The reference(s) for the applied Gene Pool or Taxon Group concept. Multiple entries are separated by a semicolon (;) without space.

2.7 Gene Pool remarks

Additional remarks regarding the taxon Gene Pool or Taxon Group. Prefix remarks with the descriptor name they refer to and follow by a colon (:). For example, *Crop use: Food – fruits (savoury), Environmental uses – ornamental*. Remarks referring to different descriptors are separated by semicolon (;) without space.

3. Use

Details about the actual or potential use of the CWR taxon as a genetic resource for crop improvement and additional direct uses.

3.1 Breeding use

Description of the use the taxon has had or potentially can have in plant breeding for crop improvement, or of the traits known to exist or already donated to the crop. If no breeding use is known, enter 'Unknown'.

3.1.1 Potential or confirmed use

Whether the taxon has been used to successfully improve crops, or has traits which have the potential to improve crops in the future. Permitted values are: Potential, Confirmed, and Unknown.

3.1.2 Breeding use reference

The reference(s) to the data source describing the actual or potential use of the taxon in breeding for crop improvement. Multiple entries are separated by a semicolon (;) without space.

3.1.3 Breeding use – related crop

The scientific name(s) of the crop(s), which has/have been or potentially could be improved using the CWR taxon, in Latin. Multiple entries are separated by semicolons (;) without space.

3.1.4 Breeding use – related crop common name

The common name(s) of the crop(s) which has/have been or potentially could be improved using the CWR taxon.

3.2 Additional use

Direct uses of the CWR taxon in addition to its use as a genetic resource in breeding for crop improvement, according to use categories adapted from IUCN (<http://www.iucnredlist.org/technical-documents/classification-schemes>). Multiple entries are separated by semicolons (;) without space.

- 1 Food – human (Food and beverages for human consumption/nutrition)
- 2 Food – animal (Food and liquids for consumption by domestic/captive animals)
- 3 Medicine – human and veterinary (Materials administered specifically to treat or prevent a specific illness or injury. Items administered as vitamins, tonics etc. should be included under ‘Food’)
- 4 Poisons (e.g. pesticides, herbicides, fish poisons)
- 5 Manufacturing chemicals (e.g. solvents, dyes, adhesives, resins, etc., whether for domestic or commercial/industrial use)
- 6 Other chemicals (e.g. incense, perfumes, cosmetics)
- 7 Fuels (including wood and charcoal production from wood, grasses, etc.)
- 8 Fibre (e.g. for weaving, sewing, rope, paper, thatch, etc.)
- 9 Construction or structural materials (e.g. supports, timber, fencing, etc.)
- 10 Wearing apparel, accessories (e.g. clothing, footwear, belts, bags, trimmings)
- 11 Other household goods (e.g. containers, furnishings, etc. with primarily utilitarian functions, though potentially highly decorated)
- 12 Handicrafts, jewellery, etc. (Finished goods with primarily ornamental/decorative rather than utilitarian functions)
- 13 Horticulture (Plants used for re-planting for ornamental purposes, including in private gardens and public display – e.g. in botanical gardens)
- 14 Research (Includes specimens used in or as the subject of any type of research, e.g. medicine, propagation, disease resistance, etc.)
- 15 Specimen collecting (Includes collection and preservation of specimens for personal pleasure, e.g. not for research; collection of live specimens should be included under ‘Horticulture’)
- 16 Establishing *ex situ* production for commercial use
- 17 Unknown
- 18 Not applicable (when taxon does not have any additional use)
- 99 Other (specify in the ‘Use remarks’ field)

3.3 Use remarks

Additional remarks regarding the taxon uses. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by semicolons (;) without space.

4. Distribution

The geographic distribution of the taxon and its distribution status.

4.1 Distribution

The general distribution of the taxon. This information can be obtained for example from the US Germplasm Resources Information Network (GRIN – <https://www.ars-grin.gov/>), Kew's World Checklist of Selected Plant Families (WCSP – <http://wcsp.science.kew.org/home.do>), or Floras, monographs and other published materials. If distribution is not known, enter 'Unknown'.

4.2 Distribution status

The distribution status of the taxon within the geographic area of the checklist or inventory, indicating whether it is a National endemic, Regional endemic, Cosmopolitan, or Unknown. Note: 'Regional' is defined here as a geographic area comprising different countries (e.g. Europe, the Mediterranean region, the SADC region, Sub-Saharan Africa, Mesoamerica) rather than a sub-unit within a country (Magos Brehm *et al.*, 2017).

4.3 Distribution reference

The reference(s) to the information source(s) describing the distribution of the taxon. Multiple entries are separated by a semicolon (;) without space.

4.4 Distribution remarks

Additional remarks regarding the taxon distribution. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by a semicolon (;) without space.

5. Crop socio-economic value¹

The socio-economic value(s) of the crop or crop group² to which the CWR taxon is related based on one or more selected criteria.

