Brassica montana
Ventotene, Italy, April 2013

Availability of wild *Brassica* sect. *Brassica* accessions in genebanks

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Introduction

Wild relatives of *B. oleracea* are included in sect. *Brassica*, which is limited to species having the C genome (n=9) only. They *are* native to the western Atlantic and Mediterranean seaboard cliffs of Europe. They carry genes of potential value for the cole crops, such as salt resistance, insect resistance, fruit indehiscence, anti-oxidant compounds, etc. As a recent example a nutritionally enhanced, high glucosinolate content broccoli variety was launched in the UK market in 2011, derived from a cross with a wild Sicilian brassica collected in 1984 (BBSRC 2011).

Conscious of the importance of this group of species, in 2010 the ECPGR *Brassica* Working Group started an investigation of the availability of wild *Brassica* sect. *Brassica* accessions in genebanks (Maggioni and Lipman 2010). In the past, several collecting missions had been sponsored by IBPGR between 1982 and 1988 and national or international expeditions have continued in the subsequent 25 years to survey and collect the wild populations.

Brassica hilarionis
St. Hilarion Castle, Cyprus, May 2011

Methods

Existing online databases were surveyed for the presence and availability of wild (n=9) *Brassica* accessions in world genebanks. Available data were verified through personal contacts with collection curators to sort out inconsistencies in the different databases and to verify the actual availability of the accessions and the reasons for non availability.

Results

Table 1. Summary of the number of accessions of wild (n=9) *Brassica* conserved in world genebanks (in brackets the number of samples promptly available with a Standard Material Transfer Agreement (SMTA), without limitations). Only accessions with a known country of origin were considered.

		Species																						Data source
		B. bourgeaui	*B. cretica*	*B. cretica*	*B. cretica*	*B. cretica*	*B. hilarionis*	*B. incana*	*B. incana*	*B. insularis*	*B. insularis*	*B. insularis*	*B. macrocarpa*	*B. montana*	*B. montana*	*B. montana*	*B. oleracea*	*B. oleracea*	*B. oleracea*	*B. oleracea*	*B. oleracea*	*B. rupestris*	*B. villosa*	
Holding genebank	**Country of origin**	**ESP**	**GRC**	**ISR**	**LBN**	**TUR**	**CYP**	**ITA**	**UKR/SUN**	**FRA**	**ITA**	**TUN**	**ITA**	**ESP**	**FRA**	**ITA**	**DEU**	**ESP**	**FRA**	**GBR**	**NZD**	**ITA**	**ITA**	
AUS039			8 (8)			1 (1)	1 (1)	12 (12)	2 (2)	2 (2)	4 (4)	2 (2)	2 (2)	3 (3)	6 (6)	2 (2)		1 (1)	3 (3)	5 (5)		8 (8)	1 (1)	WIEWS; Bob Redden (pers. comm.)
CYP004							1 (0)																	Bras-EDB; EURISCO; Angelos Kyratzis (pers.
DEU146 (^)		2 (1)	1 (1)			2 (0)		2 (1)	1 (1)		5 (1)		2 (0)			2 (0)		6 (0)				4 (2)	7 (4)	Bras-EDB; EURISCO; GBIS; Ulrike Lohwasser (pers.
ESP003		2 (0)	48 (0)	1 (0)		7 (0)	2 (0)	27 (0)	1 (0)	9 (0)	8 (0)	4 (0)	6 (0)	12 (0)	12 (0)	13 (0)		13 (0)	22 (0)	21 (0)		17 (0)	17 (0)	Bras-EDB; EURISCO; Report of 4th meeting of
FRA046 (*)										351 (*)					57 (*)					5 (*)				Lara Dixon (pers. comm.)
GBR004					3 (0)						1 (0)									20 (17)				EURISCO; SID
GBR006			4 (0)			1 (0)	2 (1)	8 (2)	1 (0)	2 (0)	1 (0)		16 (1)		1 (0)					12 (12)	1 (1)	3 (0)	12 (0)	Bras-EDB; EURISCO; Charlotte Allender (pers.
GRC005			32 (5)																					Parthenopi Ralli (pers. comm.)
ITA004								19 (2)			6 (0)		5 (2)									13 (2)	11 (2)	IGV Germplasm Database
ITA227			1 (1)					3 (0)			1 (1)		34 (4)		1 (1)	1 (1)						15 (8)	7 (0)	Bras-EDB; Ferdinando Branca (pers. comm.)
ITA038 (#)								2 (#)					2 (#)									12 (#)	22 (#)	Anna Scialabba (pers. comm.)
JPN059						5 (5)		1 (1)					2 (2)										1 (1)	Tohoku Univ. Brassica Seed Bank
NLD037									2 (2)							1 (1)	1 (1)		1 (1)				1 (1)	Bras-EDB; Noor Bas (pers. comm.)
SWE002																	1 (1)							Bras-EDB; Gert Poulsen (pers. comm.)
TUR001						6 (0)																		Bras-EDB; Ayfer Tan (pers. comm.)
USA020		2 (1)	12 (3)				1 (0)	10 (3)	1 (0)	1 (0)	5 (0)		1 (1)	2 (0)	4 (0)	1 (0)						5 (0)	6 (0)	GRIN; Larry Robertson (pers. comm.)
TOTAL		**6 (2)**	**106 (18)**	**1 (0)**	**3 (0)**	**22 (6)**	**7 (2)**	**84 (21)**	**8 (5)**	**365 (2)**	**31 (6)**	**6 (2)**	**70 (12)**	**17 (3)**	**81 (7)**	**20 (4)**	**2 (2)**	**20 (1)**	**26 (4)**	**63 (34)**	**1 (1)**	**77 (20)**	**85 (9)**	
% available		**33%**	**17%**	**0%**	**0%**	**27%**	**29%**	**25%**	**62%**	**<1%**	**19%**	**33%**	**17%**	**18%**	**9%**	**20%**	**100%**	**5%**	**15%**	**54%**	**100%**	**26%**	**11%**	

