Investigation on Ganoderma Infection in Oil Palm Based on the Cultural Characteristics and Somatic Compatibility: A Case Study in Sandakan, Sabah

ABSTRACT

Sustainability of the oil palm in Malaysia is threatened by Ganoderma species causing stem rot. There were many studies conducted to understand the etiology and epidemiology of the disease in West Malaysia, however none of them reported the situation in Sabah, one of the leading producers. Moreover, the mode of Ganoderma spread in oil palm is least understood. Thus, the aims for this study were to investigate the infection mode of Ganoderma species in oil palm based on the in-vitro cultural characteristics and somatic compatibility. A total of 21 Ganoderma basidiocarps were isolated from stem rot infected palms in an estate in Sandakan, Sabah. These samples were obtained (i) within infected palms; (ii) among infected neighbouring palms; and (iii) five clusters of infected palms. In-vitro morphology of the Ganoderma isolates was characterized based on 21 characteristics via a dendrogram. Somatic compatibility was accessed to investigate the genetic heterogenicity. There was a narrow variability (93 to 100%) in terms of the cultural characteristics, and the variations exhibited among the isolates regardless of their origin. The isolates may exhibit similar phenotype, but not necessarily have similar genotype, and vice versa. Based on the somatic compatibility test, it was found that all pairings showed incompatible reactions except in self-pairing and between isolates C5P3-1 and C5P3-2 which were isolated from the same infected palm (genetically identical). These findings indicated that infection of Ganoderma in a single palm and neighbouring palms generally were caused by multiple unidentical strains. This further concludes that spread of Ganoderma species in oil palm via rootto-root contact is uncommon. Thus, the basidiospores may play an important role in the disease epidemiology, and further research and management strategies of the disease should focus on this.