GANODERMA BASAL STEM ROT

30 critical points every oil-palm farmer and plantation manager should understand

THE MUSHROOM IS A LATE WARNING. THE DISEASE STARTED LONG BEFORE.

PolySulphatePlus | Field diagnosis • precision nutrition • monitored trials

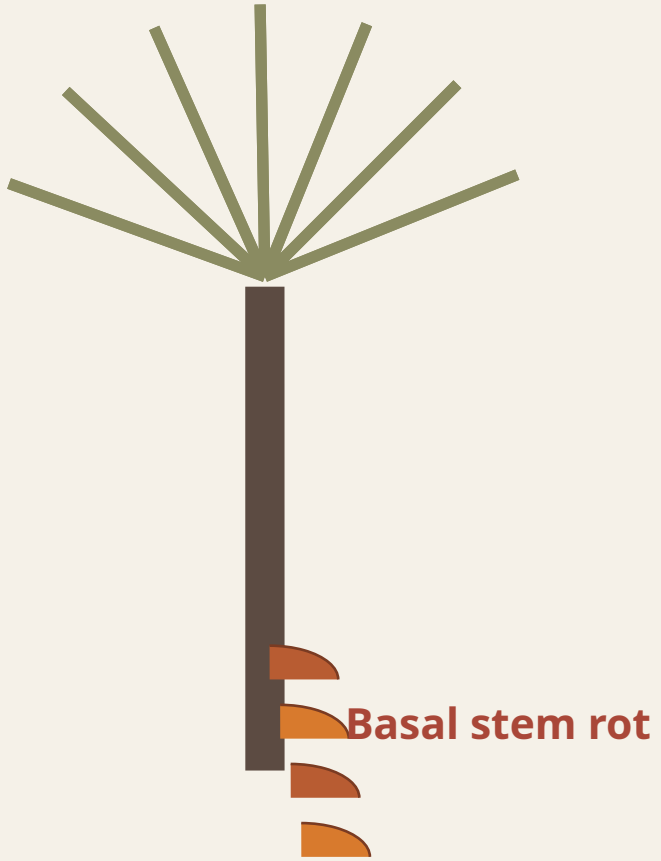
Prepared for Chandra L Ramprakash

01

What Ganoderma basal stem rot is

Point 1

- A destructive disease of oil palm roots and the lower stem.
- In Malaysia, Ganoderma boninense is the principal species associated with BSR.
- The disease reduces productive life, stand and yield.



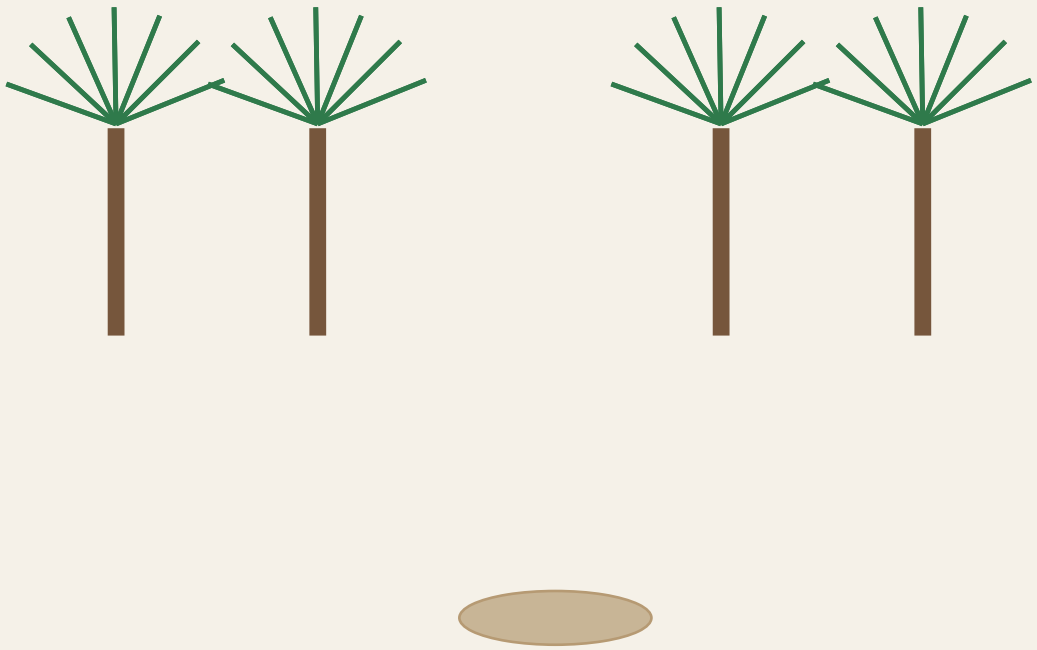
02

Why every lost palm matters

Point 2

- An oil palm is a long-term productive asset.
- When one palm dies, the plantation loses future bunches from that planting point.
- Gaps also reduce harvesting efficiency and block uniformity.

ONE GAP = YEARS OF LOST OUTPUT



03

The economic impact is serious

Point 3

- An MPOB-associated field model estimated losses of up to 68% of attainable yield among infected palms.
- Published literature has cited annual economic losses of up to about USD500 million.
- Use sourced figures - not exaggerated claims.

UP TO 68%

yield loss vs attainable yield

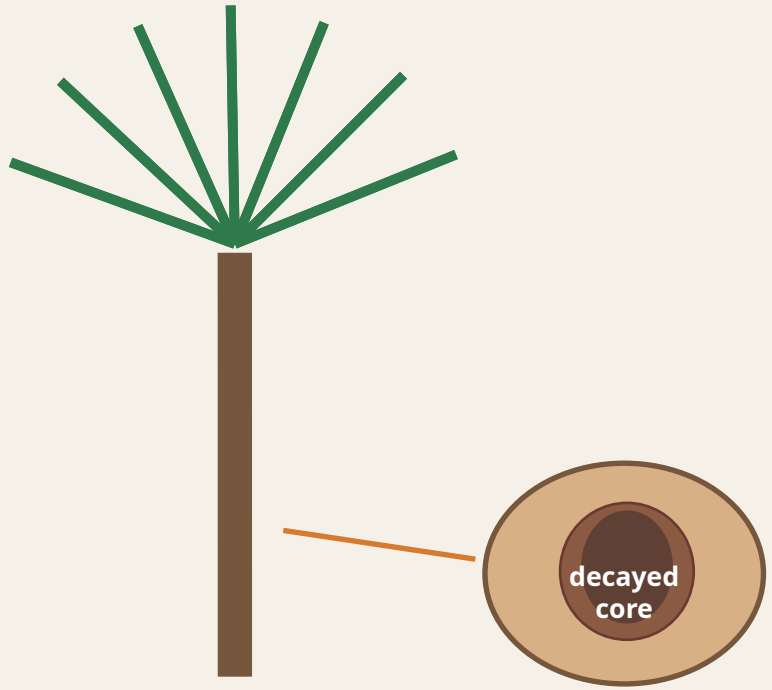
Modelled among infected palms in selected commercial plots.

Rahman et al., Journal of Oil Palm Research (2021); Zakaria, Plant Disease (2023).

