



**Conserving plant diversity
for future generations**

www.farmerspride.eu
@PGRInSitu | #EUfarmerspride



Funded by the Horizon 2020
Framework Programme of the
European Union

Farmer's Pride webinar

**Crop wild relative conservation – adding value to Europe's
natural sites**

23 June 2020

Hosted by Eurosite



Overview

Crop wild relatives (CWR) are wild plant species that provide vital diversity for adapting and improving our crops – particularly in the race to combat the adverse impacts of climate change on agricultural production systems. Recent research has shown that a significant number of CWR species occur within protected areas in Europe, including at least two thirds of the highest priority species in need of conservation action in the region. Due to the unique value of CWR for food security, conserving these species in Europe’s managed natural sites offers a novel opportunity to add significant value to these areas.

The aim of this webinar was to introduce natural site managers to the value of CWR in a European and global context, explain which species are a priority for conservation action in Europe and why, and present what we know about where they are found in the wild. We aim to engage site managers in international efforts to conserve these precious resources, and explained how this can be achieved in existing sites with minimal additional effort and investment, providing a priceless contribution to food security and sustainable agriculture.

For more information about our research, please visit www.farmerspride.eu or contact Shelagh Kell: s.kell@bham.ac.uk.

Participants

- **Speakers:** Nigel Maxted, Shelagh Kell – University of Birmingham, UK; José Iriondo – Universidad Rey Juan Carlos, Spain
- **Chair and facilitator:** Wojtek Mróz, Eurosite Secretariat
- **Q&A facilitator:** Joana Magos Brehm, Portuguese National Genebank, Instituto Nacional de Investigação Agrária, Portugal
- **Organizer and facilitator:** Jelke Brandehof, Eurosite Secretariat
- **Attendees:** 97 individuals from 35 countries in and outside Europe

Programme

1. Introduction
2. *Building mutually beneficial collaboration: linking protected area and CWR conservation* – Nigel Maxted
3. *Crop wild relatives in Europe – prioritizing species for conservation action* – Shelagh Kell
4. *Conservation of crop wild relatives in the Natura 2000 network* – José Iriondo
5. General Q&A (there was also time for Q&A after each presentation)
6. Concluding remarks

Recording and presentations

You can find a recording of the webinar and download the presentations here:

www.eurosite.org/events/farmers-pride-webinar-crop-wild-relative-conservation-adding-value-to-europes-nature/.

Q&A

Written questions were asked during the webinar using the ‘Q&A’ facility in Zoom. Some questions were answered ‘live’ by the speakers, some were answered in writing, while some remained unanswered. All questions and answers are provided below.

1. Are there special guidelines for monitoring CWR diversity in protected areas?

CWR population management guidelines are under development in the context of the Farmer's Pride project and will be published online before the end of the project. Please visit farmerspride.eu for further information about the project and sign up to our mailing list to receive regular updates.

2. Is the European priority CWR list published anywhere?

The CWR inventory for Europe (i.e. the list of priority taxa and associated data, such as the crop–CWR relationships and regional Red List status) will be published in an online data repository in the coming months. In the interim, the list of priority taxa can be found here:

more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/06/Farmers_Pride_CWR_in_Natura_2000.pdf

3. What is the geographical distribution of the priority CWR species? Are there at least some populations of some species in all European countries?

The geographical distribution of the priority species varies – some are widespread and others have relatively narrow distributions. However, as a whole, they are distributed throughout Europe and our results show that there are at least some populations of some priority species in all European countries.

4. Are you now analysing complementarity to see what 'core' subset of Natura 2000 sites conserves the most taxa and populations?

Yes, we are undertaking complementarity analysis to identify the optimum localities for conserving European priority CWR taxa. This will include consideration of ecogeographic diversity as a proxy for genetic diversity, as well as climate change modelling.

5. Do Natura 2000 site managers know they hold CWR (and manage them consciously)?

We are just taking the first steps now to communicate this to site managers, including through this webinar. The results of the analyses undertaken in the Farmer's Pride project have enabled us to take a significant step forward in this regard.

6. Is it necessary to inventory all CWR in all Natura 2000 sites or can I just derive a list CWR from Natura 2000 species lists?

