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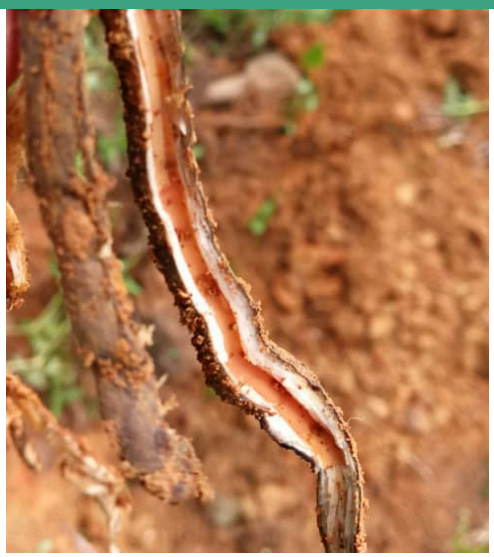
SAWIT SHIELD
BIO FERTILISER



A MICROBIAL INOCULANT FOR PREVENTING FUNGAL DISEASES

Shocking Statistics Reveal: Basal Stem Root Disease Incidence in Sabah's Oil Palm Industry Jumps from 2.74% to 7.92%, Marking over 188.91% Increase and Escalating Threat.

source-Malaysian Palm Oil Board (MPOB)

The **survey conducted in 2022 by the Malaysian Palm Oil Board (MPOB)** revealed the impact of Basal Stem Rot (BSR) on Malaysian estates. It was found that smallholders were affected even more severely. Ganoderma disease caused approximately RM 1.5 billion in lost yields, posing a significant threat to **Malaysia's oil palm industry.** This problem becomes worse because many places affected by Ganoderma disease are replanting with second-generation oil palm trees.

	Total Hectare	Affected Area (ha)	Incidence Rate
Estates	2,985,871.95	221,000	7.4%
Smallholders	60,395.64	8,752.87	14.5%

Table 1:Impact of Basal Stem Rot (BSR) on **Malaysian Oil Palm Estates in 2022**

The economic consequences are severe, potentially running into billions if left unchecked. Urgent strategic interventions are imperative to safeguard the sustainability of both large-scale estates and smallholder operations in **Sabah's oil palm industry.**

Year	Incidence Rate	Percentage of Increase
2009-2010	2.74%	188.91%
2016-2017	7.92%	

Table 2: Surveyed incidence of Ganoderma in **Sabah's oil palm industry.**

BASAL STEM ROT DISEASE CENSUS RATING

RATING 0
-Healthy palm
-No fruiting body
-PCR-DNA tested -ve

RATING 1
-No/mild foliar & rotting
-Mycelium presence
-PCR-DNA tested +ve

RATING 2
-Foliar symptom <50%
-Rotting <30%
-Moderately infected
-White button presence

RATING 3
-Foliar symptoms >50%
-Rotting >30%
-Bracket shaped fungus presence
-Severely infected

RATING 4
-Very severely infected
-White button/bracket shaped
-Collapsed/dead palm
-PCR-DNA tested +ve

BSR disease symptoms typically begin with initial signs resembling drought conditions, where young leaves fail to unfurl. The presence of fully elongated but unopened spears in the center of the palm crown indicates extensive stem damage and restricted water uptake. In mature palms, lower fronds collapse and hang vertically from the trunk, followed by drooping and pale green or yellowish discoloration of younger fronds. Ultimately, progressive crown deterioration may lead to the collapse of the entire crown or the trunk itself.

Pic 1: Visual Evidence of Untreated Tree Showing Continuous Spread of *Ganoderma* Disease.

Pic 2: Illustrating the Impact of Sawit Shield Treatment on Halting *Ganoderma* Disease Spread

The rubberwood block is inoculated with Ganoderma disease and evaluated against healthy germinated seedlings. In Picture 1, the treatment is without Sawit Shield, whereas in Picture 2, the seedling is treated with Sawit Shield. Picture 1 illustrates that the tree is affected by Ganoderma disease to the extent of 85%, while Picture 2 demonstrates that Trichoderma effectively control the spread of Ganoderma disease by 50%. Despite the Ganoderma disease affecting the tree in Picture 1, gradual application of Sawit Shield able to control the spread of Basal Stem Rot disease.