04 The disease is hidden before it is obvious

Point 4

- The crown may still look acceptable while infection progresses in roots and basal tissue.
- Visible mushrooms are not required for infection to be present.
- Late diagnosis sharply limits management options.



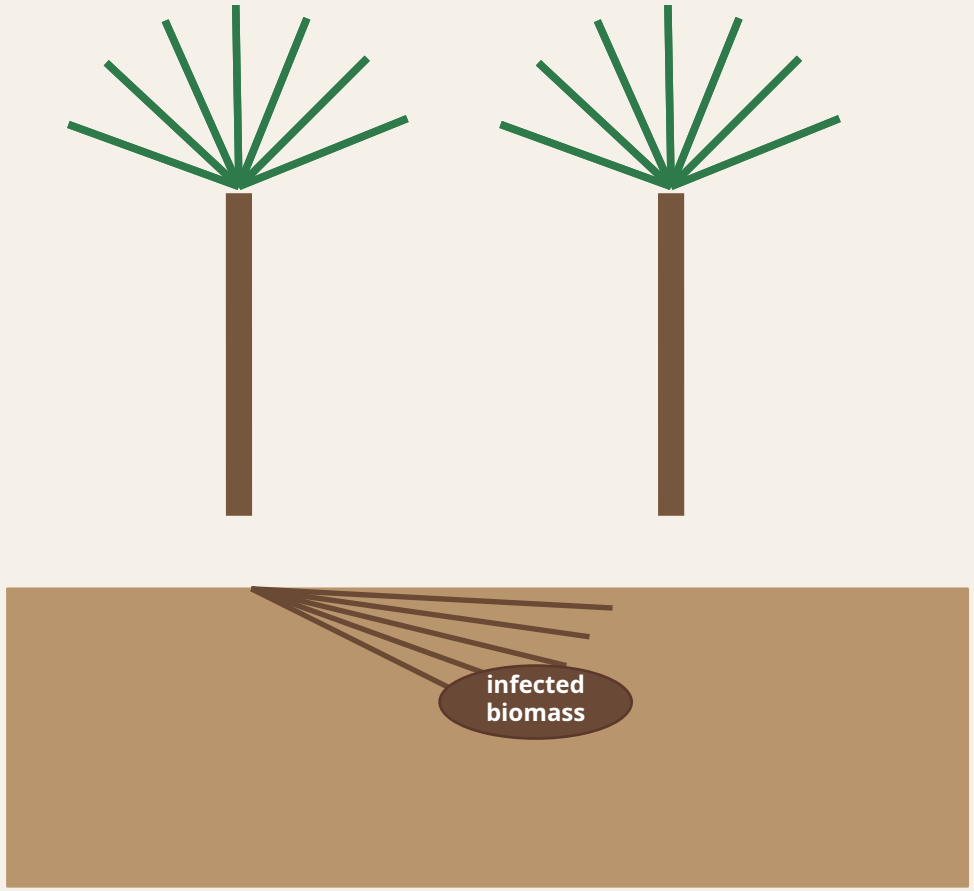
Healthy-looking crown can hide basal decay

05

Root contact and infected biomass matter

Point 5

- Infected roots, trunks and buried oil-palm material can carry inoculum.
- Successive planting cycles can increase disease pressure when sanitation is poor.
- Replanting history must be part of diagnosis.

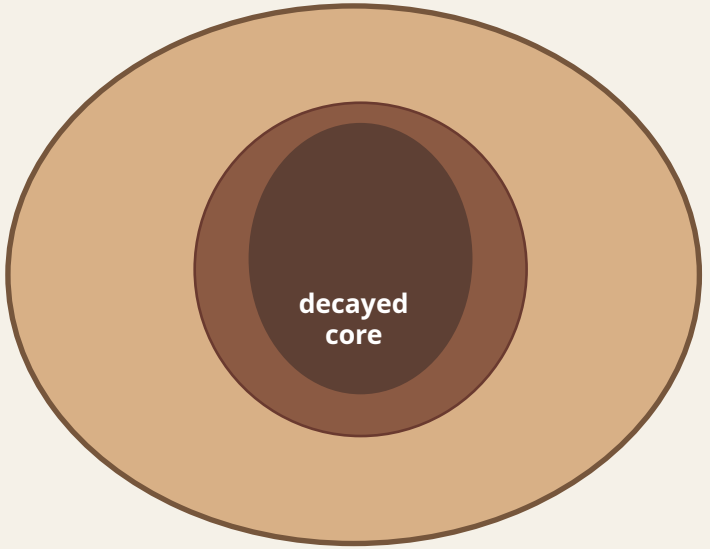


06

Ganoderma is a white-rot fungus

Point 6

- It degrades the woody structural system of the palm.
- Decay is biological, internal and progressive.
- The disease is more than a surface mushroom problem.

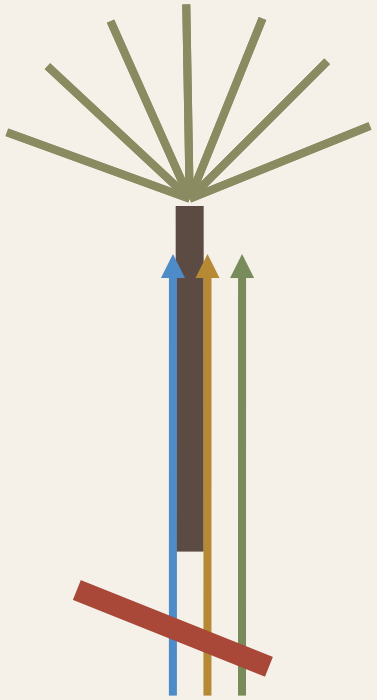


WHITE-ROT DECAY

07 Transport to the crown begins to fail

Point 7

- Damaged roots and basal tissues restrict water and nutrient movement.
- The crown behaves as though it is under severe drought and nutrient stress.
- Physiological decline can precede collapse.

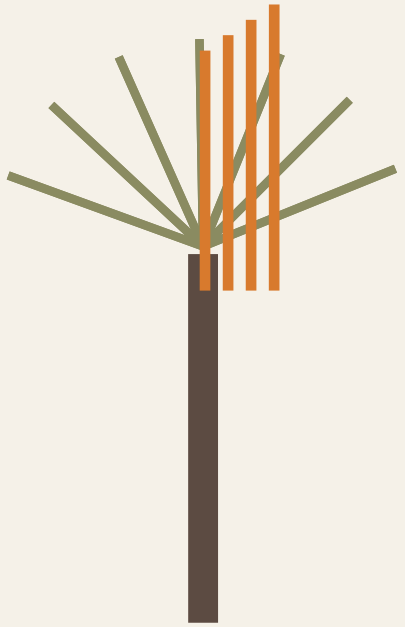


FLOW RESTRICTED

08 Unopened spear leaves are a warning

Point 8

- Several elongated but unopened spears can indicate serious internal impairment.
- The growing point is receiving inadequate water and nutrients.
- This is not an early, harmless symptom.



