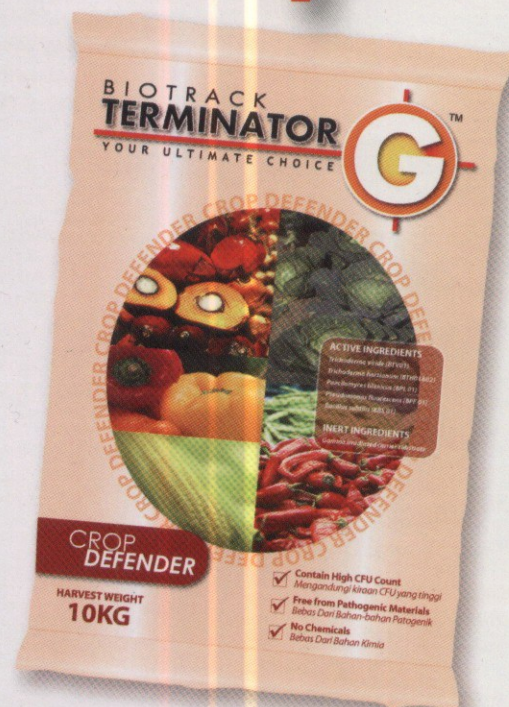





BIOTRACK TERMINATOR



-  **Increased Immunity of the Palm's Root System**
Prevention of Ganoderma Disease in Oil Palm
-  **Prevention of Pathogen on other Crops**
Increased Microflora Population
-  **Critical Component in the IPM Practises in Estates**
Chemical Free Product



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BIONEXUS
STATUS COMPANY

TERMINATOR-G™ is another Locally Produced Premium Product developed exclusively by **BIOTRACK TECHNOLOGY (M) SDN BHD** following extensive research and development



What is *Ganoderma boninense* ?

The basal stem rot of oil palm caused by *Ganoderma*, a white rot basidiomycete is the most serious disease of field palms in Southeast Asia particularly Malaysia and Indonesia. The disease was first reported by Thompson in 1931. Initially, the basal stem rot was thought to be a disease of older palms as it was found to infect mostly older palms, but in the 1960s the disease appeared in younger palms of 10-15 years old (Turner, 1981). In recent years palms as young as 1 year were found to be infected by the disease (Arifin et al 1989). The basal stem rot shortens the productive life of the oil palm resulting in considerable economic losses to the oil palm industry.

What is **TERMINATOR-G™** ?

TERMINATOR-G™ is a your ultimate choice in the prevention and prolonging productivity on *Ganoderma* infected palms and other crop diseases.

It's combination of *Trichoderma viride* (BTV01) and two isolates of *Trichoderma harzianum* (BTH01 and BTH02), *Paecilomyces lilacinus* (BPL01), *Pseudomonas fluorescens* (BPF01) and *Bacillus subtilis* (BBS01).

TERMINATOR-G™ works against *Ganoderma*, *Fusarium* sp., *Phytophthora* sp, *Rhizoctonia* sp, *Phythium* sp and *Verticillium* sp. Etc.

Advantages of **TERMINATOR-G™**

- Increases the immunity of the root system
- Prevention of *Ganoderma* disease in oil palm
- Prevention of pathogen on other crops
- Increases the microflora population
- Assists the IPM practices for your estates
- Chemical free product
- Environmentally safe product



Trichoderma harzianum
(BTH02)



Trichoderma harzianum
(BTH01)



Pseudomonas fluorescens
(BPF01)



Bacillus subtilis
(BBS01)



Trichoderma viride
(BTV01)



Paecilomyces lilacinus
(BPL01)

Application Method

Nursery

1. Apply the required amount of fertilizer at the bottom of the planting hole.
2. Lightly cover the fertilizer with 3-5 cm of soil.
3. Inoculate **TERMINATOR-G™** and **RHIZAgold®** around the root zone and cover with soil.

Field Planting

1. Apply the required amount of fertilizer at the bottom of the planting hole.
2. Lightly cover the fertilizer with soil
3. Inoculate **TERMINATOR-G™** and **RHIZAgold®** around the root zone and cover with soil.

