MAR 17 Pathogen of the month – March 2017

Ganoderma boninense Pat.

L to R: *Oil palm showing symptoms of BSR; palm fallen due to rotted bole; Ganoderma basiodiocarp on infected palm; oil palm block decimated by BSR. (Photos by A. Mudge).*

Disease: Basal Stem Rot (BSR)
Causal agent: *Ganoderma boninense* Pat. (syn *G. orbiforme* (Ryvarden)), and other *Ganoderma spp*.
Common Name: Ganoderma
Classification: Kingdom: Eukaryota Phylum: Basidiomycota Class: Basidiomycetes
Order: Polyporales Family: Ganodermataceae

The main causal agent of Basal Stem Rot (BSR) on oil palm is accepted to be *G. boninense*, although other *Ganoderma spp* have also been implicated. BSR is a major threat to the oil palm industry in South East Asia, causing losses of ~USD 0.5 billion per year due to direct loss of stand, reduced yield of diseased palms and increased replant frequency.

History

BSR was first described in west Africa in 1915 and soon after in Malaysia, as a disease of old palms and so was largely ignored. In more recent times and with successive replanting of oil palm stands, incidence of BSR has been on the rise, with the disease appearing in ever younger palms. BSR is responsible for 30 to 70% yield losses in South East Asia.

Host Range and Distribution

Ganoderma spp have a world wide distribution from temperate to tropical regions of the world and occur predominantly as saprophytes on dead wood in natural ecosystems. Pathogenic Ganodermas cause diseases in both woody crop species (*e.g.* Acacia, Eucalyptus, coconut) and ornamentals (*e.g.* golden cane palm).

Biology and Ecology

Ganoderma is a white rot fungus, preferentially degrading the lignin component of woody tissue. In natural ecosystems these are degraders/recyclers of timber on the forest floor. In oil palm, white rot leads to decay of the bole (lower stem) and eventual collapse. Ganoderma spreads through wind dispersal of basidiospores, as well as contact with infected material.

Symptomatology

Symptoms include yellowing of young fronds, collapsing of older fronds, appearance of multiple spears (unopened new fronds), decrease in yield, decay/rot of bole stem, collapse and death of palm. Brackets usually appear on lower bole before collapse of the palm.

Management options

Control measures include frequent disease surveys and the removal of infected palms, including roots. Although some fungicides are effective against Ganoderma, the cost of application makes this option unsustainable, especially for smallholder farmers. Fallowing for two years helps lower BSR incidence, however that is very costly. The best long term control is to breed resistance to BSR into oil palms.

Impact

BSR has emerged as the most devastating disease of oil palm in South East Asia, including PNG and Solomon Is, where 40 to 60% of production is carried out by smallholder farmers. The resultant loss of revenue is of great concern both at local and national level for these countries.

Further Reading: Corley & Tinkler (2003) The Oil Palm (4th ed). Hennessy & Daly (2007) Agnote I67. Paterson (2007) Crop Protection 26: 1369-1376. Pilotti (2005) Mycopathologia 159"129-137. Rees et al. (2012) Plant Pathology 61:567-578.

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