

Year of CfP: 2008

Project No 0802-006 Completed

Project title: Preparing an international networking project on rice blast diversity

Unit managing the project: BGPI, Biology and Genetics of plant/pathogen interactions (CIRAD, INRA, Montpellier SupAgro)

Project leader: Didier Tharreau (tharreau(a)cirad.fr)

Countries involved in the project: Vietnam, Nepal, India, Laos, Philippines, China

Sub-thematic axis: IPB-1 (Integrative Plant Biology 1: *Genetics and genomics, plant breeding, ecophysiology*)

Objectives:

The rice blast disease, caused by the fungus *Magnaporthe oryzae*, is the main fungal disease of rice all over the world. This plant pathogen is known to reproduce asexually in all rice growing areas studied. However, sexual reproduction can be achieved in controlled conditions, and different genetic and biological results suggest that sexual reproduction could take place in limited areas of the Himalayan foothills. This area is a centre of diversity of the pathogen and is suspected to be its centre of origin. Rice was domesticated in the same area. It is demonstrated that intercontinental migrations have shaped the structure of the rice blast populations and allowed dissemination of specific virulent genotypes around the world. If sexual reproduction takes place, even limited in frequency and distribution, because of long distance migrations, it is likely to have an impact on the durability of rice resistance to the blast disease. Thus, determining if sexual reproduction takes place is an important research objective.

Tools in population genetics allow to detect traces of sexual reproduction. These techniques will be applied to selected populations of the blast pathogen in the presumed centre of origin of the pathogen. A first step is to better delimit this centre by studying populations from different countries on the South border of Himalaya. The second step is to sample more populations in the best candidate areas previously identified. Sampling requires partners in the different countries targeted.

The objective of this project is to set up contacts and initiate collaboration with partners in South Asia to identify valuable partners to prepare a future collaborative project on rice blast diversity. The scientists involved in this project will identify and train partners on various genotyping techniques being used routinely to characterize the rice blast fungus. The final goal is to develop a network of partners and an international platform to study the diversity of the most damaging fungal pathogen of rice, *Magnaporthe oryzae*.

Action carried-out and results obtained:

The objectives of this project were to set up contacts and initiate collaboration with partners in Continental South Asia to identify valuable partners to prepare a future collaborative project on rice blast diversity. The final goal is to develop a network of partners and an international platform to study the diversity of the most damaging fungal pathogen of rice, *Magnaporthe oryzae*. We contacted more than 20 partners to explore the possibility of setting up collaborations. We realized prospective missions to Yunnan province of China, Laos, and Nepal to visit different preselected research groups working on rice and/or rice blast. These missions were followed by a collaborative work, that consisted in obtaining rice diseased samples, isolating rice blast strains, and characterizing their fertility and genetic diversity with molecular markers. This resulted in the isolation of 335 strains and characterization of 235. Among these samples, we identified a particular population that shows all characteristics of a sexually reproducing population. This is the

first time that such a population is unambiguously identified for the rice blast fungus. We could welcome a Nepalese colleague in Montpellier and train him to our biological and molecular methods of characterization. We also realized a mission to the Philippines to try to involve IRRI in the network construction.

The expected output to submit to funding agencies an ambitious international collaborative project could not be reached because there were no appropriate calls for proposals. But, the prospective missions allowed us to identify valuable partners and to initiate collaboration. The preliminary data obtained orientated the choice of geographic areas to further investigate. The results were presented in different national and international conferences and part of them are presented in a paper submitted for publication in international peer-reviewed journal.

Prospects for the future:

The project has generated effective collaboration and promising scientific results. We aim at strengthening collaboration and at comforting the scientific results. We will maintain our efforts to set up new collaborations Continental South Asia. We will go on looking for calls for proposals that would support either bilateral cooperation or networks on rice blast diversity in this area.

Total Agropolis Fondation funding: € 20,800 (travel expenses)

Funding categorie(s): Agropolis Foundation small grants (support to prepare applications for national or international calls for proposals, e.g. ANR and EU FPs)

Project duration: 18 September 2008 – 31 March 2010

Keywords: rice blast – fungus – network – phenotyping – genotyping – population genetics – diversity