UNOPENED SPEARS

09

Fronds become pale, yellow and dry

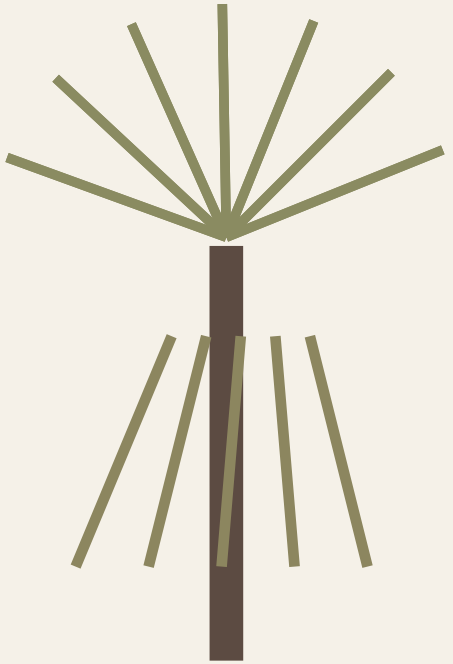
Point 9

- Younger fronds may lose colour.
- Leaflets can dry back from the tips.
- The canopy gradually loses photosynthetic capacity.

10 The crown loses form and function

Point 10

- Lower fronds may collapse and hang down.
- The crown can become reduced or one-sided.
- Yield decline may occur before palm death.



COLLAPSED LOWER FRONDS

11 The mushroom is a fruiting body

Point 11

- The bracket mushroom is called a basidiocarp.
- Inside the palm, fungal hyphae form a mycelial network.
- The visible fruiting body is only one part of the organism.

BASIDIOCARP

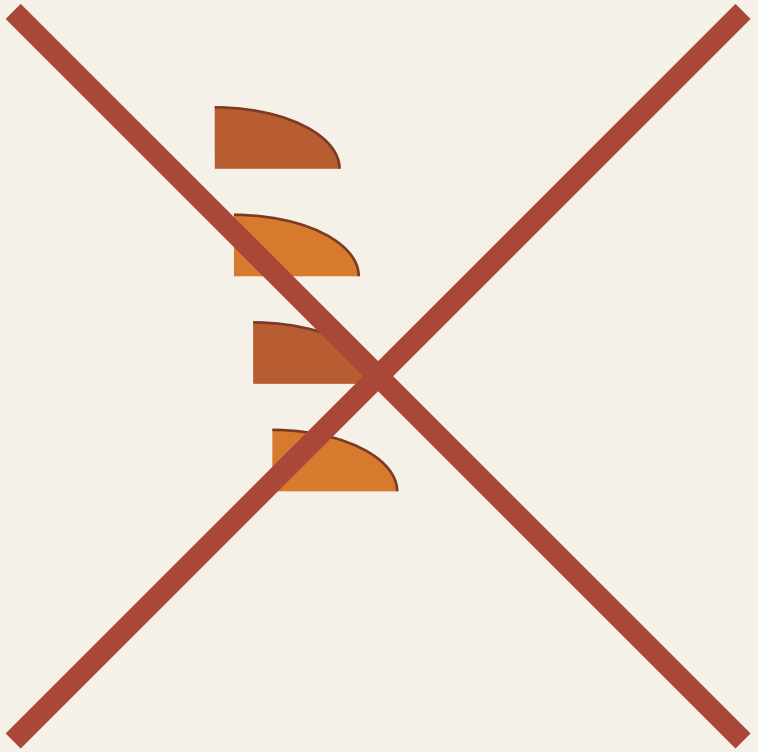
visible fruiting body

12

Cutting off the mushroom is not a cure

Point 12

- Removal may assist sanitation and spore management.
- It does not rebuild decayed tissue.
- It does not prove that internal infection has disappeared.

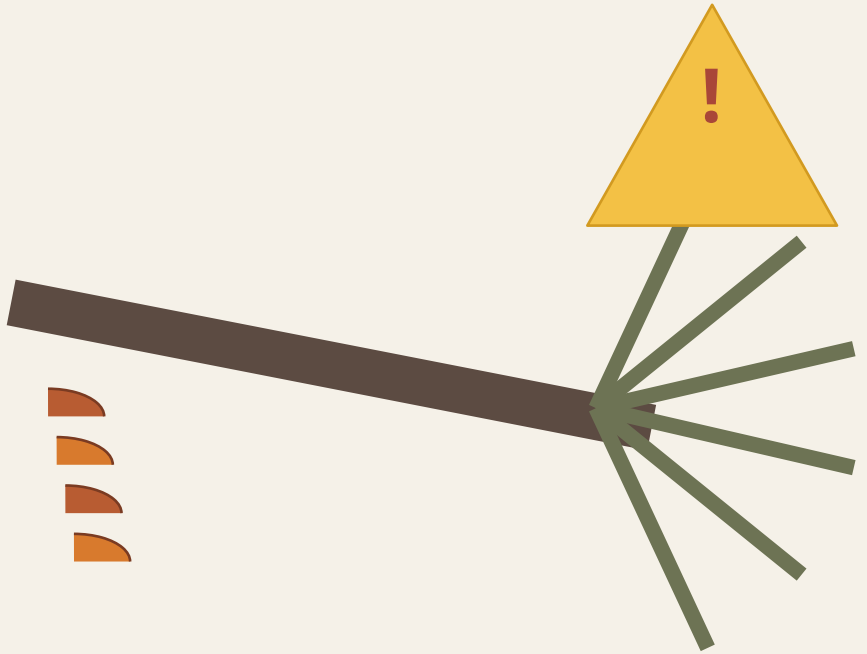


REMOVAL ≠ ERADICATION

13 Palms fall when structural strength is lost

Point 13

- The root plate and lower stem carry the weight of the entire palm.
- White-rot decay progressively removes structural integrity.
- Leaning or unstable palms are a worker-safety hazard.