5.1 Socio-economic value – related common crop name

The common name of the crop or crop group to which the socio-economic value data is provided.

¹ The term 'socio-economic value' as used in this publication refers to value to society both in terms of supporting economic growth and ensuring food security.

² Crop groups may include those defined by FAO (2017) (e.g. 'millet' which includes barnyard or Japanese millet (*Echinochloa frumentacea*); ragi, finger or African millet (*Eleusine coracana*); teff (*Eragrostis abyssinica*); common, golden or proso millet (*Panicum miliaceum*); koda or ditch millet (*Paspalum scrobiculatum*); pearl or cattail millet (*Pennisetum glaucum*); foxtail millet (*Setaria italica*) and small-grained cereals that include a large number of different botanical species) or groups such as 'cucurbits' (cucumber, gherkin, melon and melonseed), 'brassicas' (rapeseed, cabbage, cauliflower, broccoli and other brassicas), 'alliums' (onion, garlic, leek and shallot), 'citrus fruits' (orange, grapefruit, pomelo, lemon, lime, tangerine, mandarin, clementine, satsuma and other unspecified citrus fruits), and 'stonefruits' (peach, nectarine, plum, sloe, apricot, cherry and other unspecified stonefruits).

5.2 Socio-economic criterion

The socio-economic criterion used to define the value of the related crop or crop group. A number of criteria can be used – just two are listed here as examples: (i) calorific value: average annual contribution of crop/crop groups to dietary energy per capita per day over a certain period of time (e.g. last 10 years); (ii) production value: average annual production value over a certain period of time (e.g. last 10 years).

5.3 Socio-economic value

The numerical value of the socio-economic criterion.

5.4 Socio-economic value unit

The numerical value unit of the socio-economic criterion. For monetary value units use the monetary standards at <http://www.currency-iso.org/en/home/tables/table-a1.html> to indicate the currency.

5.5 Socio-economic value level

The level at which the socio-economic value of the related crop or crop group is provided. E.g. global, regional (which region), national (which country).

5.6 Socio-economic value reference

The reference(s) to the information and/or data sources used to define the socio-economic value of the related crop(s) or crop group(s). Multiple entries are separated by a semicolon (;) without space.

5.7 Socio-economic value remarks

Additional remarks regarding the crop socio-economic value. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by semicolons (;) without space.

6. Red List status

The Red List status of the taxon based on IUCN or national assessments.

6.1 Assessment level

The level of Red List assessment: Permitted values are: Global, Regional, and Not applicable. A region indicates any sub-global geographically defined area, such as a continent, country, state or province (IUCN, 2012). Multiple entries are separated by a semicolon (;) without space.

6.2 Assessment region

Indicate the region of assessment if the assessment level is regional.

6.3 Assessment year

The year in which the most recent Red List assessment was carried out. Multiple entries are separated by a semicolon (;) without space.

6.4 Assessment reference

The reference(s) related to the publication of the Red List assessment. Multiple entries are separated by a semicolon (;) without space.

6.5 IUCN category

The IUCN Red List category assigned to the taxon. Permitted values are: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient, and Not Evaluated. Multiple entries are separated by a semicolon (;) without space.

6.6 National category

The Red List category according to national criteria when an IUCN Red List assessment has not been undertaken, or in addition to IUCN category. Enter 'NA' if no national category is used.

6.7 Red List remarks

Additional remarks regarding the Red List status of the taxon. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by semicolons (;) without space.

7. Species biology

Information about the species biology, pollination, reproductive and seed dispersal systems etc.

7.1 Reproduction system

The reproductive system of the taxon. Permitted values are: Sexual, Vegetative, and Unknown.

7.2 Breeding system

The breeding system of the taxon. Permitted values are: Allogamous, Autogamous, Mixed mating, and Unknown.

7.3 Sex structure

The sex structure of the taxon. Permitted values are: Hermaphrodite, Monoecy, Andromonoecy, Gynomonoecy, Polygamomonoecy, Dioecy, Androdioecy, Gynodioecy, Polygamodioecy, Apomictic, Other, and Unknown.

7.4 Pollination method

The pollination method(s) of the taxon. Permitted values are: Ants, Bats, Bees (and other flying Hymenoptera), Beetles, Birds, Butterflies, Flies (and other Diptera), Moths, Wind, Other, Unknown, and Not applicable. Multiple values are separated by semicolons (;) without space.

7.5 Life form

The life form of the taxon. Permitted values are: Phanerophytes, Nanophanerophytes, Herbaceous phanerophytes, Chamaephytes, Hemicryptophytes, Geophytes, Therophytes, Epiphytes, Helophytes, Hydrophytes, and Unknown.

7.6 Life span

The life span of the taxon. Permitted values are: Annual, Perennial, Biennial, and Unknown.

7.7 Seed dispersal

The seed dispersal mechanism of the taxon. Permitted values are: Animal (zoochory), Wind (anemochory), Water (hydrochory), Methods originating from the parent plant or diaspore (autochory), Unassisted (barochory), Dispersal prevented (atelochory, antitelochory), Unknown, and Not applicable.

