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“Bridging the gap between increasing knowledge and decreasing resources”

Organic Pest Management Strategies to Control the Cocoa Mirid (*Monalonion dissimulatum* Dist.), Alto Beni, Bolivia

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Abstract

The cocoa mirid (*Monalonion dissimulatum*) is one of the major pests in cocoa cultivation in Alto Beni, Bolivia. The most common control method is the manual removal of the nymphs. This practice is time-consuming, and therefore farmers often do not follow it. Hence there is an urgent need for more efficient practices to control this important pest.

This study evaluated the pathogenicity of two strains of *Beauveria bassiana* for the control of *M. dissimulatum* on cocoa: a non-native, commercialised strain (Probiobass MR, Probiotec S.R.L.), and a locally isolated, native strain of Alto Beni, which is not yet commercialised. Moreover, a silicon-based product (TECSIL PM®) was tested. In addition, the effect of different degrees of infestation with *M. dissimulatum* on different stages of cocoa pod development was examined. In order to investigate these questions, several field trials were carried out at the experimental station of Sapecho between June and September 2013.

The foreign *B. bassiana* strain was the most effective bio-pesticide with a mortality rate of 63.3% in adults and 49.1% in nymphs. Cocoa pods in their early stages of development were highly susceptible to attack by *M. dissimulatum*. On the other hand, fully developed cocoa pods showed a rather strong resistance to attacks: no effects on cocoa wet bean yield were recorded up to about 70% of damaged tissue on the surface of the cocoa pods. However, when the damage increased above 70%, it had a strong impact on yield, amounting up to 50.4% loss. Damaged pods started desiccating, and fully damaged pods completely desiccated causing total yield loss.

It is concluded that the foreign strain of *B. bassiana* may be the most efficient to control *M. dissimulatum* in the field. More on-farm field trials need to be conducted over longer periods of time in order to elucidate whether the observed effects will be reflected in higher cocoa yields in the farmer's context. It is recommended to perform harvesting operations at regular intervals of two weeks in order to minimise losses caused by the desiccation of damaged cocoa pods.

Keywords: *Beauveria bassiana*, *Monalonion dissimulatum*, organic pest management, *Theobroma cacao*