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Towards agroecological management of rice blast disease in Madagascar Highlands

Sester M.¹, Ramanantsoanirina A.², Raboin LM¹, Dusserre J.¹, Raveloson H.², Tharreau D.³

¹: CIRAD. UPR AIDA. TA B-115/02. 34398 Montpellier cedex 5. France

²: FOFIFA. SRR Antsirabe. BP 230. Antsirabe 110. Madagascar

³: CIRAD. UMR BGPI. TA A-54/K. 34398 Montpellier cedex 5. France

Rice is the staple crop and food in Madagascar. Since the 1980s, a joint breeding program conducted by CIRAD and Fofifa, has led to the creation of new varieties adapted to the high altitude and at the same time to rainfed cropping environment (Raboin et al., 2014). But the first released varieties rapidly became susceptible to rice blast, a fungal disease caused by *Magnaporthe oryzae*, and had to be abandoned. In the 2000 and 2010s, new varieties tolerant to blast were proposed to farmers. Upland rice cropping system has become an important complement to irrigated rice, and a way to improve self-sufficiency in rice and food security. Rice blast, a fungal disease caused by *Magnaporthe oryzae*, is a major constraint for rice particularly in upland cropping conditions. In developing countries like in Madagascar, no chemical solution can be considered, so there is a crucial importance to find out agroecological solutions to limit the risk of epidemics. The interactions between upland rice and blast epidemics have then been studied in a multidisciplinary team in the highlands of Madagascar for more than 10 years. Conservation agriculture cropping systems were studied (Sester et al., 2014, Dusserre et al., in press) and showed an interesting impact on rice susceptibility to blast. Complementary field experiments showed that rice susceptibility was affected by soil origin and crop density and that infested crop residues appeared as sources of primary inoculum (Raveloson et al., 2013). Experiments on cultivar mixtures showed promising results to control blast epidemics (Raboin et al., 2012). These data were measured in field experiments and integrated together in a simulation model at the landscape scale (Sester et al., 2016).

Key words: blast, Rice, Agronomic Management, Food security