

GENETIC RESOURCES OF SAFFRON AND ALLIES (*CROCUS* SPP.) The CrocusBank Project

Jose-Antonio Fernandez
(on behalf of the CrocusBank consortium)
University of Castilla-La Mancha
IDR, E-02071 Albacete, SPAIN

European Commission, Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture
018 AGRI GEN RES 870/2004

Objectives: to create, characterise and exploit a germplasm collection (bank) in *Crocus* species, including saffron crocus (*C. sativus* Linn.).

The collection has two main goals:

- First, to collect and reproduce saffron bulbs, coming from all the countries that cultivate saffron, for direct use of this plant material in selection programmes all over the world; and
- Second, to create a collection of saffron allies for conservation, since they are endangered and threatened taxa and populations in *Crocus*, and for research in taxonomy and evolution, genetics, physiology, ecology and agronomy. This *Crocus* species are exploitable sources of resistances and other agronomical interesting traits to be transferred to saffron, through appropriate breeding programmes and technological tools.

1. Collection, multiplication, conservation and documentation of *Crocus* genetic resources:

- Exploration and collection of germplasm of saffron and related species. The collection of *Crocus* material will be carried out by means of requests to different regional centres growing the plants and visiting specific locations at appropriate date to collect both cultivated saffron and wild species. The taxa included in this project shape a proposal of maximum achievements. The reality of the field work is taken into account regarding the number of *Crocus* species and subspecies that we are able to collect.
- Elaboration of a list of descriptors for the characterisation of the genus *Crocus* and primary characterisation of the collected material.
- Multiplication of the collected plant material for its conservation in the Bank of Plant Germplasm of Cuenca, (Spain). Conservation methods based on tissue culture techniques will be used when required.
- Elaboration of an effective documentation system, with the passport and characterisation data of the accessions, in order to guaranty an appropriate management of the *Crocus* germplasm collection, and
- To make available this material to potential users by distribution of corms, tissue culture and DNA samples.

2. Characterisation and evaluation of *Crocus* genetic resources:

We will elaborate a list of descriptors for the characterisation of the genus *Crocus* and primary characterisation of the collected material. For the characterisation/evaluation of the material we will take into consideration phenotypic characters with good heritability at different structural and physiological levels and include both simple, single-gene autapomorphic characters and complex quantitative traits: Morphological (floral features, corm size); Phenological (flowering); Cytological (chromosomes, genome size, ploidy level); Phytochemical (saffron chemical composition, metabolic profiling); Molecular (DNA analysis); and Physiological (abiotic stresses and pathogen responses).

3. Application of the *Crocus* germplasm information and banked accessions:

- Rationalization of the collections.
- Definition of valuable germplasm for saffron breeding.
- Identification of ecologically rare and important species/genotypes in the natural environment.
- Identification of valuable species, cultivars and hybrids for the horticultural industry.
- Comparative genomics with model and crop species to identify universal features and valuable genes for agronomy.

PARTNERS

- *# 0: University of Castilla-La Mancha, SPAIN (coordinator)
- *# 1: Junta de Comunidades de Castilla-La Mancha, SPAIN
- *# 2: Agricultural University of Athens, GREECE
- *# 3: Aristotle University of Thessaloniki, GREECE
- *# 4: Polytechnic University of Valencia, SPAIN
- *# 5: University of Kastamonu (former Gazi), TURKEY
- *# 6: Tradimpex JM Thiercelin, FRANCE
- *# 7: University of Catania, ITALY
- *# 8: University of Debrecen, HUNGARY
- *# 9: National Polytechnic Institute of Toulouse, FRANCE
- *# 10: University of Leicester, UNITED KINGDOM
- *# 11: National Agricultural Research Foundation, GREECE
- *# 12: Azerbaijan National Academy of Sciences, AZERBAIJAN
- *# 13: National Research Institute, EGYPT



Crocus sativus. Photo by M. Sharaf-Eldin



Crocus cambessedesii. Photo by J.L. Guardiola

Subgenus	Section	Series	Species
Crocus	Crocus	Verni	<i>C. vernus</i> , <i>C. tommasinianus</i> , <i>C. kosaninii</i> , <i>C. etruscus</i> , <i>C. baytopiorum</i>
		Scardici	<i>C. scardicus</i> , <i>C. pelistericus</i>
		Versicolor	<i>C. versicolor</i> , <i>C. imperati</i> , <i>C. malyi</i> , <i>C. corsicus</i> , <i>C. minimus</i> , <i>C. cambessedesii</i>
		Longiflori	<i>C. longiflorus</i> , <i>C. serotinus</i> , <i>C. medius</i> , <i>C. niveus</i> , <i>C. goulmyi</i>
		Kotschyani	<i>C. kotschyanus</i> , <i>C. vallicola</i> , <i>C. gilanicus</i> , <i>C. autranii</i> , <i>C. scharojanii</i> , <i>C. ochroleucus</i> , <i>C. karaduchorum</i>
			<i>C. sativus</i> , <i>C. cartwrightianus</i> , <i>C. thomasi</i> , <i>C. hadriaticus</i> , <i>C. asumaniae</i> , <i>C. moabiticus</i> , <i>C. orocreticus</i> , <i>C. pallasi</i> , <i>C. mathewii</i>
			<i>C. reticulatus</i> , <i>C. sieberi</i> , <i>C. dalmaticus</i> , <i>C. robertianus</i> , <i>C. abantensis</i> , <i>C. ancyrensis</i> , <i>C. cvjicii</i> , <i>C. gargaricus</i> , <i>C. angustifolius</i> , <i>C. sieheanus</i> , <i>C. rujanensis</i> , <i>C. cancellatus</i> , <i>C. hermonicus</i>
			<i>C. biflorus</i> , <i>C. chrysanthus</i> , <i>C. danfordiae</i> , <i>C. almehensis</i> , <i>C. cypricus</i> , <i>C. hartmannianus</i> , <i>C. aeriis</i> , <i>C. pestalozzae</i> , <i>C. caspius</i> , <i>C. kerndorfforum</i> , <i>C. paschei</i> , <i>C. wattiorum</i> , <i>C. adanensis</i> , <i>C. leichtlinii</i>
			<i>C. alatavicus</i> , <i>C. korolkowii</i> , <i>C. michelsonii</i>
			<i>C. flavus</i> , <i>C. olivieri</i> , <i>C. antalyensis</i> , <i>C. candidus</i> , <i>C. vitellinus</i> , <i>C. graveolens</i> , <i>C. hiemalis</i>
			<i>C. aleppicus</i> , <i>C. veneris</i> , <i>C. boulosii</i>
			<i>C. carpetanus</i> , <i>C. nevadensis</i>
			<i>C. fleischeri</i>
	<i>C. speciosus</i> , <i>C. pulchellus</i>		
	<i>C. laevigatus</i> , <i>C. tournefortii</i> , <i>C. boyii</i>		
	<i>C. batanicus</i>		
		<i>Crociris</i>	

Website: Crocusbank.org and Crocusbank.com

E-mail: joseantonio.perez@uclm.es