

Effect of climate variables on cocoa black pod incidence in Sabah using ARIMAX model

Abstract

Cocoa black pod disease is one of the major diseases affecting the cocoa production in Malaysia and also around the world. Studies have shown that the climate variables have influenced the cocoa black pod disease incidence and it is important to quantify the black pod disease variation due to the effect of climate variables. Application of time series analysis especially auto-regressive moving average (ARIMA) model has been widely used in economics study and can be used to quantify the effect of climate variables on black pod incidence to forecast the right time to control the incidence. However, ARIMA model does not capture some turning points in cocoa black pod incidence. In order to improve forecasting performance, other explanatory variables such as climate variables should be included into ARIMA model as ARIMAX model. Therefore, this paper is to study the effect of climate variables on the cocoa black pod disease incidence using ARIMAX model. The findings of the study showed ARIMAX model using MA(1) and relative humidity at lag 7 days, RH_{t-7} gave better R square value compared to ARIMA model using MA(1) which could be used to forecast the black pod incidence to assist the farmers determine timely application of fungicide spraying and culture practices to control the black pod incidence.