

Green Muscardine Fungus

(*Metarrhizium anisopliae*)

The green muscardine fungus (GMF) is a naturally occurring entomopathogen that has many strains and can be used to manage many insect pest species. One particular strain of GMF can cause mortality in larval, pupal and adult stages of the coconut rhinoceros beetle (*Oryctes rhinoceros* L.).



Once in contact, the conidia of the fungus will germinate on the host beetle and penetrate its cuticle. It will multiply in the hemocoel and other tissues causing mummification. A white mass of fungus first appears on the surface of the mummified body of the beetle about 10 days from infection. It turns to green after 3 to 5 days.



Laboratory production of GMF

GMF is cultured in the laboratory in potato dextrose agar and inoculated to corn grits for further sporulation. Once media is fully coated and has turned dark green, the fungus is harvested, dried and packed.



Method of application

An artificial breeding site is made by putting together four, cut, one meter coconut logs. The cavity is filled to the brim with sawdust, coco peat, dry animal dung and other decomposed matter. At least one hundred grams (100g) of dried GMF is placed in two layers within the sawdust mixture. The top is watered and covered with coconut fronds or banana leaves to maintain moisture and encourage fungal growth.



Four to five log traps per hectare are positioned along the edges and center of the plantation or near breeding areas.



If coconut stumps, saw dusts and fallen logs abound in the area and are starting to decompose, GMF can be applied directly to these breeding places. The media must be moist enough to encourage fungal growth.

Monitoring of log traps

Log traps can be inspected two months after set up to determine if the beetle bred on the trap. Infected larvae may be transferred to other log traps to reinforce existing inoculum. The trap maybe added with GMF or decomposed matter if needed.

Prevention of Beetle Infestation

- * Collect and utilize coconut debris like slabs, leaves, rachis, cabbage to avoid biomass piling
- * Scatter thinly decomposed matter on the ground as fertilizer
- * Plant covercrops if intercropping is not practiced
- * Practice farm sanitation

Alternate Hosts of Rhinoceros beetle

- * *Agave sisalana* (sisal hemp)
- * *Ananas comosus* (pineapple)
- * *Areca catechu* (betelnut palm)
- * *Carica papaya* (pawpaw)
- * *Colocasia esculenta* (taro)
- * *Elaeis guineensis* (African oil palm)
- * *Lantana*
- * *Metroxylon sagu* (sago palm)
- * *Musa x paradisiaca* (plantain)
- * *Pandanus* (screw-pine)
- * *Phoenix dactylifera* (date-palm)
- * *Saccharum officinarum* (sugarcane)
- * *Wodyetia bifurcata* (foxtail palm)

Other Possible Breeding Sites of Rhinoceros Beetle

- * Corn cobs
- * Rice straw
- * Cow manure
- * Rubber stumps/logs
- * Sugar cane bagasse
- * Saw dusts
- * Banana trunks

Caution

GMF is **not** toxic to non-target organisms and humans but may cause allergy to sensitive individuals.

GMF for rhinoceros beetles might not be effective if used against other insect pests.

For more information, please write or call:

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GREEN MUSCARDINE FUNGUS (GMF) FOR MANAGEMENT OF COCONUT RHINOCEROS BEETLES