There are various ways to identify which species in Natura 2000 sites are CWR. In addition to the results presented in this webinar, another option is to cross-check protected area inventories with an inventory of CWR taxa (see more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/06/Farmers_Pride_CWR_in_Natura_2000.pdf). We have not started such an initiative, but we will be very happy for protected area managers interested in following this approach to contact us.

7. Does CWR conservation need to be integrated into all Natura 2000 sites and their management plans? Do all Natura 2000 sites need to provide seed and other samples of their CWR at regular intervals to national gene banks with open ABS access?

It would be ideal if we could integrate CWR conservation into all Natura 2000 sites and their management plans. If that were implemented, it would not be necessary to provide CWR seed samples from all sites to national gene banks. A representative sample from carefully chosen Natura 2000 sites would be enough to ensure that genetic diversity of CWR is adequately conserved *ex situ*. The terms of use of the material would be negotiated on an individual basis between the protected area manager and the gene bank, according to national and EU regulations.

8. How does protection in the Natura 2000 network relate to the ECPGR Concept for *in situ* conservation of CWR in Europe?

The ECPGR Concept for *in situ* conservation of CWR in Europe calls for the establishment of Most Appropriate Wild Populations (MAWPs) of CWR to be identified at both national and regional levels. Within the Farmer's Pride project, we are taking the Concept forward with the current regional diversity and gap analyses and with the establishment of the European network for plant genetic resources conservation and sustainable use (which will include both CWR and landrace diversity – see more.bham.ac.uk/farmerspride/network/). The Natura 2000 network is an important vehicle for taking the Concept and the European PGR network forward since it is a permanent mechanism for the implementation of the EU Birds and Habitats Directives, and countries in the EU are therefore committed to maintaining the sites for their conservation value. Further, countries and individual site managers can increase and promote the value of Natura 2000 sites by including CWR (and landrace) conservation in their management plans. Thus, the identification and promotion of CWR in the Natura 2000 network is a significant step forward in meeting the goals of the European Concept for *in situ* conservation of CWR in Europe.

9. How many of the priority CWR are not found in the Natura 2000 network, and of these, how many are found in gene banks?

The results show that of the 568 priority CWR for which high quality data were available for the *in situ* gap analysis presented in this webinar (66% of the priority taxa), 49 (<9%) do not have any populations within the Natura 2000 network. Further investigation is needed to ascertain under which type of land use these populations occur. We are currently working on the *ex situ* conservation gap analysis for the priority taxa and will be publishing the results in the Farmer's Pride website in the coming months.

10. Should the CWR in Natura 2000 sites be regularly sampled (e.g. every few years) to supply and update national gene banks in order to reflect any evolution, hybridization, locational movements etc.?

In an ideal world, yes, germplasm of all populations targeted for *in situ* conservation should be collected regularly (e.g. every five or ten years, depending on the biology, threat status etc. of the taxon) to ensure that a representative range of evolving genetic diversity is conserved *ex situ*. This is both to ensure that the genetic diversity is not lost to unforeseen pressures on the *in situ* populations, and that genetic diversity that may be changing in response to environmental conditions (particularly in the context of climate change) is available for use in crop improvement programmes. However, to achieve this, gene banks will require additional funding and infrastructure.

11. How about changes of habitats in protected areas due to climate change? Currently protected CWR in those areas may be under threat later.

It is important to take the potential impacts of climate change on CWR populations into account when planning complementary conservation, and this can be achieved using meteorological data in the diversity and gap analyse (and will be undertaken in the Farmer's Pride project as part of the regional CWR conservation planning for Europe). Using this approach, for *in situ* conservation, we can prioritize the populations that we think will be most secure, while for *ex situ* conservation, we can prioritize the populations that we think will suffer genetic erosion or be lost due to the impacts of climate change. Further, when CWR are identified in protected areas and included in the management plan for the site, regular monitoring will provide early warning for population decline and genetic erosion. The potential impact of climate change applies to all species in protected areas and is not specific to CWR.

12. As a number of CWR species are also found in marginal zones of agricultural sites, will you be engaging with farmers close to existing protected areas as a priority?

