The UPM seed genebank (Madrid) forty years later

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In 1966, a seed bank of wild Brassicaceae was created in theUniversidad Politécnica de Madrid (UPM). At that time only six or seven seed banks existed, all devoted to crop species.

Therefore, it was the first in the World devoted to wild species. Soon after, the UPM bank scope was extended to include rare, threatened and endangered species of the West Mediterranean region.

Storage in flame sealed vials with silica gel inside (Gómez-Campo, 1972) and/or in hermetic jars (www.seedcontainers.net) at temperature of only -5/-10ºC. This method

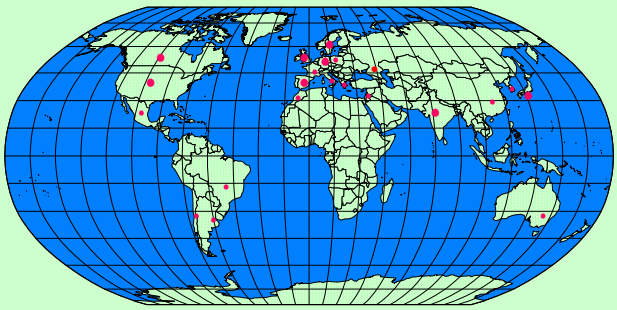
yielded high germination rates after almost 40 years (see table)

Germination rates of 12 accessions of Brassicaceae after 38-39 years preserved in ultra-dry conditions (Pérez-García, et al. 2007). Average G-final / G-initial = 98,4 %.

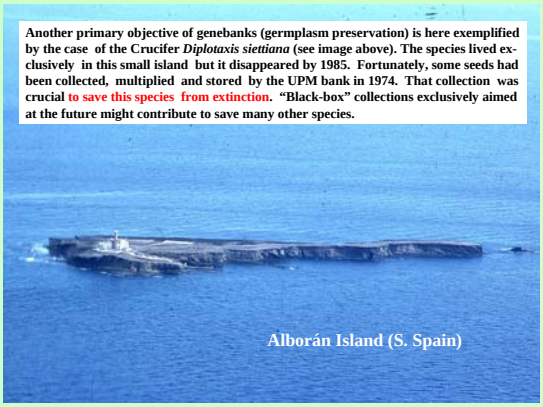
Accession number	Taxon	Years of storage	Germination rate (% ± SE)			
			Initial Gi	Final 25 ºC	Final 25/15 ºC	Scarified seeds
0588	*Alyssoides utriculata*	38	100	5 ± 2.61	0	95 ± 2.71
0303	*Alyssum saxatile*	38	100	89 ± 3.28	96 ± 1.41	NO
1261	*Barbarea intermedia*	38	95	96 ± 1.41	99 ± 0.87	NO
1280	*Brassica napus*	38	100	100	99 ± 0.87	NO
1166	*Coincya rupestris*	38	92	91 ± 1.66	98 ± 1.00	NO
0430	*Erucastrum abyssinicum*	39	100	100	97 ± 1.66	NO
0238	*Erysimum cheiri*	38	100	97 ± 2.38	96 ± 1.43	NO
0205	*Erysimum odoratum*	38	100	95 ± 0.87	98 ± 1.08	NO
1163	*Erysimum repandum*	38	100	76 ± 5.83	100	NO
0946	*Isatis tinctoria*	38	100	91 ± 2.60	79 ± 6.33	NO
0016	*Matthiola incana*	38	95	99 ± 0.87	94 ± 2.24	NO
1248	*Matthiola sinuata*	38	100	4 ± 1.50	12 ± 8.20	99 ± 1.04

Other major achievements

Below, main destinations of the germplasm distributed by the UPM bank. This has been extensively used for taxonomy, cytogenetics, molecular studies, transgenesis, cancer research, breeding, pests and diseases, weed research, etc. (Gómez-Campo, 2007)



Another primary objective of genebanks (germplasm preservation) is here exemplified by the case of the Crucifer *Diplotaxis siettiana* (see image above). The species lived exclusively in this small island but it disappeared by 1985. Fortunately, some seeds had been collected, multiplied and stored by the UPM bank in 1974. That collection was crucial to save this species from extinction. "Black-box" collections exclusively aimed at the future might contribute to save many other species.



Additionally:

Optimised utilisation of rather scarce economic resources.
Extensive duplication of most accessions in 2-4 other banks.

According to the UPM seed genebank experience:

When orthodox seeds are efficiently preserved …

… enormous amounts of time, effort and seed material can be saved by using much more extended periods in routine periodical germination tests and by simplifying the initial ones.

… one could almost forget about regeneration during perhaps 100 or 200 years. Yellow table, above, strongly suggests it.

REDBAG members (now nine, see a part in figure at right) and a few other banks of wild species in other countries using similar methods can expect to have their seeds fully alive when they become 40 years old.

After 1980 a net of seed banks devoted to wild species has progressively been created in Spanish botanical gardens (REDBAG). They use preservation systems similar to those of the UPM bank.

REFERENCES: Gómez-Campo 1972, *Biol. Conserv.* 4,355-360 ; Gómez-Campo, 2007, *Plant Genetic Res. Newsl.*, in press ; Pérez-García, F. González-Benito, M.E. & Gómez-Campo, C. 2007, *Seed Sci. & Technol.* 35,143-153.

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