GLOBAL CROP CONSERVATION AND USE METRICS

TURKEY BERRY
(*Solanum torvum* Sw.)

CROP TRUST

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Global crop conservation and use metrics

TURKEY BERRY
(*Solanum torvum* Sw.)

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and Regional Identity

Description

This report provides an up-to-date overview of the global status of *ex situ* conservation of genetic resources of turkey berry and its wild relatives, including key metrics on:

- the identity and composition of genebank collections;
- the Multilateral System (MLS) status of accessions in these collections;
- storage, regeneration, and safety duplication status;
- documentation, information systems, and research resources; and
- crop networks and partnerships

Introduction and background on turkey berry

Turkey berry (*Solanum torvum* Sw.) is likely native to Mesoamerica and the Caribbean, although it is now naturalized at low elevations across many tropical and subtropical regions worldwide and is considered a weed in many regions (USDA, 2025; WFO, 2025). Many sources cite its native range as including areas of Africa and Asia as well as the Americas (Ogwu *et al.*, 2023). The plant produces edible fruits rich in vitamins, minerals (including iron), dietary fiber, protein, and phytochemicals including flavonoids, alkaloids, and saponins, and is used particularly in Africa and Asia to prepare curry and gravy dishes, stir-fries, pickles, chutneys, soups, stews, and sauces (Ogwu *et al.*, 2023; WFO, 2025). The fruit is exported to Europe and other regions (WFO, 2025). It is also used as a medicinal plant, particularly renowned in Ayurveda and Siddha medicine for healing stomach aches, breaking fasts, and enhancing digestion, among others (Darkwah *et al.*, 2020; Ogwu *et al.*, 2023). Horticulturally, it serves as a disease resistant rootstock for eggplant (Miceli *et al.,* 2014). Global cultivation and consumption statistics are extremely limited for turkey berry, and it is not tracked in FAOSTAT.

Identity and composition of *ex situ* collections

Solanum L. (Solanaceae) is an enormous genus of more than 1,200 species (Messeder *et al.*, 2024; WFO, 2025), which contains over 20 cultivated species, including major domesticated crops such as potato (*Solanum tuberosum* L.), eggplant (*Solanum melongena* L.), and tomato (*Solanum lycopersicum L.*), and regionally important species including African eggplant (*Solanum macrocarpon* L.), Ethiopian eggplant (*Solanum aethiopicum* L.), lulo or naranjilla (*Solanum quitoense*), pepino (*Solanum muricatum* Aiton), tree tomato or tamarillo (*Solanum betaceum* Cav.), cocona (*Solanum sessiliflorum* Dunal), bush tomato (*Solanum centrale* J.M.Black), and turkey berry (*Solanum torvum* Sw.) (Hilgenhof *et al*., 2023). A published genepool concept is not available for turkey berry. Data compilation for this report on turkey berry genetic resources focused only on the taxon *Solanum torvum* Sw.

Based on the latest data in global genetic resource databases, germplasm collections of turkey berry are present in 10 institutions worldwide, collectively maintaining only 141 accessions (Table 1, Table 2). The World

Table 1. *Ex situ* collections of turkey berry genetic resources, listed in descending order by total number of accessions. Number of accessions and storage condition information from Genesys and FAO WIEWS (2025), with supplementary information as noted. Multilateral System (MLS) status from Plant Treaty GLIS (2025) and from Genesys and FAO WIEWS (2025).

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
TWN001	World Vegetable Center	107	75.9%	75.9%	101	106	106
GBR004	Millennium Seed Bank - Royal Botanic Gardens Kew	20	14.2%	90.1%	Not listed*	0	8
GHA091	Plant Genetic Resources Research Institute	4	2.8%	92.9%	Not listed	3	4
BRA012	Embrapa Hortaliças	3	2.1%	95.0%	Not listed	0	2
CUB014	Instituto de Investigaciones Fundamentales en Agricultura Tropical	2	1.4%	96.5%	Not listed	0	0
ARM008	Scientific Centre of Vegetable and Industrial Crops	1	0.7%	97.2%	Not listed	1	1
BGR001	Institute for Plant Genetic Resources 'K.Malkov'	1	0.7%	97.9%	Not listed	0	0
BRA003	Embrapa Recursos Genéticos e Biotecnologia	1	0.7%	98.6%	Not listed	0	0
DEU146	Genebank, Leibniz Institute of Plant Genetics and Crop Plant Research	1	0.7%	99.3%	1	1	1
NLD037	Centre for Genetic Resources, the Netherlands	1	0.7%	100.0%	1	1	1

* but known to conserve accessions in long-term storage conditions

Vegetable Center maintains an international collection for the crop, which comprises over three-quarters of all accessions worldwide.