We are increasingly turning to the promotion of CWR *in situ* conservation on-farm because CWR often occur in field margins, orchards or fallow areas. However, these populations may occur either within or outside protected areas. Working with farmers inside protected areas has the advantage that these areas already have an associated long-term conservation ethos and are less prone to hasty management changes associated with private land, and it may be relatively easy to amend the existing site management plan to facilitate genetic conservation of wild plant species. As a community of PGR conservation practitioners, it is important to communicate with farmers about the value of the CWR on their land. They are often receptive to the idea of engaging in active *in situ* CWR conservation, appreciating their value for crop improvement.

13. Many CWR occur in disturbed habitats like roadsides where it is difficult to apply management approaches (e.g. *Lactuca* and *Daucus* spp.). How do we deal with those taxa/populations?

In these circumstances, specific management approaches need to be explored and implemented, and an agreement made between the private companies/public administrations in charge of managing these habitats and the national agency responsible for PGR conservation.

14. What does 'passively protected' mean?

In the context of CWR, 'passive' conservation is a term used when a taxon is present in a given protected area, but not specifically a target of conservation action. The populations of these passively conserved taxa are therefore not monitored or managed. The distinction between 'active' and 'passive' CWR conservation is important because it is often assumed that CWR taxa are conserved simply due to their presence in protected areas, and reported as such through mechanisms such as the Second Global Plan of Action for PGRFA (www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/en/). The identification of CWR in protected areas is a first step towards their active conservation, which requires their inclusion in the site management plan, and associated actions.

15. Are there any monitoring and/or management plans prepared/implemented for the genetic reserves in the UK, although they are not officially recognized (so far)?

Yes, there is a management and monitoring plan for CWR in the Lizard National Nature Reserve, although it is restricted to demographic population monitoring, not genetic monitoring. Ideally, monitoring of CWR populations should be a mix of demographic and genetic monitoring.

16. Have you assessed the Purbeck National Nature Reserve for CWR opportunities (in Dorset, England)?

Yes, this came out as a richness site for CWR in the UK analysis. We are negotiating with the managers there to establish a genetic reserve at the site.

17. Have there been any examples of reintroduction of CWR?

We are not aware of any specific examples, but it is possible that reintroductions have occurred of wild species that coincidentally are CWR.

18. What is the definition of 'crop' that is applied to CWR and how do taxa become 'crops' and also become no longer 'crops'?

Broadly speaking, we consider a 'crop' to be anything that is cultivated. A taxon becomes a crop when material is brought from one or more wild populations into cultivation. Germplasm can 'escape' from cultivated populations and become naturalized – these populations are considered to be CWR. Some crop taxa also occur in the wild – therefore, the wild populations of those taxa

are CWR. This can cause difficulties for conservation planning, but there are ways of minimizing the chances of erroneously including cultivated populations in diversity and gap analyses. The precise methodology used in the development of the regional CWR conservation strategy for Europe is available here: [more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/07/D1.2 In situ PGR in Europe crop wild relatives.pdf](https://more.bham.ac.uk/farmerspride/wp-content/uploads/sites/19/2020/07/D1.2_In_situ_PGR_in_Europe_crop_wild_relatives.pdf)

19. Regarding the criteria for CWR prioritization, why is the criterion, ‘relative threat status’ not applied in the first step of the process? All crops/taxa have a value – some crops are of great value currently, or are used more today, while others have potential value and will be used widely as biotechnology techniques develop. If we lose any taxon because it is not of high socio-economic value today, it will be lost forever.

The methodology proposed by Kell *et al.* (2017) (see access.onlinelibrary.wiley.com/doi/full/10.2135/cropsci2016.10.0873) and presented in this webinar ensures that all wild relative taxa which are under threat and in the broad gene pools of priority crops, are prioritized for conservation planning. In addition, in the selection of priority CWR for regional conservation planning in Europe, the list of priority crops is very broad. We have to draw the line somewhere when directing the use of limited conservation resources, and therefore do not include wild relatives of crops grown on a small scale. Furthermore, currently, and probably for the foreseeable future, CWR are used for the improvement of the most economically important crops due to the cost involved in transferring traits from exotic material. Also note that we are conserving CWR for their value as gene donors for crop improvement, not for their potential as new crops.

20. What about ornamental plants? We've just finished the national CWR checklist for Poland and we included ornamental plants. Can we consider some species as a priority species if they are threatened with extinction but they are not directly connected with food plants?