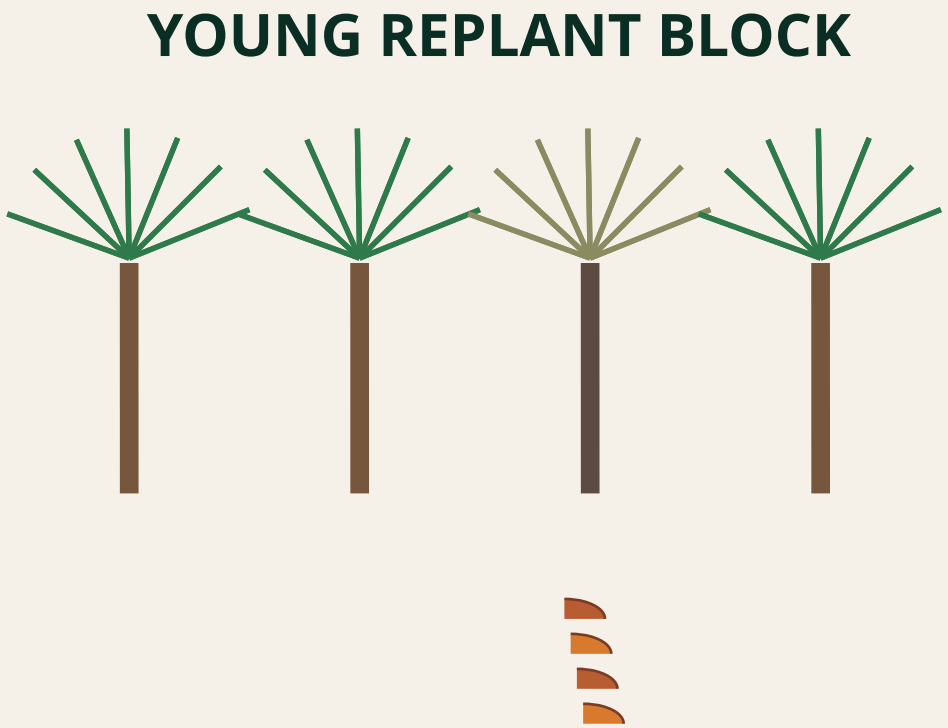


SAFETY HAZARD

14 Young palms are no longer automatically safe

Point 14

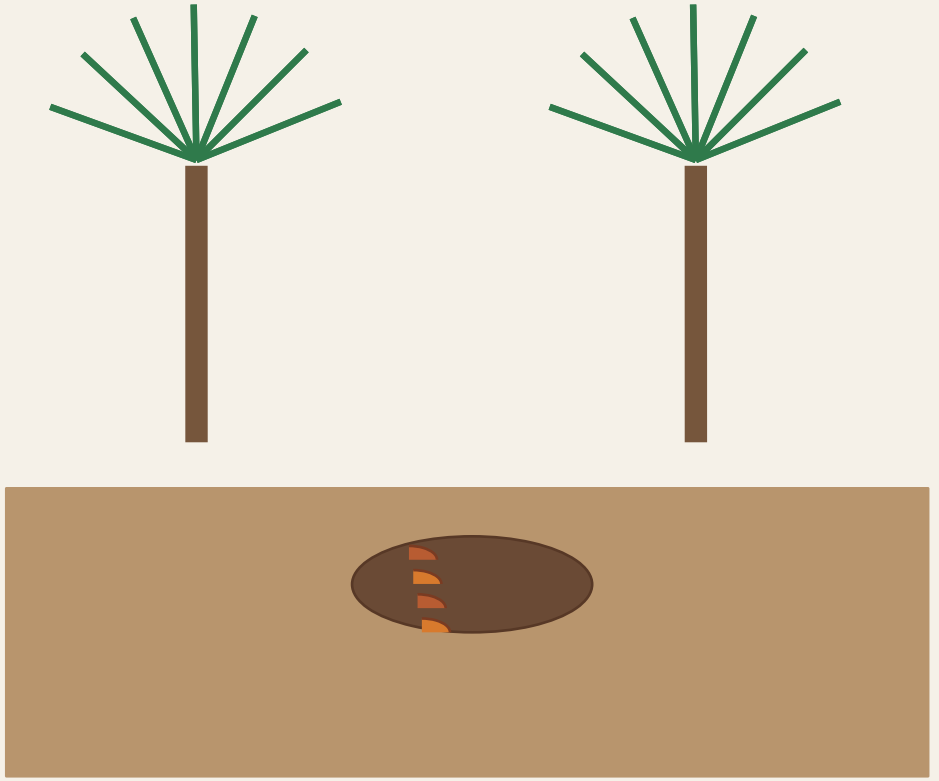
- BSR was historically associated with older palms.
- Younger plantings are now reported in high-inoculum environments.
- Aggressive isolates and infected replant sites increase vulnerability.



15 Poor replant sanitation threatens the next crop

Point 15

- Old infected roots and trunks can remain disease reservoirs.
- Planting beside infected residues exposes new roots.
- Replanting preparation is a major yield-loss predictor.

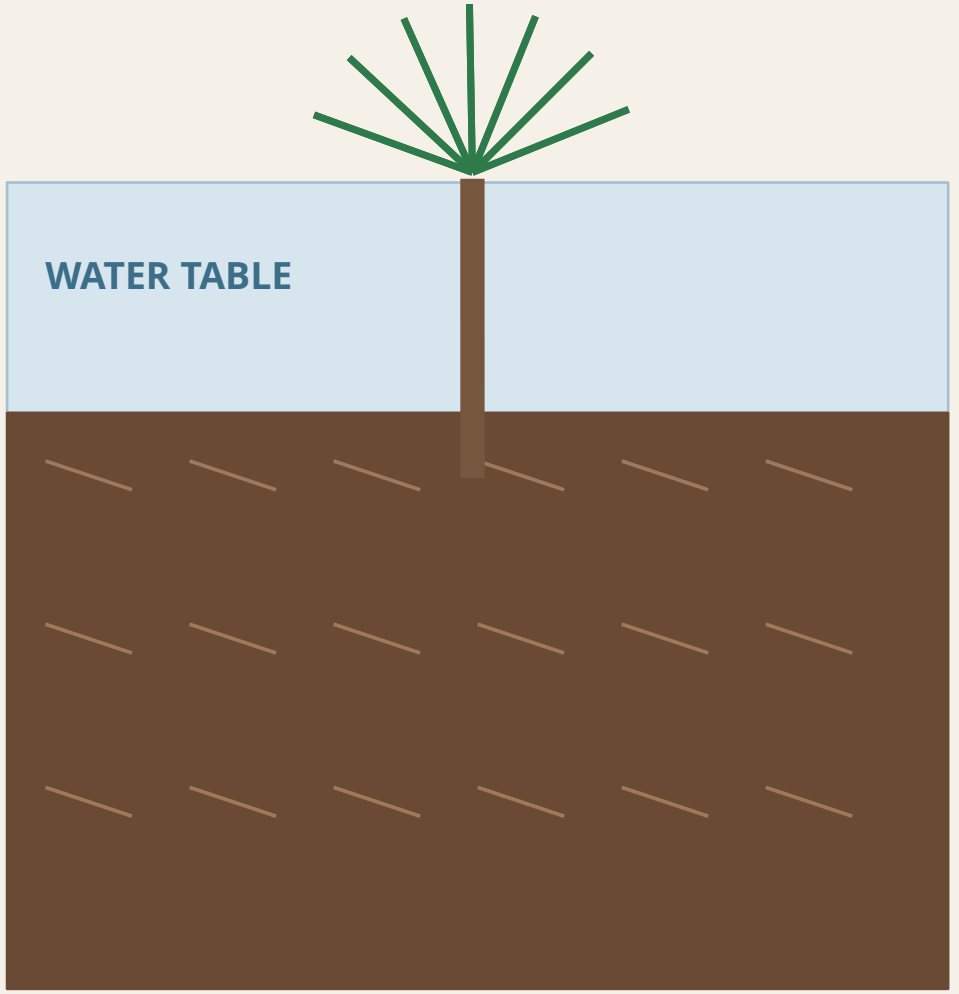


16

Peat soil is not exempt

Point 16

- Ganoderma occurs in peat, mineral and acid-sulphate environments.
- Peat creates added challenges: acidity, water table, drainage, aeration and nutrient balance.
- A peat-specific programme is essential.



