

SAWITSECURE 2.0: DIGITAL MANAGEMENT OF PESTS AND DISEASES OF OIL PALM

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The palm oil industry has significantly contributed to the rapid economic development of the country. Malaysia produced more than 17.8 million tonnes of crude palm oil from a planted area of 5.87 million hectares in 2020. The country's total export of palm oil and palm-based products was 25.2 million tonnes, generating export earnings of RM64.92 billion in 2020 (Parveez *et al.*, 2020). Despite of the rapid growth, the oil palm industry is prone to the threat by various pests including insects, vertebrates, diseases and weeds. Thirty two diseases and disorders affecting the oil palm in Africa, Southeast Asia and South America are described with their distribution, economic importance, etiology and control (Kushairi *et al.*, 2018). Of these, nine diseases are considered to be of major economic importance worldwide, 19 are of minor importance, and four are due to nutrient deficiencies. The major diseases causing serious economic losses vascular wilt (*Fusarium oxysporum* f. sp. *elaeidis*), *Ganoderma* basal stem rot (*Ganoderma* spp.) and *Armillaria* trunk rot (*Armillariella mellea*) in Africa; basal stem rot, *Corticium* leaf rot (*Corticium solani*). *Marasmius* bunch rot (*Marasmius palmivora*) in Southeast Asia; sudden wilt and bud rot in South America (Corley and Tinker, 2015; Maizatul-Suriza *et al.*, 2021).

The most serious oil palm disease in Malaysia is basal stem rot (BSR) caused by *Ganoderma* spp. The prevalence of the BSR disease in Malaysia is increasing at an alarming rate, particularly in smallholder areas whereby control measures are not implemented effectively. A total of 221 000 ha of oil palm estate plantations have been infected by this disease, therefore affecting many stakeholders in the industry (Mohd Shukri *et al.*, 2020). Efforts are currently focus in advocating good agricultural practices through integrated *Ganoderma* management (IGM), to harness the benefits in managing the disease. These management practices are aimed at reducing disease incidences

in replanting, extending the productive lifespan of infected palm, and finally delaying the progress of *Ganoderma* infection. Other diseases such as charcoal base rot, stem wet rot, sooty mold, algae leaf spot and orange spotting are among the field diseases which are less commonly reported in oil palm. These diseases usually affect only a small number of palms and rarely cause significant economic loss to the plantation. The cases are mostly only confined to specific area and in certain cases it only involves one or two isolated palm(s).

Furthermore, threats by insect pests also can affect the palm oil production lines (Fee, 2017). The management of these pests relate directly with sustainable agriculture practices and natural biological control approaches, which has been highlighted through the implementation of integrated pest management (IPM). Bagworms are the main insect pests of oil palm. There were three major species that affected oil palm in Malaysia namely *Metisa plana*, *Pteroma pendula* and *Mahasena corbetti*. *M. plana* has been reported as the most dominant pest of oil palm in Peninsular Malaysia. Leaves defoliation of approximately 10%-13% due to bagworm attack might cause about 33%-40% yield loss. The rhinoceros beetle, *Oryctes rhinoceros*, is also one of the major insect pests of oil palm in Malaysia, especially in areas replanted with zero burning. In the oil palm environment, the rhinoceros beetle breeds in rotting materials, such as oil palm trunk heaps and empty fruit bunches. Since the introduction of zero burning techniques for land clearance for replanting in the 1990s, outbreaks of *O. rhinoceros* on oil palm plantations are more frequently reported. If no control measures had been practiced, severely attacked palms could suffer crop loss as high as 25% per year.

As the proper control measures aimed at minimising disease incidences in immature palms, prolonging the productive life of the infected

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palm, and controlling the progress of pest and disease infestation through integrated weed, pest and disease control and management in existing plantings and management strategies have been accomplished. Thus, an effective digital platform to effectively and diligently disseminate information about major pests and diseases of oil palm has been developed in order to speed up the access of information to large amount of people efficiently.

OBJECTIVE

SawitSecure 2.0 is designed as an easy access platform to comprehensive resources on major, emerging and exotic of oil palm pests, diseases and weeds to Malaysian oil palm industry. The application also serves as a quick reference for stakeholders to identify the major, emerging and exotic pests, diseases and weeds.

SAWITSECURE 2.0 AS OIL PALM SMART MOBILE APPLICATION

This application was first developed to provide information about the threats of exotic that may infect the Malaysian palm industry. However, the application is now being upgraded to incorporate comprehensive information on *Ganoderma* disease, emerging diseases and major of pests of oil palm in Malaysia.



