

The relationship between SPAD chlorophyll and disease severity in ganoderma-infected oil palm seedlings

ABSTRACT

Establishment of disease in oil palm seedlings through artificial inoculation of Ganoderma are widely used for studies of various aspects of plant pathology, including epidemiology, etiology, disease resistance, host-parasite interaction and disease control. The estimation of chlorophyll content in the infected seedlings possibly could provide a good indicator for degree of disease or infection, and changes during pathogenesis. Thus, the objective of this study was to evaluate the relationship between disease severity index (DSI) and chlorophyll content in Ganoderma infected oil palm seedlings. Three-month-old oil palm seedlings were infected with Ganoderma inoculum on rubber wood block (RWB), where 44 isolates of Ganoderma were tested. Disease severity index (DSI) and chlorophyll content using a single-photon avalanche diode (SPAD) meter were recorded at 4 weeks interval for a period of 24 weeks after inoculation (WAI). Pearson's correlation analysis and regression analysis were performed to evaluate the relationship between the variables. It was found that the relationship between DSI and SPAD chlorophyll value was inversely proportional ($R = -0.92$) in a linear trend ($R^2 = 0.85$). Furthermore, the increasing trend of the DSI across the weeks were fitted in a quadratic model ($R^2 = 0.99$). In contrast, the SPAD chlorophyll value declined in a linear trend ($R^2 = 0.98$). The SPAD chlorophyll value could be considered as a better alternative over the DSI as the SPAD chlorophyll value was strongly related to DSI, as well as able to detect physiological changes in the infected oil palm seedlings at the early stages of pathogenesis.