PEAT: ACIDITY • DRAINAGE • AERATION • BALANCE

17

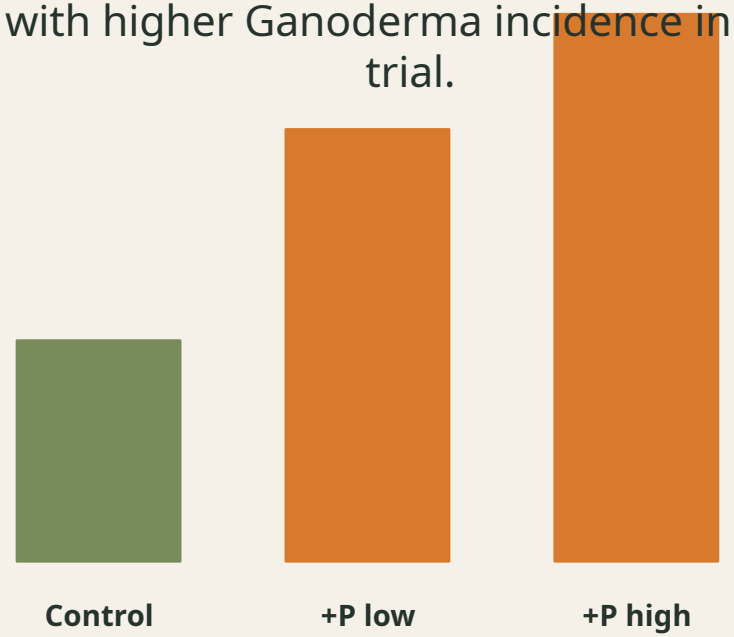
A peat field trial gave an important warning

Point 17

- More fertilisers doesn't mean you are protected
- A 14-year trial found higher Ganoderma incidence under higher phosphorus and nitrogen rates.
- Potassium rate showed no significant main effect in that trial.
- The lesson is balance and diagnosis - not “more fertiliser”.

14-YEAR PEAT TRIAL

Higher P and N rates were associated with higher Ganoderma incidence in this trial.

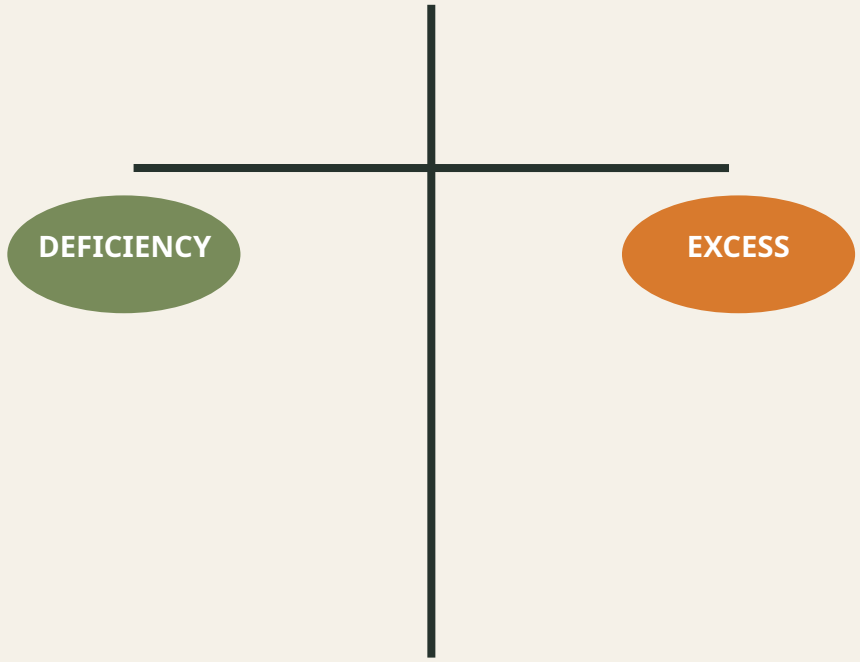


18

More fertiliser is not automatically better

Point 18

- Excess or imbalance can change plant tissue and rhizosphere conditions.
- Disease management cannot be based on guessing.
- Leaf, soil, drainage and disease-stage information must guide the programme.



PRECISION = BALANCE

19 The palm has defensive mechanisms

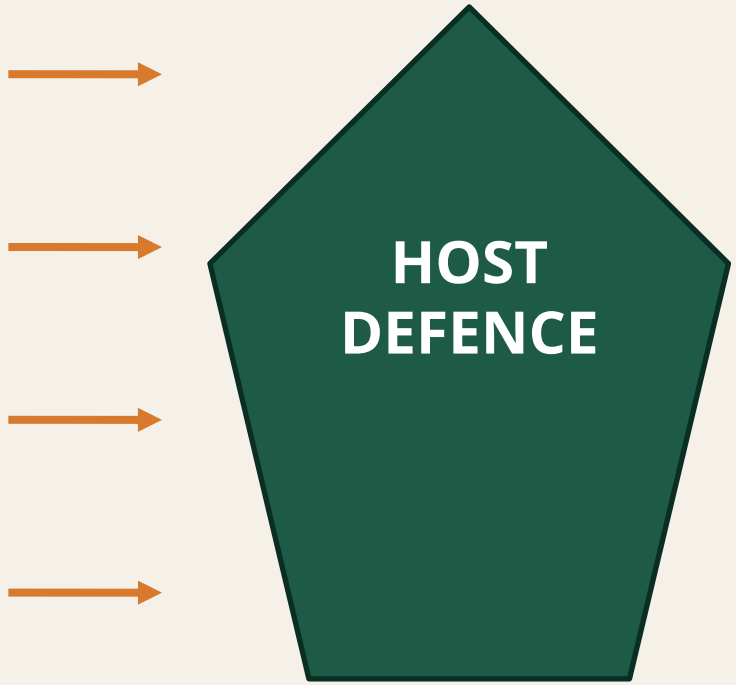
Point 19

When the Palm’s Natural Defence System Breaks Down

Oil palm is not defenceless. A healthy palm relies on balanced nutrition, strong roots, beneficial microorganisms and natural biochemical defence mechanisms to resist disease pressure.

But after years of repeated stress — including unbalanced fertilisation, heavy salt/chloride inputs, repeated fungicide use and nutrition programmes centred mainly on NPK with only a few additional elements — the root-zone ecosystem can become progressively weakened. Important secondary nutrients, micronutrients and trace elements may be overlooked, while beneficial microbial diversity can decline.

