

**Year of CfP: 2010 Grand federative project**

**Project 1001-001**

<b>Project title:</b> Bioagressors and invasive species: from individual to population to species
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**Unit managing the project:** UMR CBGP Centre for Biology and Management of Populations (CIRAD, INRA, IRD, Montpellier SupAgro)

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**Countries involved in the project:** Liban, Cameroun, Brazil, Burkina-Faso, Ivory Cost, Cuba, China, Madagascar, Italia, UK, Spain, Sweden, Switzerland, Canada, Danemark, Netherlands, USA

**Research units from the Foundation's scientific network involved:** BGPI, CBGP, B-AMR, RPB

**Subthematic axes:** IPB-2 (Integrative Plant Biology 2: *Plant pests and diseases, integrated crop protection, population ecology*); STDI-1 (Socio-Technical Dynamics of Innovation 1: *Agri-environmental innovations, agri-ecosystems, resources management*); STDI-3 (Socio-Technical Dynamics of Innovation 3: *Innovation processes, social management of innovations*)

**Objectives:**

The main objective of this federative project is to develop, coordinate and communicate research actions on bioagressors in Europe (insects, mites, trees, fungi and virus) and on their associated natural enemies. By bioagressors we specifically refer to (i) local pest species - with respect to the European continent – that re-emerge due to changes in agricultural practices, (ii) *sensu stricto* invasive species (i.e. alien pest species introduced in Europe), (iii) potential invasive species, recorded as invasive and causing damages in non European countries (especially in Mediterranean and tropical areas) and that may settle and become damaging in Europe. By natural enemies, we refer to species that could be deliberately introduced to control these pests. BIOFIS research actions will address both applied and academic questions, and consider three biological levels (individuals, populations and species).

BIOFIS will focus on four complementary tasks:

**Task 1.** The detection and characterization of present or potential arthropod species damaging crops and their natural enemies. The development of a large Web database that includes various features (taxonomy, DNA barcodes, biological information, distribution and socio-economic risks).

**Task 2.** The experimental and theoretical studies of key evolutionary questions associated to the emergence of invasive populations. Regarding the experimental part, this task will focus on a subset of invasive species selected according to two main criteria: they are associated to important socio-economic, ecological and agronomical issues and they can provide answers to key evolutionary questions associated to the emergence of invasive populations. The theoretical part will be mainly based on generic modelling actions using mathematical and computer simulation tools.

**Task 3.** The specification and formalisation of recommendations for management practices against bioagressors and invasive species based on the applied and academic research actions developed in task 1 and task 2. This objective will involve a large number of the scientists involved in BIOFIS as well as additional (external) experts. This part of BIOFIS will take into account social, economical and bio-technological issues.

**Task 4.** The organisation of an international congress on bioagressors, invasive species, natural enemies, and the evolutionary biology of such species (and opportunistically the organisation of smaller national/local meetings/workshops in this field)

In conclusion, BIOFIS represents a unique opportunity to bridge the gaps on common scientific objectives between different experimental and theoretical approaches, between different scale studies (from individual to population to species), and between applied and academic issues. Furthermore, BIOFIS will be relevant to various socio-economic and sustainable developmental issues. Temperate (including Europe), peri-Mediterranean and tropical countries are indeed facing major socio-economic risks from invasive alien species, especially bioaggressor introduction.

**Total Agropolis Fondation funding:** €1,000,000

**Funding categorie(s):** 2 to 3 Post-doctoral fellowships (total duration = 36-48 months), 3 to 4 Doctoral fellowships (total duration = 144-180 months), 2 Visiting fellowships for short period of stay (total duration = 6 months), 2 small grants for support to scientific events

**Project duration:** 15 December 2010 – 15 December 2014

**Keywords:** bioaggressors and invasive species, biosecurity, arthropod, emergence of invasive populations, management practice, database, natural enemies