Figure 1. The new SawitSecure 2.0 landing page.

SawitSecure 2.0 is now consisted of six menu sections namely SawitSecure, *Ganoderma*, Emerging Diseases, Pests, References and Report to Us (Figure 1). The SawitSecure section mainly represents the first version of SawitSecure app whereby it contained eight sections of menu including introduction, threat identification, pest risk assessments, risk mitigation, contingency and response management, awareness materials, pests, diseases and weeds and interaction.

Under the new feature enhancements, *Ganoderma* menu contains information on Pathogen Identification, Know Your Palm Condition, Disease Control and Management, Commercial Products, What to Avoid and Standard Operation Procedure (SOP) (Figure 2). These sub-menus were designed for the stakeholders to easily asses the content through interactive information which have been summarised for easy understanding. All the information in the *Ganoderma* menu were based on research and development conducted by MPOB.



Figure 2. *Ganoderma* disease menu incorporated in the SawitSecure 2.0.

Another new feature in SawitSecure 2.0 was the Emerging Diseases menu whereby three categories of emerging diseases of oil palm in Malaysia namely Field Diseases, Nursery Diseases and Seed Diseases have been included in the application (Figure 3). Incidence of the emerging diseases usually random, discrete and do no cause significant economic impact to the industry and are considered minor diseases. Nevertheless, these diseases should not be neglected and need to be monitored and controlled to prevent outbreak as changes in biotic and abiotic such as climate may favour the causing pathogens. The biology, causal agent, symptoms and control and management of the emerging field diseases such as Orange Spotting (OS), Charcoal base rot, Bunch rot, Stem wet rot, Sooty mold and Algae leaf spot were spelled out in information given. Two nurseries and two emerging seed diseases were also included in the menu.



Figure 3. List of emerging diseases reported in field, nursery and seed were incorporated in SawitSecure 2.0.

The oil palm in Malaysia remains prone to threats by a variety of several key insect pests such as bagworm, nettle caterpillar, rhinoceros beetle, termite, bunch moth and rats. Under the newly added Pest menu, pests under the category of Insect Pest and Mammal were included (Figure 4). Comprehensive guidelines on major insect pests of oil palm such as bagworms, nettle caterpillar, rhinoceros beetle, termites and bunch moth and rat under the Mammal category have been provided.

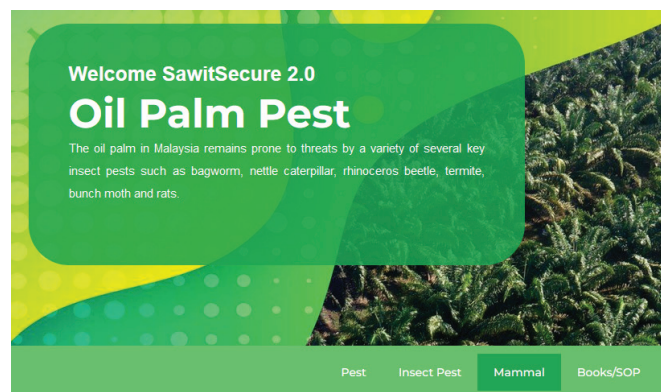


Figure 4. The oil palm pest menu available in SawitSecure 2.0.

Furthermore, a References menu also has been added as the new SawitSecure 2.0 feature. The References menu contained an up-to-date publications on major, emerging, exotic pests, diseases and weeds of oil palm. It is hope that through this feature, all the stakeholders aware on the latest research and findings of pests and diseases of oil palm particularly to major pest and disease such as bagworm and *Ganoderma* disease. Lastly, Report To Us section that provides a platform for stakeholders such as plantation owners, researchers or officers from Department of Agriculture (DOA) or Malaysian Quarantine and Inspection Services (MAQIS) to easily send report or attach pictures to MPOB if they spot any abnormalities in the plantations is still maintained in the application.

BENEFITS

SawitSecure 2.0 is clearly an ideal reference tool kit for control and management of major, emerging and exotic pests, diseases and weeds for

the Malaysian oil palm industry. The application provides direction and guidance to all relevant sectors in pre-emptive actions, emergency response and incursion management during the previous of the application whereby more than 1700 users have downloaded the SawitSecure app and more than 27 508 users have visited the website. With new features in SawitSecure 2.0 that include comprehensive details on disease management of *Ganoderma*, emerging diseases and major pests of oil palm, it is foreseen that this application will become even more important and beneficial to the Malaysian oil palm industry stakeholders.

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