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PARTNERSHIP

A model laboratory without walls: the Brazilian Labex

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Agropolis Fondation:
support for the International Advanced Biology Consortium

Agropolis Fondation was founded in 2007 with an initial endowment of 20 million euros to support and promote international level scientific programmes in agriculture and sustainable development with focus on issues in both the North and the South. In particular, Agropolis Fondation —with its four charter members INRA, CIRAD, IRD and Montpellier SupAgro— makes it possible for international scientists to come and work in the Foundation's scientific network. It also helps teams to organise meetings, in particular for developing new collaborative projects. Since 2007, Agropolis Fondation has launched regular Call for Proposals. In 2007, it funded the proposal aimed at providing financial support for the workshops organized under the International Advanced Biology Consortium (CIBA), a Labex spin-off.

The first two CIBA workshops were held at the end of 2007 and early 2008, with the development of new projects submitted to French and European Calls for Proposals. Agropolis Fondation supported Workshops 3 (Brazil, end of 2008) and 4 (Montpellier, October 2009). The fourth workshop was of particular interest as it initiated research and training within a France-Brazil-Africa tripartite framework.

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Genetic resources, genome analysis and varietal improvement of groundnut

Groundnut is the main legume in sub-Saharan Africa and is grown on 23 million hectares in the tropics, forming an important world source of food, oil and plant protein. The species grown is an allotetraploid resulting from a recent hybridisation between two wild diploid species that led to reproductive isolation of the cultivated species from other species. The genetic base is small, limiting the impact of breeding on responses to the main cultivation constraints (drought and diseases).

In 2004, the GCP funded a three-year project, with collaboration between Embrapa, UCB, CIRAD, ICRISAT, CERAAS, IBONE and Aarhus University. The aim was to remove the main biological blockages to the improvement of groundnut: (i) the breeding of synthetic wild varieties with the same ploidy level as the cultivated species to provide access to the diversity of the wild compartment, (ii) the development of the molecular tools required for study of the genome and the implementation of modern breeding approaches. Synthetic varieties of wild origin developed by Embrapa have been transferred to the groundnut development programme run by ISRA (Senegal). In addition, scientific exchanges between Embrapa and CIRAD have resulted in the development of genome resources (BAC libraries) that are specific to the two wild species.

With support from the GCP, the partnership (Embrapa, UCB, ISRA and CIRAD) was continued by scientific visits, exchanges of plant material and the supervision of a doctoral thesis. The resulting germplasm and molecular tools were used in an approach incorporating marker-assisted selection and genetic analysis: a set of chromosome segment substitution lines for both renewing the genetic base of the cultivated species and identifying the genome zones involved in the expression of characters of agricultural interest was developed. This new germplasm was developed partly from an élite variety grown in Senegal and provides opportunities for the rapid improvement of the species grown in dry zones. Characterisation of this material in a broad range of environments and its use for breeding purposes will be continued in the broadened framework of a GCP – Bill & Melinda Gates Foundation project.

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▲ *1: The development of chromosome segment substitution lines in a greenhouse at the CERAAS (Thiès, Sénégal).*
2: Emasculation of a groundnut flower during manual crossing for backcross purposes.
3: Pods harvested from an introgression line.

This partnership used in successive projects has made it possible to prolong South-South and North-South collaborations and to develop lasting training activities concerning the genetic base of cultivated groundnut and the incorporation of molecular tools in selection work.

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