^ Some accessions have limited availability for research purposes, due to low seed amounts
* Available for exchange depending on seed availability of given accession and on the basis of bilateral agreement
\# Available material for scientific cooperation from most of the known *Brassica* populations of Sicily

Note: Last minute data received from ESP003 indicate the presence of 230 accessions, of which 181 are available through an MTA for non-commercial purposes, while 49 are not available due to low seed quantities.

Institute codes

AUS039	Australian Temperate Field Crops Collection, Australia
CYP004	National (CYPARI) Genebank, Agricultural Research Institute, Ministry of Agriculture, Natural Resources and Environment, Cyprus
DEU146	Genebank, Institute of Plant Genetics and Crop Plant Research, Germany
ESP003	Comunidad de Madrid. Universidad Politécnica de Madrid. Escuela Técnica Superior de Ingenieros Agrónomos. Banco de Germoplasma, Madrid, Spain
FRA046	Conservatoire botanique national méditerranéen, Porquerolles, France
GBR004	Millennium Seed Bank Project, Seed Conservation Department, Royal Botanic Gardens, Kew, Wakehurst Place, United Kingdom
GBR006	Warwick Genetic Resources Unit, School of Life Sciences, The University of Warwick, Wellesbourne, Warwick, United Kingdom
GRC005	Greek Genebank, Agricultural Research Centre of Northern Greece, Directorate General of Agricultural Research, Hellenic Agricultural Organization-DEMETER, Greece
ITA004	Istituto di Genetica Vegetale, Consiglio Nazionale delle Richerche, Italy
ITA227	Dipartimento di Scienze delle Produzione Agrarie e Alimentari (DISPA), Università di Catania, Catania, Italy
ITA038	Orto Botanico dell' Università di Palermo, Italy
JPN059	Faculty of Agriculture, Tohoku University, Japan
NLD037	Centre for Genetic Resources, the Netherlands, Plant Research International, The Netherlands
SWE002	Nordic Genetic Resource Center (NordGen), Alnarp, Sweden
TUR001	Aegean Agricultural Research Institute (AARI), Izmir, Turkey
USA020	North Central Regional Plant Introduction Station, USDA-ARS, NCRPIS, USA

Databases cited as data sources

Database	Maintainer	Website
Bras-EDB (ECPGR *Brassica* Database)	Centre for Genetic Resources, The Netherlands (CGN)	http://documents.plant.wur.nl/cgn/pgr/brasedb/
EURISCO	Bioversity International, Rome , Italy	http://eurisco.ecpgr.org
GBIS/I (Genbankinformationssystem des IPK Gatersleben)	Institute of Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany	http://gbis.ipk-gatersleben.de/gbis_i/
GRIN (Germplasm Resources Information Network)	USDA, ARS, National Genetic Resources Program, USA	http://www.ars-grin.gov/~sbmljw/cgi-bin/relative.pl
IGV germplasm database	IGV CNR, Institute of Plant Genetics, Bari, Italy	http://eco.igv.cnr.it/igvdb/web/passport/search
SID (Seed Information Database)	Kew Royal Botanic Gardens, UK	http://data.kew.org/sid/
Tohoku Univ. Brassica Seed Bank	Tohoku University, Japan	http://www.agri.tohoku.ac.jp/pbreed/Seed_Stock_DB/Stock_English_top.html
WIEWS (World Information and Early Warning System on PGRFA)	Food and Agriculture Organization (FAO), Rome, Italy	http://apps3.fao.org/wiews/wiews.jsp

Conclusions

- The analysis of the databases has revealed an often poor quality and inconsistency of publicly available passport data, which brings uncertainties on the origin location and the taxonomy status of the accessions.
- Although several collecting missions have been undertaken, most species and localities are under-represented in collections, while the level of duplication of the same accession in several genebanks is high (not shown in the table). Main geographical gaps to be considered in the future are the Adriatic coasts (Albania, Croatia and Italy), the Aegean coasts (Greece and Turkey), Northern Cyprus and the coastal cliffs of Tunisia.
- The availability of accessions with a SMTA is very limited. The reason for poor availability is most often the lack of sufficient seed, as the brassicas are laborious and expensive to multiply. In other cases there is reluctance to include wild brassicas in the Multilateral System, even though the entire *Brassica* complex is fully included in Annex I of the International Treaty.
- It is striking that in some cases the only unconditioned available source of Mediterranean *Brassica* accessions is from genebanks outside of Europe (i.e. Australia or Japan). This is a sign that the establishment of a well functioning European Collection conserving and documenting material at a high level and making the material readily available, as intended by AEGIS (2013), is an important undertaking to bring to completion.

References

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FAOSTAT. 2011. FAO Statistics online database. http://faostat3.fao.org/

Maggioni L, Lipman E. 2010. Report of a Working Group on *Brassica*. Fourth Meeting, 2-4 March 2010, Linguaglossa, Catania, Italy. Bioversity International, Rome, Italy.

Brassica sp.
Monte Conero, Italy, May 2005