Plants in the Field

1. Prepare 5 pockets of 20cm deep and 0.5m from the base of the plants.
2. Inoculate **TERMINATOR-G™** and **RHIZAgold®** equally in the pockets and cover with soil.

Application Dosage

	TERMINATOR-G™	RHIZAgold®
Oil Palm		
-Nursery		
Pre Nursery	5g/Seedling	10g/Seedling
Main Nursery	5g/Seedling	40g/Seedling
-New / Re-Planting		
Non- <i>Ganoderma</i> Area	100g/Hole	500g/Hole
<i>Ganoderma</i> Area	200g/Hole	500g/Hole
Rubber		
- Nursery	10g/Seedling	20g/Seedling
- Field Planting	50g/Plant	200g/Plant
Fruits Trees		
- Nursery	20g/Seedling	50g/Seedling
- Field Planting	50g/Plant	500g/Plant
Banana	20g/Hole	50g/Hole
Vegetables / Flowers	20g/Acre	20kg/Acre

MITIGATION OF GANODERMA DISEASE IN OIL PALM BY APPLICATION OF TRICODERMA AND ARBUSCULAR MYCORRHIZAL FUNGI

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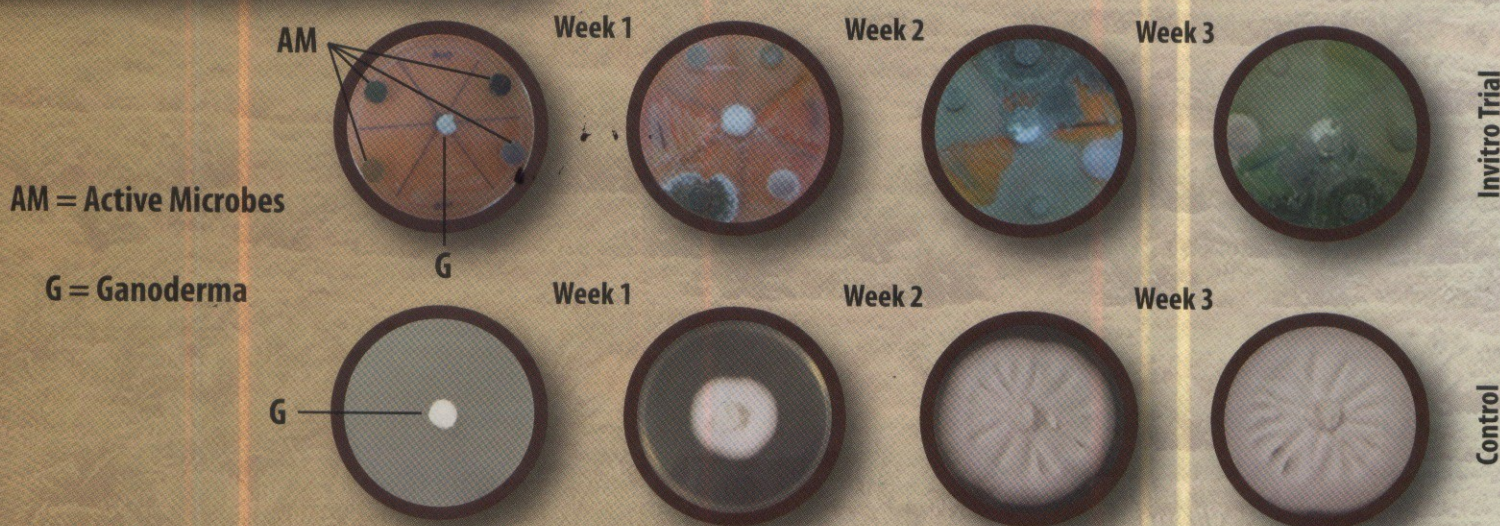
2 Faculty of Science, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.

