

Assessment of Unique Material in the European Collections of Umbellifer Crops

Charlotte Allender
University of Warwick
Charlotte.Allender@warwick.ac.uk

Umbellifer crops are well represented in European *ex situ* collections; in total about 10 390 accessions of carrot, celery, parsnip, dill, caraway, coriander, parsley, fennel and chervil were listed in the EURISCO database in May 2010. Given the size and diversity of the collections, both in terms of species and numbers of accessions, it became obvious that the identification and selection of Most Appropriate Accessions (MAAs) as required by AEGIS (A European Genebank Integrated System) would be challenging. Selection of MAAs is necessary to ensure that redundancy and duplication is kept to a minimum which permits more efficient collection management whilst maintaining the conservation of crop genetic diversity.

The project itself involved seven partners (the Agricultural Technology Transfer Center of Lushnje, Albania, Crop

Research Institute Olomouc, Czech Republic, Central Agricultural Office Department for Agrobotany, Hungary, Agrocampus Ouest, Angers, France, Nordgen, Sweden and the Georgian Research Institute of Farming, Georgia) and was coordinated by the University of Warwick, UK. It aimed to produce a draft list of MAAs based on previous efforts within other ECPGR Working Groups. The experiences of the *Brassica* Working Group were of particular interest as the biology of the two crop groups are similar (both are outbreeding and seed-propagated). An early decision was made to focus on carrot as a model for the other umbellifer crops as project partners had a high level of familiarity with the diversity of the carrot gene pool and also because cultivated carrots are characterized by 'umbrella' types based on root shape (for example Nantes, Chantenay, Berlicum). The variety type is often reflected in the variety name, making an assessment of the distinctness and uniqueness of multiple accessions with the same or similar names difficult.

The first project workshop held on 13th and 14th October 2010 at the University of Warwick provided project partners with the opportunity

to discuss the benefits and relevance of AEGIS to their own collections. This was necessary so that a unified approach and understanding could be achieved, benefiting the outputs of the project. The workshop was extremely useful in giving project partners the opportunity to work together through a small subset of the EURISCO carrot data; the descriptive data associated with accessions is variable in terms of completeness, so working through some of the data as a group proved valuable in terms of deciding on a common approach. Another issue highlighted was the fact that some carrot material was not listed in EURISCO due to a lack of immediate availability but was potentially significant in the context of AEGIS. Details of these accessions were added to the EURISCO dataset before it was divided among the project partners to work through according to an agreed set of criteria in the months after the workshop. In total 2498 accessions were considered and project partners worked through a set of 500 accessions each, assigning each accessions as either a potential MAA, not an MAA or to be queried with the relevant collection curator.

The second workshop was held jointly with a meeting of the Umbellifer Crops Working Group in Quedlinburg, Germany in March 2011. This provided an opportunity for project partners to discuss problems and questions they encountered in the application of the agreed criteria, and to discuss the project with the wider Working Group to obtain their impact. In total, 45% of the original 2498 accessions were identified as potential MAAs. These would then need to be approved by the curators and the national coordinators of the holding countries. A revised workflow for the identification of MAAs was prepared for the final project report which will serve as a reference for future work on different umbellifer crops. Project partners concluded that the selection of MAAs will never be entirely objective due to the level of missing data which prevent straightforward selection criteria from being applied. When selecting MAAs from groups of potential duplicates (similar accession names), 'Country of Origin' is an important criterion, which can potentially identify duplicate samples of commercial varieties and give priority to accessions conserved in their country of collection. In the case of large groups of accessions with similar or identical names, 20% of the group should be selected as MAAs to maximize the coverage of genetic diversity (e.g. different collection locations or well separated collection dates).

In summary, the project was successful in designing a workflow for the selection of MAAs in carrot which can be applied to the other umbellifer crops. This very necessary work is required in order to identify accessions to be held as part of a European Collection within AEGIS so that the collection represents an appropriate balance between maintaining genetic diversity and reducing redundancy.



Recognizable by its distinctive central black flower, wild carrot (*Daucus carota*). Photo: L. Maggioni/Bioversity