7.8 Chromosome number

The chromosome number(s) of the taxon. Multiple values are separated by a semicolon (;) without space.

7.9 Biology remarks

Additional remarks regarding the biology of the taxon. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by semicolons (;) without space.

8. Conservation

Information about conservation actions carried out for the taxon, adapted from IUCN - Classification of Conservation Actions In-Place v.2³.

8.1 Conservation action

Indicate whether there are any current conservation actions in place for the taxon. Permitted values are: Yes, No, and Unknown.

³ Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3118/dec_2012_guidance_conservation_actions_in_place_classification_scheme.pdf (accessed on 22 November 2017).

8.2 Conservation area

The geographical area to which the conservation action applies (region, country or a country subdivision). For country codes use the three-letter ISO 3166–1 Alpha-3 code; for sub country region codes use the ISO 3166–2 codes.

8.3 Species conservation action plan

Indicate whether there is a species conservation action plan for the taxon. Permitted values are: Yes, No, and Unknown.

8.4 *In situ* conservation actions

8.4.1 Presence in existing protected area(s)

Indicate whether the taxon is known to be present in one or more protected areas (PA) or the distributional range of the taxon overlaps with one or more protected areas. Permitted values are: Known presence in PA, Overlap with PA, No, and Unknown.

8.4.2 Active *in situ* management and monitoring

Indicate whether the taxon is actively managed and monitored within the PA(s) (i.e. a PA management plan exists that addresses the management of the target taxon). Permitted values are: Actively managed in at least 5 PAs, Actively managed in 1–4 PAs, Not actively managed, and Unknown.

8.4.3 Range of active *in situ* conservation actions

Indicate whether sites for active *in situ* conservation of the taxon have been identified from throughout or through part of the taxon's range. Permitted values are: Yes - over entire range, Yes - over part of range, No, and Unknown.

8.4.4 Recovery action

Indicate whether there is a recovery action plan for the taxon. Permitted values are: Yes, No and Unknown.

8.5 *Ex situ* conservation

8.5.1 Number of population samples conserved *ex situ*

Indicate whether there are samples (accessions) of the taxon held *ex situ*. Permitted values are: More than 50 samples held *ex situ*, 10–49 samples held *ex situ*, Less than 10 samples held *ex situ*, Not conserved *ex situ*, and Unknown.

8.5.2 Range of *ex situ* conservation sampling

Indicate whether *ex situ* conservation samples (accessions) have been collected from throughout or through part of the range of the taxon. Permitted values are: Yes - over entire range, Yes - over part of range, No, and Unknown.

8.6 Education

Indicate whether the taxon is included in any recent education or awareness schemes. Permitted values are: Yes, No, and Unknown.

8.7 Legislation

Indicate whether the taxon is included in international, regional or national policy or legislation. Permitted values are: International policy or legislation, Regional policy or legislation, National policy or legislation, No, and Unknown.

8.8 Trade

Indicate whether the taxon is subject to any international management/trade controls. Permitted values are: Yes, No, and Unknown.

8.9 Conservation references

Provide the reference(s) related to the conservation actions. Prefix references with the descriptor name they refer to and follow by a colon (:). Multiple entries are separated by a semicolon (;) without space.

8.10 Conservation remarks

Additional remarks regarding conservation descriptors. Prefix remarks with the descriptor name they refer to and follow by a colon (:). Remarks referring to different descriptors are separated by semicolons (;) without space.

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ANNEX I. The Gene Pool and Taxon Group concepts

The Gene Pool (Harlan and de Wet, 1971) and Taxon Group (Maxted *et al.*, 2006) concepts provide classification systems for the relationship between crops and their wild relatives.

Gene Pool: Within each crop complex there is a potential pool of genetic diversity available for utilization. The Gene Pool concept describes a gradation of that diversity dependent on the relative crossing ability between the crop and the wild species in the primary, secondary or tertiary gene pool of the crop.

The Gene Pool (GP) levels are defined as follows:

GP 1a – cultivated form of the crop taxon

GP 1b – wild or weedy forms of the crop taxon and all the closely related taxa that are able to freely interbreed with the crop and give rise to fully fertile progenies

GP 2 – taxa more remotely related to the crop, but still capable of crossing with it and producing some fertile hybrids

GP 3 – taxa remotely related to the crop and naturally incapable of interbreeding with the crop

Taxon Group: For those taxa where the necessary crossing and genetic diversity data are unavailable to define the Gene Pool level, the Taxon Group concept provides an alternative means of estimating the degree of relatedness of crops and their wild relatives.

The Taxon Group (TG) categories are as follows:

TG 1a – crop

TG 1b – same species as crop

TG 2 – same series or section as crop

TG 3 – same subgenus as crop

TG 4 – same genus as crop

TG 5 – different genus to the crop



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