Basal stem rot caused by *Ganoderma boninense* is the most serious disease of oil palm in Malaysia. Originally the disease was found in mature and old palms, but is now common even in young palms less than 10 years old. At present, there is no effective chemotherapy against the disease. This study investigates the use of Tricoderma-infused compost (Tricogreen) and a bio-based product containing a mixture of *Tricoderma viride*, *Tricoderma harzianum*, *Paecilomyces lilacinus* and arbuscular mycorrhizal fungi (Terminator-G) in mitigating *Ganoderma* infection in young oil palms. The trial was carried out in an oil palm estate in Johore, on 3-year palms infected by *Ganoderma*. Infected palms at the early stage of infection, i.e. those with slight-to-moderate disease severity were marked and selected for the study. Treatment consisted of single application of Terminator G (TG) at 500g per palm, and Tricogreen (TC) at 50kg per palm. In the control, palms were subjected to normal estate maintenance without other additional treatments. Disease severity, measured on a 0-4 scale, was assessed at 3 monthly intervals. The production of oil palm fresh fruit bunches (FFB) was recorded during each harvest. The trial was laid out in complete randomized design with 35 individual replicates for each treatment. Results showed that *Ganoderma* infection advanced steadily in the control, from a severity scale of 1.17 reaching 2.37 after 34 months. In both the treated plots, disease progress was markedly retarded. In treatment TC, disease increased at the slowest rate, from severity scale of 1.23 to 1.54, while in treatment TG, the disease increased gradually from 1.23 to 1.71 in 2 years. Statistical analysis showed that FFB production in the control and treatment TC was not significantly different, but the cumulative FFB yield in treatment TG significantly different at about 9.6% higher than the control. Thus, there is great potential in using TG and TC to mitigate *Ganoderma* disease and perhaps increase oil palm yield.

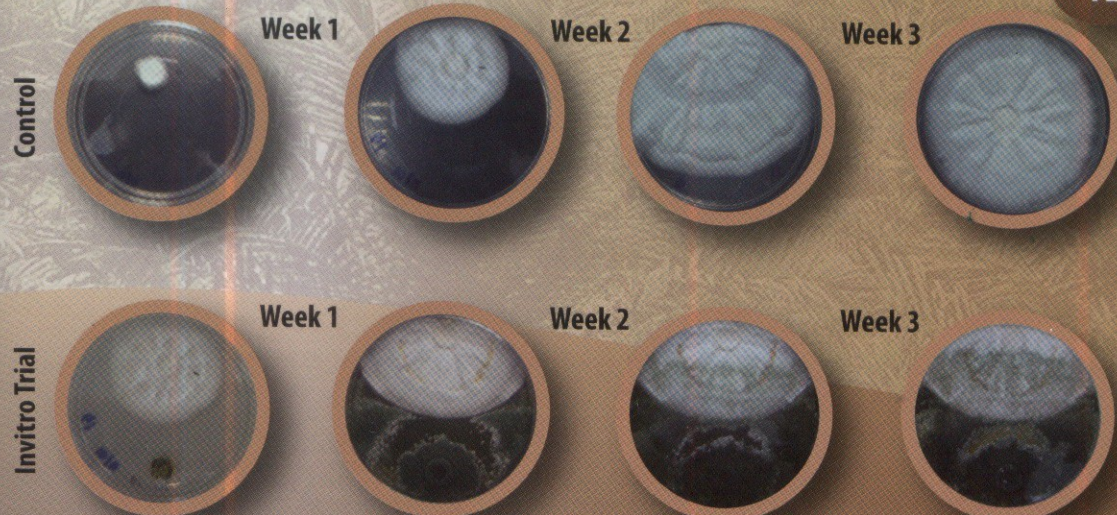
Keywords : *Ganoderma*, oil palm, *Tricoderma*, arbuscular mycorrhizal fungi, disease control

Source : 7th MAPPS International Conference on Plant Protection in the Tropics

TERMINATOR-G™ Invitro Trial 1



TERMINATOR-G™ Invitro Trial 2



ANTAGONISTIC TEST BY DUAL CULTURE

Calculation of PIRG
(Percent inhibition of radial growth)
$$PIRG = (R1 - R2) / R1 \times 100$$

Where

R1 – radius of the mycelial extension by *Ganoderma* in the control plate
R2 – radius of the mycelial extension by *Ganoderma* in the dual culture plate

Percent Inhibition of Radial Growth (PIRG)
69.44%