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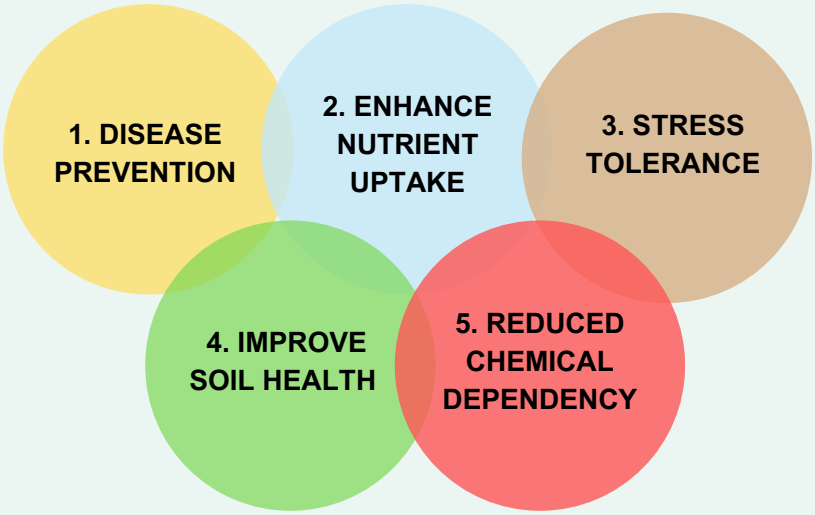
5IN1 BENEFITS OF SAWIT SHIELD



5IN1 BENEFITS OF SAWIT SHIELD

1. **DISEASE PREVENTION:** *Trichoderma harzianum* can suppress various plant pathogens, including fungi that cause diseases in oil palm such as basal stem rot (Ganoderma boninense) and Fusarium wilt.
2. **ENHANCE NUTRIENT UPTAKE:** It can improve nutrient uptake by the oil palm roots, leading to better growth and development of the plant.
3. **STRESS TOLERANCE:** *Trichoderma harzianum* can enhance the oil palm's resistance to various stresses, including drought and soil salinity.
4. **IMPROVE SOIL HEALTH:** As an endophyte, it can also contribute to the overall health of the soil by promoting beneficial microbial interactions and nutrient cycling.
5. **REDUCED CHEMICAL DEPENDENCY**: By utilizing *Trichoderma harzianum*, oil palm growers may reduce their dependence on chemical fertilizers and pesticides, thus promoting more sustainable agricultural practices.

IN *VIVO* TESTING OF OIL PALM SEEDLINGS WITH *GANODERMA* INOCULATED WOOD BLOCK BY SAWIT KINABALU

TREATMENT		% Healthy Seedlings
T1	Control	100.00
T2	*Ganoderma*	0.00
T3	*Ganoderma* + Sawit Shield 1	**70.00**
T4	*Ganoderma* + Sawit Shield 2	**76.67**

In nursery tests, 12-months-old seedlings treated with Sawit Shield grew better in all aspects and didn't have Ganoderma disease, unlike those without treatment. Seedlings treated with T3 and T4 showed 70% and 76.67% healthy plants, while those without treatment (T2) had 0% healthy plants and showed Ganoderma symptoms. After two and a half years of Sawit Shield use during replanting, young palm trees remained free from Ganoderma Disease, ensuring healthy palms and better productivity.

SAWIT SHIELD: PROTECTING PALMS, BOOSTING YIELD

The trial aimed to study the efficacy of integrating Sawit Shield into existing manuring practices on oil palm yield during the young mature stage. Two treatments were compared: Treatment 1 (T1) involved the integration of Sawit Shield with existing practices, while Treatment 2 (T2) relied solely on existing methods.

