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# Delivery Techniques of *Metarhizium* for Biocontrol of Rhinoceros Beetles in Oil Palm Plantations

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*The effectiveness of application of various forms of spore-bearing materials of the fungus *Metarhizium anisopliae* variety major in the field using different delivery techniques to control the rhinoceros beetle, *Oryctes rhinoceros* was reviewed. Growing substrates and preparing fresh spores solution and subsequently applying onto the breeding sites were simple and practical, but was restricted for small areas. These two forms of inoculums have short life span and it is therefore costly to be stored for a longer period. Mass release of adult-carrying-spores either manually or using a specially designed auto dissemination trap was capable for distributing the spores into the beetle breeding habitats. However, the level of viable spores seemed to be low and were not sufficient to create a significant infection to reduce the beetle population. Application of spore solution prepared from a powder formulation of *M. anisopliae* by normal or high volume spraying techniques was effective. Application of spore solution using a mist blower or a power sprayer killed 100 per cent larvae as early as 4 months after treatment (MAT). In areas where the beetle breeding habitats had been fully covered with leguminous cover crops, blanket spraying of spore solution reduced the overall beetle population by up to 80 per cent after 8 MAT. A new approach of applying *Metarhizium* was through the setting up of an Artificial Breeding Site (ABS) technique. This technique was able to cause 43 per cent infection, better than the blanket spraying which only caused 33 per cent infection. In the ABS, beetles attracted by pheromone would fall into the decomposed trunk-chipped that was frequently treated with *Metarhizium*. Those infected adults which escaped, carried over the spores and distributed them to the other healthy adults.*

**Keywords:** *Metarhizium anisopliae, Oryctes rhinoceros, rhinoceros beetle, delivery techniques.*