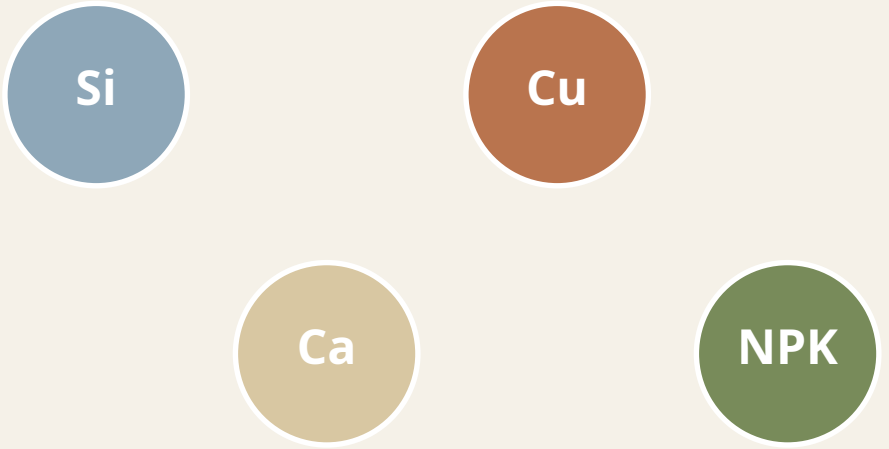
Some of these naturally occurring soil organisms are antagonistic to Ganoderma: they compete with it, suppress it, or attack fungal structures. When the root-zone biological community is weakened, Ganoderma faces less natural competition.
That is the real problem.
Ganoderma is an ancient, highly adapted fungus. It has survived in natural ecosystems for millions of years. When the palm is nutritionally stressed and its protective root-zone biology is depleted, Ganoderma can gain the advantage.
The objective is therefore not simply to “kill the fungus” — it is to rebuild the palm’s nutrition, root-zone biology and natural capacity to defend itself.



20 Nutrition can support resistance - when balanced

Point 20

- Research has examined targeted multi-element palm nutrition and soil-support system built beyond routine NPK, incorporating N, P, K, S, Ca, Mg, Fe, Zn, B, Mn, Cu, Si, Co, Mo, Na, Cl, Ni, C and O, together with trace/analytical elements detected in laboratory testing such as Ba, Al, Cr, Cd, Pb, Hg, Se, V, Ti, Sr, Li, Ag and As.
- Some nursery and field studies report reduced disease severity or improved growth.
- Results depend on formulation, rate, timing, disease pressure and trial design.



BALANCED INPUTS
+ CORRECT RATE
+ CORRECT TIMING

21 The PolySulphatePlus concept

Point 21

Rebuilding the Palm's Living Defence System

Balanced nutrients can strengthen the palm's resistance, but nutrition alone is not enough.

Our approach combines a 34-element nutrient and trace-mineral formulation with a deliberately developed 19-member microbiome consortium comprising beneficial bacteria, fungi, protozoa and archaea. The objective is to rebuild a diverse, competitive biological community around the root zone rather than relying only on conventional fertilisers, fungicides or isolated chemical inputs.

Through our study of Ganoderma — including its behaviour in medicinal cultivation systems — we have also identified fast-growing microorganisms with strong antagonistic potential against Ganoderma. These organisms are not intended to work alone; they function as part of a broader microbial ecosystem that competes for space and nutrients, supports root-zone activity and helps restore biological pressure against the pathogen.

Therefore combines mineral nutrition with microbiome restoration — feeding the palm, rebuilding the root-zone ecosystem and restoring the biological conditions required for stronger natural defence.

More specifically, it is a group of fast-growing soil fungi. Some species can act as mycoparasites, meaning they attack or suppress other fungi.

PolySulphatePlus

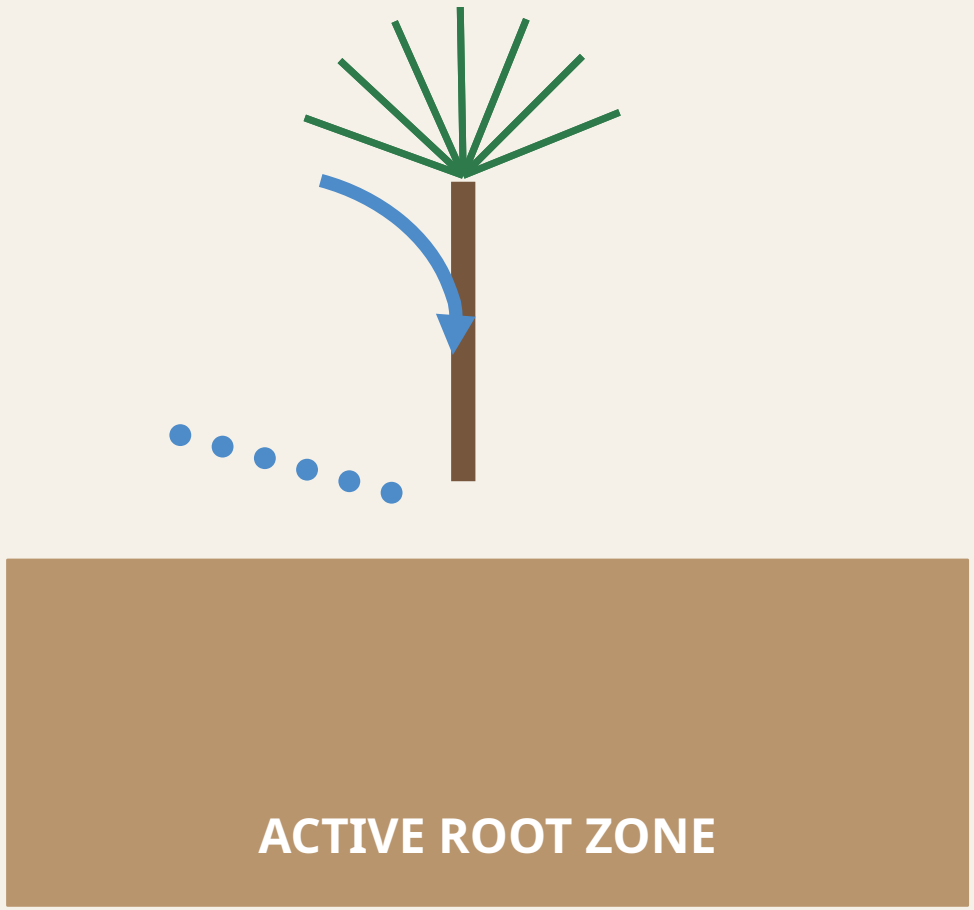
Multi-component nutrient • mineral • organic Microbiome functional formulation