Yes, wild relatives of any cultivated plants may be prioritized for conservation action. The reason for only including human and animal food CWR in the regional conservation strategy for Europe is because of the geographic scale of the conservation planning. It would be both very difficult to include all types of crop categories in the selection of priority crops since there are many – ornamental, medicinal, aromatic, industrial etc. Therefore, a pragmatic approach at regional level is to prioritize wild relatives of crops important for food security and the agricultural economy. However, the approach to conservation planning in Europe as proposed in the ECPGR Concept for *in situ* conservation of CWR in Europe ([www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/WG_UPLOADS_PHASE_IX/WILD_SPECIES/Concept for in situ conservation of CWR in Europe.pdf](http://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/WG_UPLOADS_PHASE_IX/WILD_SPECIES/Concept_for_in_situ_conservation_of_CWR_in_Europe.pdf)) involves a two-tiered approach which integrates regional and national CWR conservation. At national level, conservation planning and action can be more easily targeted across a range of taxa due to the narrower geographic range and access to more detailed data. The selection of priority taxa at national level may therefore include wild relatives of any types of crops, according to the specificities of the country regarding the CWR taxa present, their distributions, existing policies related to biodiversity conservation etc. Also, bear in mind that a national CWR checklist may include all wild relatives of a broad range of crops. This list will be narrowed down by selecting priority taxa.

21. I wonder why not incorporate areas of CWR richness in Key Biodiversity Areas of IUCN?

The IUCN CWR Specialist Group tried to promote the inclusion of CWR (along with wild medicinal plants, timber trees and other wild plant species with socio-economic value) in the criteria for defining Key Biodiversity Areas. However, these recommendations were not taken up by the IUCN team developing the KBA criteria.

22. CWR are also useful for many other uses beyond food for people.

CWR taxa may have other uses that are coincident with their value as gene donors for crop improvement. However, when planning CWR conservation, it is important to distinguish their indirect value as gene donors for crop improvement from other potential values (e.g. their direct use value as a wild harvested plant) because the selection of priority taxa for conservation planning and action is unique for CWR due to their relationship to crops.

23. Are you trying to look at Africa also for CWR conservation management?

There have been two major projects on CWR in the SADC region – one that ended in 2016 and the other ongoing. For information, see: www.cropwildrelatives.org/sadc-cwr-project/ and www.cropwildrelatives.org/sadc-cwr-net/. The University of Birmingham research group is also working in a number of other countries, including in northern Africa.

24. What is your opinion about the CWR conservation scenario in India?

We are not very familiar with the work on CWR in India, but a book was published in 2005: www.cropwildrelatives.org/fileadmin/templates/cropwildrelatives.org/upload/documents/Wild_relatives_of_crops_plants_in_India_collection_and_conservation_Pandey_2005.pdf

25. The eastern Mediterranean needs to be involved to ensure thorough coverage of all crop gene pools. Also, capacity building in the region is really lacking, especially for pre-breeding.

The eastern Mediterranean is vitally important if the most important CWR diversity globally is to be conserved. National agencies, regional structures and international bodies must together ensure that this is achieved.

26. I agree about the potential importance of Natura 2000 (e.g. agro.biodiver.se/2011/06/protecting-pi-198758-and-its-mates/).

We also identified this Natura 2000 site when we carried out an assessment of *Beta* CWR in the AEGRO project (www.agrobiodiversidad.org/aegro/).

27. I want to congratulate you for this initiative, as I see it as a potential convincing tool to eventually being able to establish a receptive mood in the nature conservation community, towards the effective conservation of CWR in protected areas, and the need for their complementary/integrated conservation *ex situ*. In many countries, such as Brazil, very restrictive barriers for plant collection, generally established as a reaction against the accelerated destruction of natural sites, are the main constraints, even for plant genetic conservation agents, to be allowed to bring germplasm samples *ex situ*, out of protected areas. I do hope this educational initiative will raise the worldwide understanding that CWR are threatened plants like many others, and while not available *ex situ*, and not characterized, they cannot be used for crop improvement.

This is a serious limitation on the conservation and sustainable use of CWR and other socio-economically important species. All we can do is to continue with our research and advocacy work.