
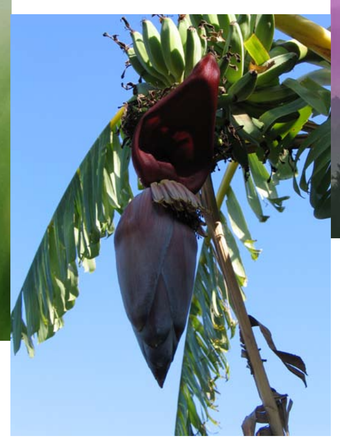

GBIF
www.gbif.org
...free and open access to biodiversity data

GBIF: Providing means for evaluating the impact of climate change on crop wild relatives

Crop	Genus	# species	G	H	Total
Barley	Hordeum	27	1419	10965	12384
Bean	Phaseolus	72	2435	2952	5387
Chickpea	Cicer	23	314	19	333
Cowpea	Vigna	64	2509	6306	8815
Faba bean	Vicia	9	511	949	1460
Finger millet	Eleusine	7	3	68	71
Maize	Zea	4	228	143	371
Pearl millet	Pennisetum	54	963	3409	4372
Pigeon pea	Cajanus	26	197	601	798
Sorghum	Sorghum	31	320	4138	4458
Wheat	Aegilops	23	4016	2231	6247
Wheat	Triticum	3	1374	1	1375

Table 1. Total number of herbarium specimens and germplasm accessions available for each major crop wild relative genepool through GBIF

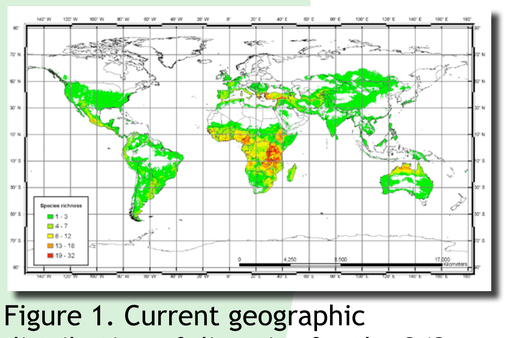

Figure 1. Current geographic distribution of diversity for the 343 crop wild relative species studied

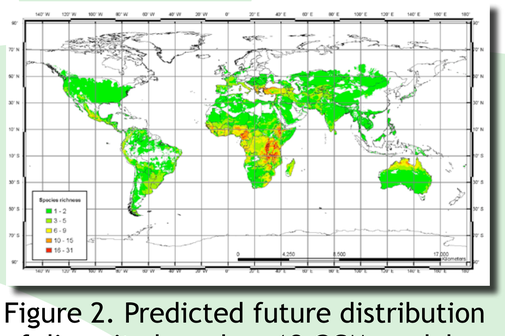

Figure 2. Predicted future distribution of diversity based on 18 GCM models under the A2a scenario

Crop wild relatives are a vital source of genetic diversity that can be used to adapt cultivated crops to climate change. However, the survival of crop wild relatives themselves is under threat today from the impacts of climate change.

In this study, we use data accessible through GBIF, the Global Biodiversity Information Facility, to evaluate the possible threats posed by climate change on 11 wild genepools of some of the major crops across the globe, comprising a total of 343 species.

For each species, we have compiled data of both herbarium collections and germplasm accessions from GBIF, and analysed the potential distribution of each species using the Maximum Entropy approach in Maxent (Figure 1). Based on 18 global climate models for the year 2050 under emissions scenario A2a we also mapped the future geographic distribution of species, assuming unlimited migration rates (Figure 2)

We then mapped the current richness of crop wild relatives, the future predicted richness and the predicted change. The results show the hotspots of change, where significant loss of diversity is expected to occur (Figure 3). These sites, mostly in sub-saharan Africa, eastern Turkey, the Mediterranean region, and parts of Mexico are priority areas for future collection of *ex situ* genetic resources and their long-term conservation in genebanks.

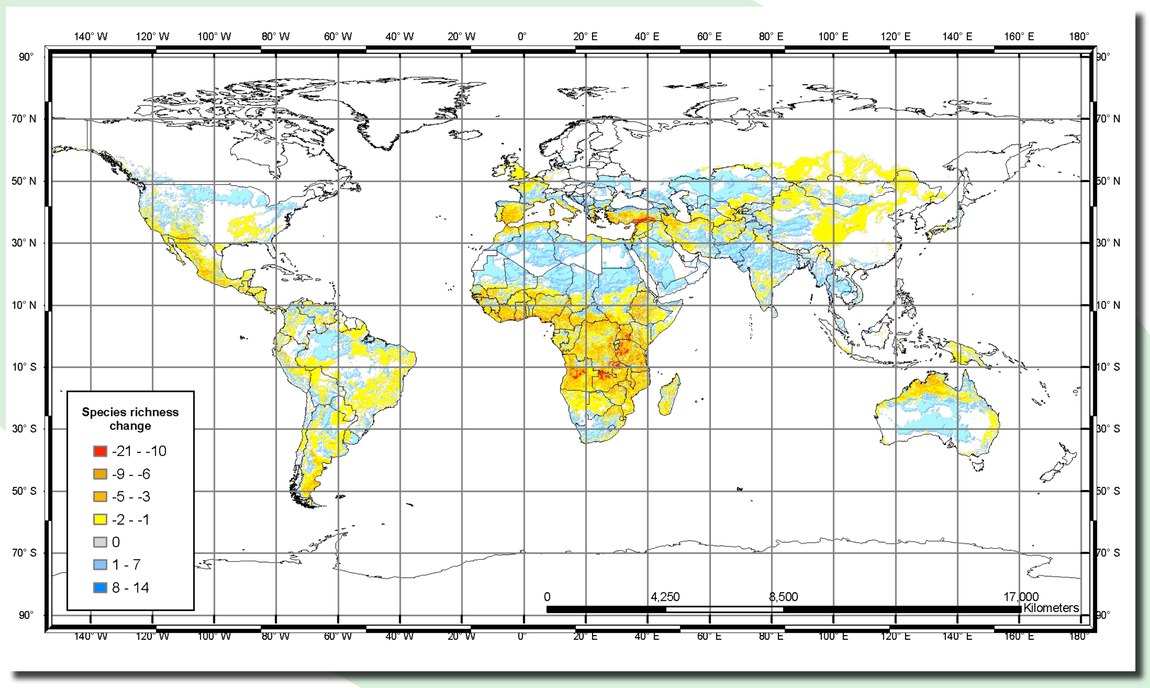

Figure 3. Predicted change in species richness to 2050

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International Center for Tropical Agriculture

Bioversity International

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About GBIF

GBIF makes digital biodiversity **data openly and freely available** on the Internet for everyone, and endorses both open source software and open data access.
http://www.gbif.org

GBIF provides **scientific biodiversity data** for decision-making, research endeavours and public use.
http://data.gbif.org

GBIF is a network of **data publishers who retain ownership and control** of the data they share. Linked datasets provide a more robust representation of biodiversity than any single dataset.

GBIF provides access to primary biodiversity data held in institutions in developed and developing countries. **Data shared through GBIF are repatriated data**.

GBIF is a **dynamic, growing partnership** of countries, organisations, institutions and individuals working together to mobilise scientific biodiversity data.

GBIF invites you to download species occurrence data freely and openly from **http://data.gbif.org**

GBIF invites you to **join** the GBIF network **and share** your biodiversity data, as well as participate in developing **new tools and services.**

2010 International Year of Biodiversity

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