The great majority of accessions (77.3%) are listed as of wild origin, with an additional 17% listed as landraces (Table 2); these percentages are estimates based on available data, noting that 5% of accessions do not have biological status data. Turkey berry germplasm has been collected from at least 20 countries; none of the accessions originate from the primary regions of diversity of the plant in the American tropics. Information on botanic garden collections from BGCI PlantSearch indicate that 17 botanic gardens also conserve turkey berry.

Table 2. Composition of *ex situ* collections of turkey berry genetic resources. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). Primary and secondary regions information from Khoury *et al.* (2023) and subsequent research for this summary. Botanic gardens data from BGCI PlantSearch (2025).

Metric	Number	Percentage
Total number of accessions in genebank collections	141	
Number of institutions holding genebank collections	10	
Number of distinct taxonomic names in genebank collections	1	
Number of accessions of wild materials in genebank collections	109	77.3%
Number of accessions of weedy materials in genebank collections	0	0.0%
Number of accessions of landraces in genebank collections	24	17.0%
Number of accessions of breeding materials in genebank collections	1	0.7%
Number of accessions of improved varieties in genebank collections	0	0.0%
Number of accessions of other materials in genebank collections	0	0.0%
Number of accessions not marked with an improvement type in genebank collections	7	5.0%
Number of countries where germplasm has been collected for genebank collections	20	
Number of accessions in genebank collections from the primary region(s) of diversity	0	0.0%
Number of taxa in botanic garden collections	1	
Number of botanic gardens holding collections of crop or its wild relatives	17	

Multilateral System status of accessions in *ex situ* collections

Solanum sections Tuberosa (potato) and Melongena (eggplant) are listed in Annex I of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty) and are thus included in its Multilateral System of Access and Benefit Sharing (MLS). Turkey berry is not listed. This said, institutions can voluntarily place their collections under the MLS. Of the 141 accessions conserved globally, 75.9% are held in international institutions (i.e., at the World Vegetable Center), and are included in the MLS of the Plant Treaty, with the remainder maintained in national and other collections (Table 3).

As of 2025, 112 accessions are formally included in the MLS according to the Plant Treaty's GLIS database, and 114 accessions have been assigned Digital Object Identifiers (DOIs). Per the relevant fields in the global genetic resources databases, 123 accessions (87.2% of world total) are listed as included in the MLS.

Table 3. Representation of turkey berry accessions in international and national institutions, number of accessions with DOIs, and representation of accessions in the Multilateral System of Access and Benefit Sharing of the International Treaty on Plant Genetic Resources for Food and Agriculture. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). DOI and MLS data from Plant Treaty GLIS (2025).

Metric	Number	Percentage
Number of accessions in genebank collections in international institutions	107	75.9%
Number of accessions in genebank collections in national or other institutions	34	24.1%
Number of accessions in genebank collections in Annex I	0	0%
Number of accessions with DOI (Plant Treaty GLIS 2025)	114	
Number of accessions included in the Multilateral System (MLS) (Plant Treaty GLIS 2025)	112	
Number of accessions included in the Multilateral System (MLS) (genebank collections databases)	123	87.2%
Number of accessions included in the Multilateral System (MLS) that are in international collections (genebank collections databases)	106	75.2%
Number of accessions not included in the Multilateral System (MLS) (genebank collections databases)	15	10.6%
Number of accessions without information regarding inclusion in the Multilateral System (MLS) (genebank collections databases)	3	2.1%

Storage conditions, regeneration status, and safety duplication

As expected for an orthodox seed crop, the great majority (at least 94.3%) of turkey berry accessions are conserved as seed, with 77.4% of these accessions listed as conserved under long-term cold-storage conditions (Table 4). Information on storage in general is missing for 5.7% of all accessions, and information on seed storage type (i.e., long, medium, or short term) is missing for 20.3% of seed accessions.

Current regeneration status and needs cannot be directly derived from the global germplasm databases. FAO WIEWS reporting for the *Third State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2025b) for the years 2014 to 2019, did not document any regeneration needs specifically for turkey berry.

