Cropping system to limit blast disease in rainfed rice

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Introduction

Rainfed rice is essential for Madagascar to become self-sufficient with rice production. Blast disease is one of the major problems for this crop, but no chemical solution is acceptable for farmer and varietal solution are not durable enough. There is then a need for durable solutions: systems with no tillage showed very interesting results (1). We wanted here to confirm the possibility of crop protection by cropping systems adaptation.

Materials and methods

Rainfed rice in a multi-year trial, randomised design with two cropping systems : zero tillage or yearly tillage.

Leaf blast

A sensitive variety checked weekly for symptoms of pyricularia on leaf (rate of affected stems and disease grade) and panicles (rate of affected panicles and percentage of affected grains per panicle).

Rate of panicles with symptoms x % grains affected by sick panicle = % grains affected on the field.

Panicle blast

Results

A difference was observed for leaf blast even in term of number of symptoms (Fig 1) and in term of severity of the disease. The number of grains per panicles, elaborated during the « leaf blast period » was affected in the tillage crop compared to the zero tillage. We supposed then that not only did leaf blast have an effect on photosynthesis, but it could also affect the yield by reducing the number of grains.

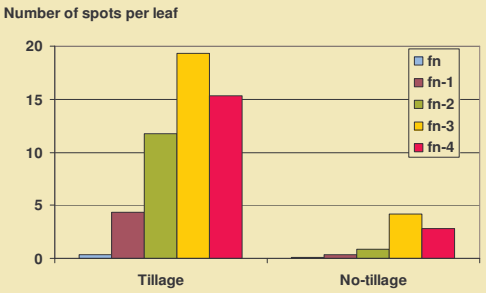

Fig 1

The dynamics of blast disease were different in he two cropping systems (fig2). The evolution of the disease was delayed in the zero tillage. The proportion of grains affected by the disease was well correlated to the percentage of fulfil grains and to grin yield (Fig 3). Blast was then the major factor reducing rice yield in our trials.

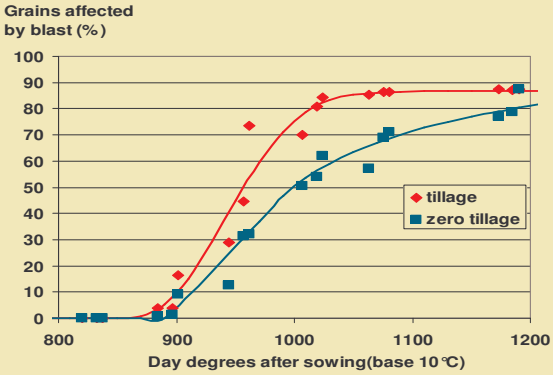

Fig 2

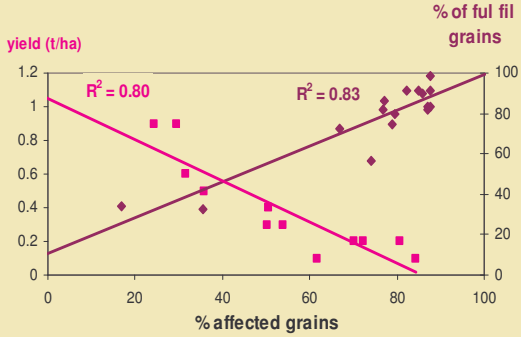

Fig 3

Conclusion

The use of appropriate cropping systems to manage crop diseases could be proposed to farmers as a long term solution for crop protection. The system tested here was recent and not performing enough for very sensitive variety but the fact the we observed effects was encouraging and th opportunity to combine newly adapted cropping systems to partially resistant varieties brings great hopes for improving crop protection (2).

References :

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(2) Ratnadass A. et al. 2006. In Biological Approaches for Sustainable Soil Systems. CRC Press. 589-602.

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