

## SYMPTOMS OF *GANODERMA* INFECTION IN YOUNG PALMS

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### INTRODUCTION

Basal stem rot (BSR) caused by *Ganoderma* is a disease that cannot be eradicated yet. Replanting into fields previously affected by *Ganoderma*-palms will result in new infections throughout the planting cycle. It is anticipated that infection levels will be higher in second and third generation plantings as seen in other countries and hence, early intervention is critical for the control of basal stem rot (Fig. 1).

Because of the nature of the disease (BSR), we expect that young palms will become infected at a very early stage after planting. These infections will be seen when palms are approximately 3-4 years old.

The interval between disease onset and death of young palms will be shorter than in older palms. Hence, it is vital that infection is detected as early as possible and infected palms removed before they collapse, die and become a source of infection for surrounding palms.



Figure 1. A young collapsed palm affected by BSR.

### SYMPTOMS OF BSR IN IMMATURE OIL PALM

**Foliar symptoms** Juvenile palms (4-6 yrs) will not show the same symptoms as in older palms. This is because the stem is not fully developed and hardened. Hence, symptoms will be expressed in the leaves initially without frond collapse. Very young palms will die quickly and infections may not be recognized before palm death (Fig 2).



Figure 2 A very young palm which has died from undetected *Ganoderma* infection. (Photo F. Sanderson)

In early stages of infection young palms will show a narrowing of the rachis and loss of colour in unaffected fronds (Fig. 3). The leaflet tips in the lowest fronds will become necrotic, beginning from the outermost leaflets. These will gradually die and leaflets in younger fronds will begin to turn yellow and die. Symptoms will then progress to successively younger fronds and older fronds will completely die. Multiple spears may also be seen at this stage. The palms will die within 3-6 months after first detecting the symptoms, usually as a result of secondary bacterial rots.



Figure 3 A 4-year old palm showing dead and dying leaflets.



## SYMPTOMS IN IMMATURE OIL PALM (CONT.)

As the disease advances, the leaflet tips will start to turn yellow and die from the end of the frond downwards towards base. Within a few weeks, the lower fronds will die and the leaflet tips on younger fronds will start to turn brown (Fig 4). Fruit bunches will be aborted at this stage. Younger fronds will progressively die and sometimes fracture (Fig. 5). Multiple spears will be observed.



Figure 4 A 5 year-old palm with dead fronds and leaflets and loss of colour in younger fronds.

Eventually (8-12 weeks later), the majority of fronds will wither and the palm will die. Ganoderma brackets will not usually be seen in immature palms but externally visible basal rot may be present.

If these dying palms are left standing in the field, they will develop a secondary bacterial infection which mimics spear rot. They should be removed when recorded in surveys.



Figure 5 A 5-year old palm with basal stem rot showing death of pinnae and frond fracture.

## SYMPTOMS OF BSR IN 7-8 YEAR OLD OIL PALM

Leaflet necrosis will be similar to that in younger palms however symptom progression will be more gradual. In addition, at this age, the palm canopy is dense and fronds will be overlapping so early foliar symptoms can be missed (Fig. 6).

Pinnae will die from the tips on the oldest fronds and multiple spears may be seen. As disease progresses, whole fronds will turn brown and/or fracture (Fig. 7).

Brackets may or may not be seen at the base of the palms.



Figure 6 (Above) Death of pinnae and fronds and loss of colour in a Ganoderma-infected palm.

Figure 7 (Right) More advanced symptoms in a young palm with progressive death of younger fronds and pronounced yellowing. *Inset:* Fracture of fronds may also be observed.



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