Analysis of the location of safety duplication sites of turkey berry germplasm, as listed in Genesys, indicates that at least 14.2% of accessions are safety duplicated in an active collection (i.e., apart from potentially being duplicated at the Svalbard Global Seed Vault [SGSV]) outside of the country of the main collection (Table 4). Information from the SGSV database from 2024 indicates that approximately 36.2% of total accessions worldwide are duplicated in Svalbard.

Table 4. Storage conditions of turkey berry *ex situ* collections, regeneration status, and safety duplication status. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). Regeneration status information from FAO WIEWS (2025); data from 2014 to 2015. Safety duplication out of the country data based only on Genesys (2025) data. Svalbard Global Seed Vault data from SGSV portal (2025).

Metric	Number	Percentage
Number of accessions held in seed storage in genebank collections	133	94.3%
Number of accessions held in short-term seed storage in genebank collections	0	0%
Number of accessions held in medium-term seed storage in genebank collections	3	2.3%
Number of accessions held in long-term seed storage in genebank collections	103	77.4%
Number of accessions held in seed storage of undefined type in genebank collections	27	20.3%
Number of accessions held in field storage in genebank collections	0	0%
Number of accessions held in in-vitro storage in genebank collections	0	0%
Number of accessions held in cryo storage in genebank collections	3	2.1%
Number of accessions held as DNA in genebank collections	0	0%
Number of accessions held in other storage in genebank collections	0	0%
Number of accessions not marked with a storage type in genebank collections	8	5.7%
Number of accessions in genebank collections regenerated 2014-2019	0	0%
Number of accessions in genebank collections in need of regeneration 2014-2019	0	0%
Number of accessions in genebank collections in need of regeneration without budget for regeneration 2014-2019	0	0%
Number of accessions safety duplicated out of the country in genebank collections	20	14.2%
Number of accessions in genebank collections safety duplicated in Svalbard	51	36.2%

Documentation, information systems, and research resources

There is no descriptor list published by the international agricultural research community specifically for turkey berry. The estimated completeness of passport information for turkey berry accessions listed in Genesys is 6.4 on a scale of 0 (no data) to 10 (complete data), which indicates that a sizable amount of data is available, but also that there are gaps that it would be valuable to fill. The amount of research resources, such as herbarium specimens, in the Global Biodiversity Information Facility, is 20,668 records for the species (GBIF, 2025).

Conclusions

Turkey berry is a useful and promising plant for both human nutrition and sustainable agriculture. Its *ex situ* genetic resources comprise only around 150 accessions globally, thus further collecting of a broader representation of the diversity of this widespread food plant is a high priority. Current collections are bolstered by the activities mainly taking place at the World Vegetable Center. Lack of inclusion of the plant in Annex 1 of the Plant Treaty may constrain international access to germplasm, although the large proportion of accessions held at the World Vegetable Center translates to approximately 87.2% of total accessions worldwide currently included in the MLS. Likewise, due to World Vegetable Center infrastructure, long-term seed storage of turkey berry collections appears to be very well established, with around 77.4% of all accessions worldwide maintained as seed conserved in these conditions. Information on production and consumption of the crop, associated research resources, and germplasm distributions and varietal development are limited. Further efforts are required to: regenerate accessions in need; fully secure these accessions in long-term seed storage conditions and safety backup all unique accessions, including at the SGSV; and provide more complete accession-level passport information as well as generate characterization and evaluation datasets.

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Methods and materials

Primary data sources for the metrics reported in this summary include: Genesys; World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture of the Food and Agriculture Organization of the United Nations (FAO WIEWS); Botanic Gardens Conservation International PlantSearch database (BGCI PlantSearch); Global Information System of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty GLIS); Data Store of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty Data Store); Svalbard Global Seed Vault portal (SGSV portal); International Union for the Protection of New Varieties of Plants (UPOV) PLUTO database; FAOSTAT; National Center for Biotechnology Information's Entrez database (NCBI Entrez); Google Scholar; PubMed Central; Wikipedia; and the Global Biodiversity Information Facility (GBIF). Some of these data were acquired from literature/databases including Khoury et al. (2023) and Khoury et al. (2025). Data processing, metric calculation, and table generation were conducted in R, with code available on this GitLab repository. Extended methods are available here.

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