**A model for predicting flower development in Elaeis guineensis Jacq**

ABSTRACT

The proper development of oil palm fruit is important as the source of oil is the fruit mesocarp and kernel. Prior to fruit formation, the development of flowers is therefore also important. Determination of the flower development stages in oil palm generally involves tedious histological analyses of each sampled inflorescence, making it a costly and inefficient way of gauging the developmental state. In this study, a statistical model was established from the association of physical or macroscopic measurement data to flower development, which was determined via histological analyses. The final reduced ordinal logistic regression model is a partial proportional odds model that uses inflorescence length and palm age as predictors to predict the flower development stage. The likelihood-ratio $\chi 2$ test suggested the model adequately fits the data (p<0.01). The model, with a prediction accuracy of 78.5%, can be used for selecting inflorescences of specific development stages from palms aged three to 10 years of field-planting. These stages can be further verified by histological analyses. This lowers the overall costs and time by reducing the number of samples requiring histological analysis prior to downstream studies.

**Keyword:** Flower development; Histology; Ordinal logistic regression