DETECTION OF *Ganoderma* DISEASE AND BAGWORMS IN OIL PALM USING HYPERSPECTRAL REMOTE SENSING

Nisfariza M N M; Idris A S; Nordiana, A A; Izzuddin, M A and Norman, K

**ABSTRACT**

Three major oil palm threats for the crop losses can be classified into insects, diseases and vertebrates. The visible symptom of basal stem rot (BSR) disease caused by *Ganoderma* fungus is seen at a later stage where by the infestation of the pathogen has damaged the stem and bole of the oil palm. Other major insect pests, include the infestation of bagworms (Lepidoptera: Psychidae) which caused visible damage on the leaf. Ground base spectral data were obtained for single oil palm trees with varying degrees of current attack of the *Ganoderma* disease and bagworms. These data were acquired in two separate field scouts, using GER 1500 Spectroradiometer which provides spectral responses in 512 bands ranges from 350-1050 nm. Wavelengths bands suitable for discriminating different levels of damage symptoms were defined and compared in the two types of attack in oil palm trees caused by *Ganoderma* disease and bagworms pest using two different techniques; the original reflectance spectra and first derivative spectra were used to obtain the suitable wavelengths in discriminating the damage. The results of discrimination analysis on original spectra of bagworms samples were identified as most sensitive in both immature and mature palms around band centred at 570 nm, 680 nm, 734 nm, 787 nm, 996 nm and 1047 nm. However in the case of *Ganoderma* disease, the discriminating bands in mature and immature were found in ranges of 515-586 nm, 615-622 nm, 633-644 nm, 690-708 nm, 727-758 nm and 773-784 nm respectively.

**Keywords:** hyperspectral data, *Ganoderma*, basal stem rot, bagworms, first derivate spectra, remote sensing, spectroradiometer.

---

1Department of Geography, Faculty of Arts and Social Sciences, Universiti Malaya, 50603 Kuala Lumpur, Malaysia.  
2Biological Research Division, Malaysian Palm Oil Board, 6, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia.  
Email: nish@um.edu.my