Saving our crops: Scientists develop first database of crop wild relative species

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The first database of crop wild relatives (CWR) – species that are closely related to crops - and their locations around the world has been developed by scientists at the University of Birmingham according to research published in the Journal of Biological Conservation.

Impacts of climate change on crops and food security together with a growing world population is necessitating the conservation of CWR and is deemed an urgent priority by the United Nations Food and Agriculture Organization, as the wild relatives of crops have the potential to contribute many resilient traits that could play a key role in crop improvement, helping to mitigate the predicted negative impact of climate change on crop production.

Each of the crops that we eat grow under a limited range of environmental conditions, however their wild relatives often grow under a much broader range of conditions, for example, extremes of weather such as heavy rainfall or drought, and exposure to different pests and diseases localized to certain areas. So the crop related wild species have evolved the traits to withstand these stresses and these can be transferred to the less resilient crops

Now a comprehensive database of CWR exists, the aim is to systematically conserve CWR diversity and make the wealth of resilient characteristics available to plant breeders to transfer to the related crops, so that the crop is then able to grow in more testing conditions.

The inventory the Birmingham scientists have developed lists 173 crops and their 1667 priority wild relatives. For example, the crop wild relative of the wheat crop, called Aegilops tauschii, is resistant to the Hessian Fly, which is a pest of cereal crops; Saccharum arundinaceum, which is the relative of sugarcane, can survive in very low temperatures; and Prunus ferganensis, the crop wild relative of the peach crop, is tolerant to drought conditions.

The Birmingham research team found the priority CWR predominantly in developing countries including Central America, the Andes, Ethiopia, Central Asia, India, Papa New Guinea as well as Australia and around the Mediterranean. The highest concentration of CWR per unit area of land was found in Syria and the Lebanon.

Dr Nigel Maxted from the University of Birmingham's School of Biosciences, who led the research, said: *'There has previously been no opportunity to systematically conserve and use CWR as there was a lack of clarity over their identities. By generating this inventory and discovering which countries and regions are the richest in terms of priority CWR, we can more efficiently plan conservation efforts to target them.'*

He continued: *'Our inventory is the first annotated list of priority CWR of the world's most important human and animal food crops and it is already proving to be a significant resource for conservation planning. Once they are conserved they can be used to mitigate the effects of climate change, which could mean the difference between living and dying in some communities.'*

Holly Vincent from the University of Birmingham, who was also involved in the research, said: *'The global population is now 7 billion and by 2050 it will be 9 billion so there is an urgent need to identify and conserve crop wild relatives as part of the wider need to address global food security issues.'*

Ends

Notes to Editors
1. The inventory is called the Harlan and de Wet CWR Inventory in honour of the scientists who originally proposed the crop gene pool concept.
2. The inventory can be visited at **www.cwrdiversity.org/ (http://www.cwrdiversity.org/)**
3. Below is a table of crops, their wild relatives and where they were found:

Crop	CWR	Trait of CWR	Location of CWR
Sugar beet	*Beta maritima*	Salt tolerance, drought tolerance	UK, Portugal, Spain, Algeria, Egypt, Libya, Morocco, Cyprus, Israel, Jordan, Lebanon, Syria, Turkey, Azerbaijan, Sweden, Belgium, Germany, Netherlands, Albania, Bulgaria, Croatia, Greece, Italy, Ireland, Montenegro, France, Tunisia
Carrot	*Daucus carota* subsp. *gummifer*	A source of cytoplasmic male sterility	UK , Spain, France, Portugal, Libya, Morocco
Wheat	*Aegilops tauschii*	Hessian fly resistance	Syria, Turkey, Russia, Georgia, Armenia, Ukraine, China, Afghanistan, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan, Azerbaijan, Iraq
Rice	*Oryza coarctata*	Salt tolerance	Bangladesh, India, Pakistan, Burma
Sugarcane	*Saccharum arundinaceum*	Low temperature tolerance	China, Japan, Taiwan, Bangladesh, Bhutan, India, Sri Lanka, Laos, Burma, Malaysia, Thailand, Vietnam
Peach	*Prunus ferganensis*	Drought tolerance	Tajikistan
Potato	*Solanum kurtzianum*	Cyst nematode resistance	Argentina
Sunflower	*Helianthus deserticola*	Downy mildew resistance	USA

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