TREATMENTS	YIELD PARAMETERS (JULY-DECEMBER 2021)		
	BUNCH NUMBER	AVERAGE BUNCH WEIGHT (KG)	FFB (KG)
T1-SAWIT SHIELD + ESTATE PRACTICES	111	8.46	938
T2- CONTROL ESTATE PRACTICES	115	6.86	789

Table 1: The yield of T1 is 19% higher compare to T2 after the application of Sawit Shield at young mature stage (1st year).

In the first year, although T2 showing a higher number of bunches, T1 demonstrated an improvement with a 23% increase in average bunch weight and a 19% increase in Fresh Fruit Bunch (FFB) weight compared to T2.

TREATMENTS	YIELD PARAMETERS (JANUARY-DECEMBER 2022)		
	BUNCH NUMBER	AVERAGE BUNCH WEIGHT (KG)	FFB (KG)
T1-SAWIT SHIELD + ESTATE PRACTICES	370	8.51	3136
T2- CONTROL ESTATE PRACTICES	327	6.66	2206

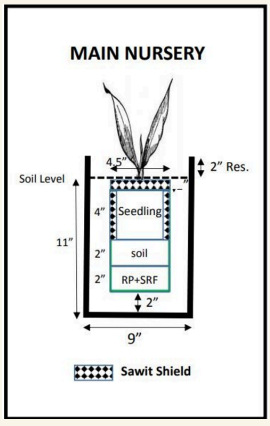
Table 2: The yield of T1 is 42% higher compare to T2 after the application of Sawit Shield at young mature stage (2nd year).

In the subsequent year, T1 continued to show improvement performance. T1 recorded a 13% increase in bunch number, a 26% increase in average bunch weight, and a significant 42% increase in FFB weight compared to T2.

SAWIT SHIELD RECOMMENDATIONS (PREVENTION STRATEGIES)

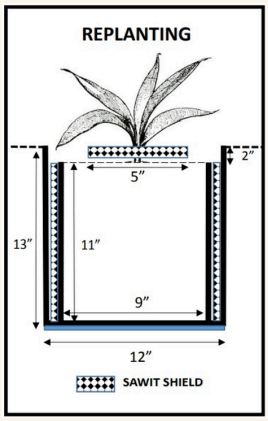
AREA	STAGE	RATE (KG)	ROTATION
Nursery	Main nursery	0.20	1
Replanting	Planting	3.00	1
Pre-mature	Year 1	3.00	1
Pre-mature	Year 2	4.00	1
Pre-mature	Year 3	4.00	1
Mature	>4 Years	4.00	1

SOP SAWIT SHIELD APPLICATION



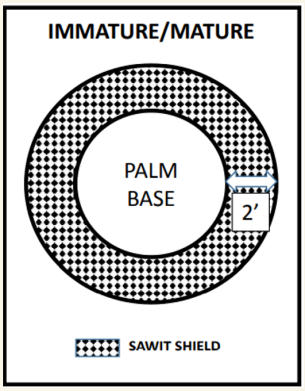
MAIN NURSERY APPLICATION:

1. Prepare core hole at 11.25cm (4.5") wide and 25cm (10") depth dimension at the center of main polybag.
2. Dust 30g RP and 50g Flexicote into planting hole.
3. Add soil layer of 5cm soil (2").
4. Insert oil palm seedling into the core.
5. Fill in 100g of Sawit Shield into the side gap of seedling.
6. Balance 100g of Sawit Shield to apply around the seedling basal.
7. Do not plant seedling too shallow or too deep.



REPLANTING APPLICATION:

1. Prepare core hole at 30cm (12") wide and 32.5cm (13") depth main polybag.
2. Dust 500g RP inside planting hole.
3. Insert oil palm seedling into the planting hole.
4. Apply 1.5kg of Sawit Shield into the side gap of the seedling.
5. Balance 1.5kg of Sawit Shield to apply around seedling basal (5") radius.



IMMATURE/MATURE APPLICATION:

1. Same application method for 1st year immature, 2nd year immature, 3rd year immature and mature area.
2. Broadcast Sawit Shield 2 feet RADIUS from palm base (inwards).
3. Apply Sawit Shield rates according to stage (Refer to Sawit Shield recommendations).
4. Avoid Sawit Shield application with other fertilizers at least for one (1) month apart.

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