Application of GIS for mapping the spatial distribution of ganoderma stem rot in oil palm plantations

ABSTRACT

Oil palm is widely cultivated in Indonesia and Malaysia. However, the sustainability of oil palm is threaten by Ganoderma species which cause stem rot disease. The outbreak of a disease or pathogen could be monitored using sophisticated tools, such as Geographical Information System (GIS). Thus, the objective of this study is to demonstrate the use of GIS in small scale to generate a spatial distribution map of Ganoderma species in an oil palm plantation. The study was conducted in a 16 hectare (200 x 800 m) experimental plot of oil palm plantation. Each palm within the plot were located based on the field planting row and column, and they were observed and coded either 0 for absence of Ganoderma or 1 for presence of Ganoderma. The data were collected from 2011 to 2012 at six months intervals. The data were then analyzed (interpolated) based on ordinary kriging fitted to spherical model of semivariogram using ArcMap of ArcGIS 10 to generate a spatial pattern map of Ganoderma species. The occurrence of Ganoderma in the study plot reached up to 9.80% during the study period. Graphical maps generated demonstrate spatial distribution pattern of Ganoderma, and they showed ranges of intensity (0 - 100%). Higher intensity indicates that there were higher occurrence of Ganoderma in a particular area, and vice versa. Moreover, there were changes in the spatial pattern throughout the year which indicate rapid spread of Ganoderma species. The information provided by the GIS map could be useful in various aspects. Keywords: Ganoderma; GIS; Oil palm; Spatial distribution.