BEAN RESEARCH BY THE FOOD LEGUMES GROUP AT GALICIA (SPAIN)

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Common bean (*Phaseolus vulgaris* L.) is an important food in the northwest of Spain where it is consumed as either green pods or dry seeds after cooking.

Legumes research started at the Mision Biologica de Galicia (Consejo Superior de Investigaciones Cientificas –CSIC– Pontevedra, Spain) in 1987. First work was to know the degree of diversity present in the bean (*Phaseolus*) and pea (*Pisum sativum*) varieties usually cultivated by farmers in Galicia (Northwest of the Iberian Peninsula) and adjacent areas. So since 1987 a germplasm program, including collection, maintenance, multiplication and characterization, is carried out by researchers from the CSIC at the Mision Biologica de Galicia.

Currently the germplasm collection includes 933 accesions of bean (*Phaseolus* spp.) from Spain as well as from other origins from Europe and America. During 1988 were made five collecting expeditions in the North and Northwest of Spain and in the North of Portugal. In 1989 and 1990 there were two expeditions to the North of Spain. In 1993, in cooperation with the University of Tras-os-Montes e Alto Douro (Vila Real, Portugal) an expedition was made in the North of Portugal. The last expedition was in 1997 in the Northwest of Argentina, in cooperation with organizations from Argentina: CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas), University of Buenos Aires and INTA (Instituto Nacional de Tecnología Agropecuaria).

SOURCE OF GERMPLASM	ACCESSIONS
Phaseolus vulgaris	
cultivated European	636
cultivated non-European	87
primitive Argentinean	76
wild Argentinean*	28
commercial	73
TOTAL	**900**
Phaseolus coccineus	
European	18
non-European	13
commercial	2
TOTAL	**33**

There have been evaluated 563 accessions of this collection for agronomic traits and nutritional value of pod and seed . Based on the results of the agronomic and

quality evaluations of the collection, some populations were chosen to be utilised in breeding programmes with the objective to improve the protein content, the physical quality of seed and the architecture of the plant. Their degree of genetic diversity has been displayed by means of electrophoretic analysis of isoenzymes. Thus starch-gel electrophoresis was employed on primary leaves to study the differences between the isozyme patterns of different common bean (*Phaseolus vulgaris,* L) varieties. GOT (Glutamate oxaloacetate transaminase), EST (Esterase), ACP (Acid phosphatase), MDH (Malate dehydrogenase), DIA (Diaphorase), ME (Malic enzyme), PRX (Peroxidase), SKDH (Shikimate dehydrogenase), IDH (Isocitrate dehydrogenase), PGM (Phosphoglucomutase) and PGI (Phosphoglucoisomerase) are the isozymes assayed.

Since the main tasks of the Misión Biológica de Galicia - CSIC are the genetic research and the breeding, some of the bean accessions of the collection are the basic material for improvement by means of hybridization and selection.

Thus the bean collection is the basis for breeding programmes involving some aspects like:

-Selection in populations of bean for quality of pod and seed and for architecture of plant

-Hybridization intra and interspecific in bean as a basis for obtaining genetic material for selection. The scarlet bean (*P. coccineus*) is a species phylogenetically close to the common bean; both share traits that can be useful to widen the genetic basis of the common bean. There are some incompatibility barriers to obtain hybrids from these species but they can be avoided to a certain extent by using the embryo rescue technique. To obtain hybrids through this technique, crosses have been made between several populations of *P. coccineus* from the North of Spain, Rwanda and Mexico and several pure lines of *P. vulgaris* from the collection existing in the MBG-CSIC.

-Use of primitive and wild forms of Andean *Phaseolus* for the genetic improvement of cultivated *Phaseolus vulgaris.*

-Study of cropping systems in bean (sole crop and intercrop). Intercropping or associated cropping with maize is an extended practice in the North of the Iberian Peninsula, the advanced generations were cultivated both in monoculture and in mixture with maize. These systems are characterized by high species diversity, closed cycling of soil nutrients, reduced pest incidence, soil erosion control, intensive exploitation of limited land resources and low but stable yields, providing subsistence for the farmer.

The next steps that will be carried out in the investigation are:

-To complete the characterization of the collection.

-To choose populations with appropriate characters for the improvement.

-To obtain resistance to plagues, a more appropriate architecture and to improve the nutritive and organoleptic quality.

-To introduce resistances to the BCMV in the lines and in the improved materials.

- To get by means of hybridization interespecific introgression of useful characters from other species.

-To continue the germoplasm prospecting in the Andean area.