PROTOCOL-BASED

22 The drenching protocol

Point 22

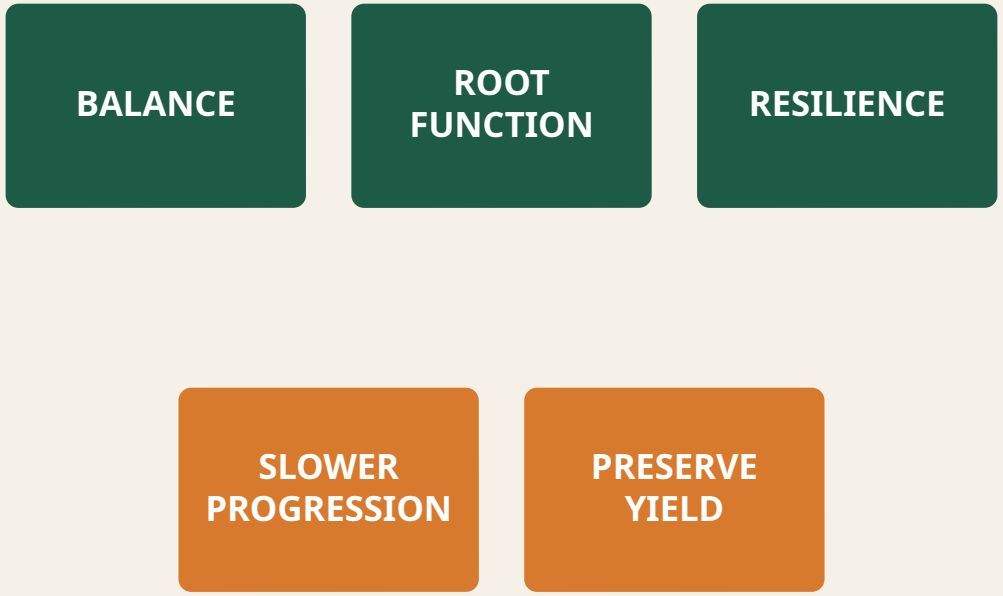
- Apply into the active root zone under a written protocol.
- Adjust for soil type, palm age, disease stage, drainage and analysis results.
- Record date, palm ID, batch and application volume.



23 What the programme is designed to achieve

Point 23

- Ultimately our intention is to increase yield and eliminate Ganoderma Spp.
- Correct diagnosed nutrient imbalances.
- Improve root-zone function and physiological resilience.
- Slow disease progression and preserve productive capacity where possible.



24 What we never be promised

Point 24

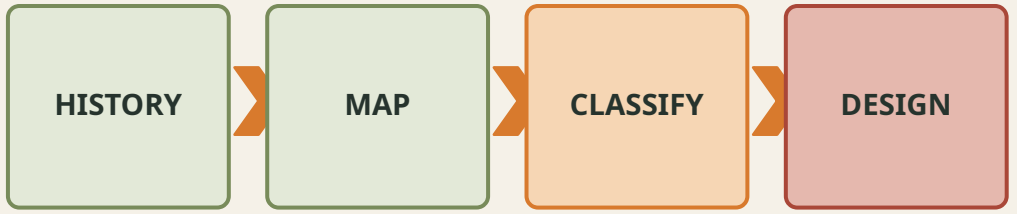
- No instant or universal cure.
- No guarantee that severely decayed palms will recover.
- No claim that greener leaves prove Ganoderma has been eliminated.

TRUTH BEFORE SALES

NO INSTANT CURE
NO GUARANTEE
NO FALSE HOPE

25 Start with plantation diagnosis

Point 25



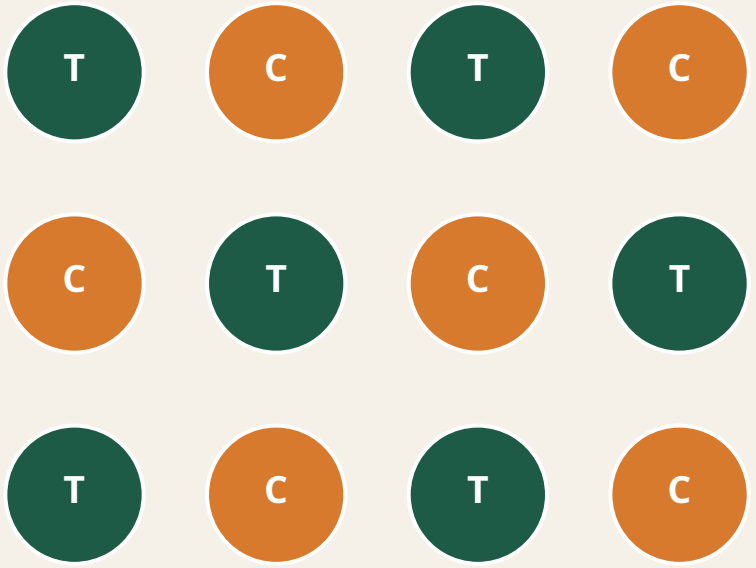
- Review block and replanting history.
- Map affected and neighbouring palms.
- Classify disease stage, soil, drainage and safety risk.

DIAGNOSIS BEFORE PRODUCT

26 Use a controlled pilot

Point 26

- Select comparable treatment and control palms.
- Define the protocol and outcomes before application.
- Use replication and randomisation where the estate size permits.



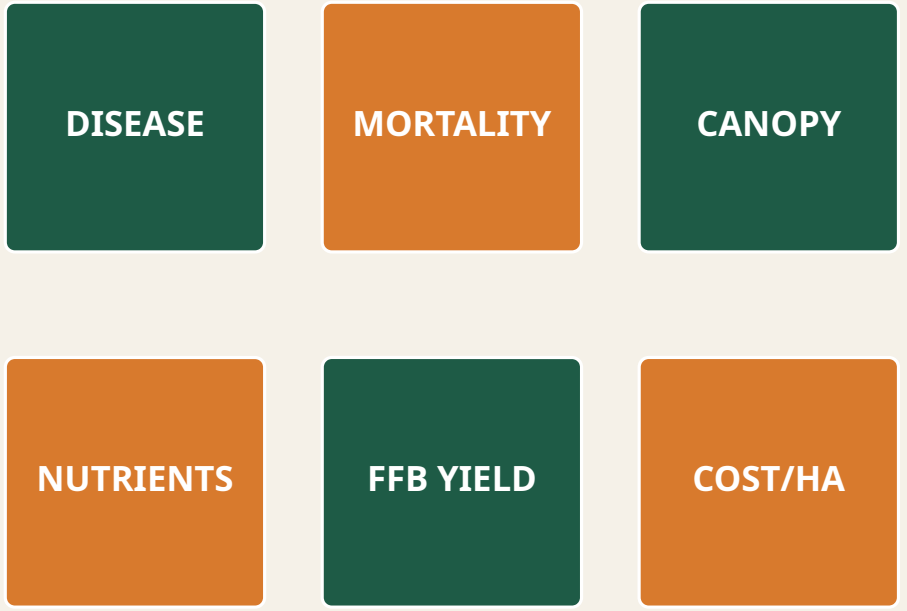
T = Treatment C = Control

27

Measure results that matter

Point 27

- Disease incidence and severity.
- Palm mortality, crown condition and new basidiocarps.
- Leaf and soil status, stand density, FFB yield and treatment cost.

