Impact of a DMC rainfed rice-based system on soil pest and Striga infestation and damage in Madagascar

Direct seeding. Mulch-based, Conservation agriculture (DMC) systems are being extended in Madagascar in view of reducing erosion and loss of fertility of hill slope soils observed in conventional rainfed systems. However, little is known on their effects on infestation and damage to crops (particularly rice) by soil insect pests and Striga.

While in the regions around Lake Alaotra and Mararaka, dramatic damage by black beetles (Coleoptera, Scarabaeidae) was observed on rice cropped on mulch (Charpentier et al, 2001), attacks by these pests were reduced after a few years of DMC management in the Highlands of the Vakinankaratra region (Michellon et al, 2001). On the other hand, in the Middle-West of Vakinankaratra, where Striga asiatica (Scrophulariaceae) has become a major constraint to staple cereal crop cultivation in rainfed systems (Andrianias sorondra et al., 1999), parasitization of DMC and insecticide protection (Table 1).

Results

At both Andranomanelatra and Ibity, pitfall traps and soil samplings revealed higher abundance and biodiversity of epigaeic and endogeic macrofauna, under DMC as compared to ploughed plots, particularly in terms of “non-pest” taxa. In December 2002, resp. 2.6 & 1.6 adults of the decomposer Dynastid Hipparidium equestre of DMC and insecticide protection (Table 1).

Discussion

Our results from the Highlands indicated that after four years under DMC management under high soil pest pressure, rice yield, in the absence of seed protection with imidacloprid, was equivalent to that of ploughed rice with seed treatment. In the Middle-West, results obtained in 2004/2005 confirmed the general trend observed earlier, namely: impressive results in terms of grain yield, attributed to reduction in Striga infestation were obtained after the first year (3 t/ha of paddy rice, compared to 1.5 t/ha on the plowed control, and results kept improving year after year, reaching 4.1 t/ha, even in a cyclonic year like 2004 (Michellon et al, 2005).

References

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