

Estimating the yield loss of oil palm due to Ganoderma basal stem rot disease by using Bayesian Model Averaging

ABSTRACT

It is very crucial to planters to estimate the yield loss due to Ganoderma basal stem rot (BSR) disease in oil palm. However, currently there is a limited mathematical model available that can be used for that purpose. Therefore, this empirical study was conducted to build a mathematical model which can be used for yield loss estimation due to the disease. Three commercial oil palm plots with different production phases (i.e. steep ascent phase, plateau phase and declining phase) were selected as the study sites. The yield and disease severity of the selected palms in the three study sites were recorded for the duration of 12 months. Model averaging approach using Bayes theorem was used to build the model. This is also known as Bayesian Model Averaging (BMA). The BMA model revealed that planting preparation technique was the most important predictor of oil palm yield loss, followed by disease progress (measured using area under the disease-progress curve, AUDPC), disease severity, number of infected neighbouring palms, and two interaction terms. By using the developed BMA model, it was estimated that the economic loss can be up to 68% compared to the attainable yields of all the infected palms.