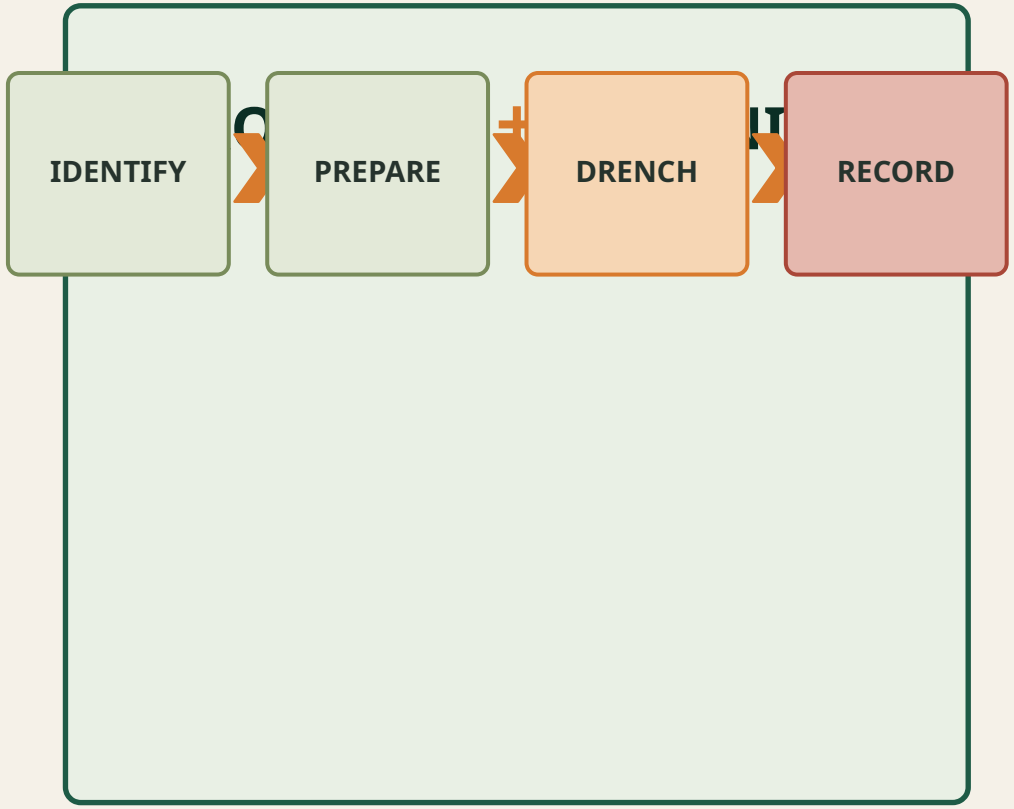


28

Sales Point 1: Product + farmer training

Point 28

- Precision engineering.
- Supply PolySulphatePlus with a written protocol.
- Teach disease-stage recognition, preparation, drenching, safety and record-keeping.
- No unsupervised guesswork or wasteful over-application.

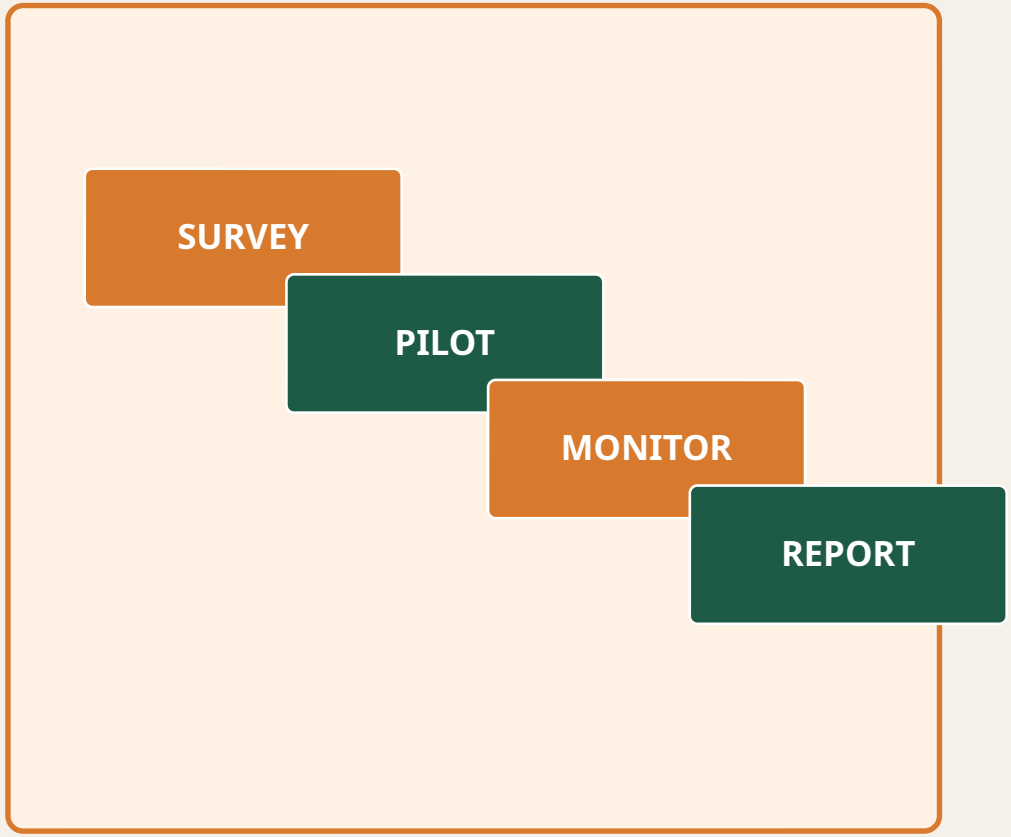


29

Sales Point 2: Managed plantation programme

Point 29

- Block diagnosis and mapping.
- Pilot design, supervised application and scheduled monitoring.
- Technical report and scale-up recommendation.



30 Move from late reaction to early management

Point 30

- Do not wait for the next palm to fall.
- Begin with one mapped pilot block and transparent field evidence.
- Protect the palm, the worker, the plantation and Malaysia’s productive capacity.

For further technical discourse
WhatsApp 0123795729
Chandra L Ramprakash

START WITH ONE MAPPED PILOT BLOCK

REQUEST AN ASSESSMENT

SELECTED SCIENTIFIC REFERENCES

- Rahman, M.A. et al. (2021). Estimating yield loss due to Ganoderma BSR using Bayesian model averaging. Journal of Oil Palm Research.
- Rees, R.W. et al. (2009). Mode of root infection and lower-stem invasion by Ganoderma boninense. Plant Pathology.
- Pujianto et al. (2016). Impact of mineral nutrition management on Ganoderma incidence in oil palm on peat. 15th International Peat Congress.
- Najihah, N.I. et al. (2015). Silicon treatment confers resistance to BSR caused by G. boninense. Crop Protection 67:151-159.
- Bivi, M.S.H.R. et al. (2016). Calcium, copper and salicylic-acid supplementation in oil-palm BSR control research.

SELECTED SCIENTIFIC REFERENCES

- Sahebi, M. et al. (2018). Antioxidant enzyme and metabolite responses in NPK-treated, Ganoderma-infected oil-palm seedlings. BioMed Research International.
- Rebitanim, N.A. et al. (2020). GanoCare improves growth and resistance in nursery and field trials. BioMed Research International.
- Ibrahim, M.S. et al. (2020). Surveillance of Ganoderma disease among Malaysian smallholder replanting participants. Journal of Oil Palm Research.
- Periasamy, G. et al. (2026). Survival and aggressiveness of G. boninense in Peninsular Malaysia. Discover Plants.
- Zakaria, L. (2023). Basal stem rot of oil palm: pathogen, incidence and control methods. Plant Disease 107(3):603-615.

Final website efficacy claims should be reviewed against your own controlled field data and by an independent oil-palm pathologist/agronomist.