MODELLING OF *Sitophilus oryzae* AGE STRUCTURE USING MULTIVARIATE ANALYSIS

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**Final Year Project Report
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This Final Year Project Report entitled " **Modelling of *Sitophilus oryzae* Age Structure Using Multivariate Analysis**" was submitted by Nur Nadia Farahin binti Md Rosli in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

MODELLING OF *Sitophilus oryzae* AGE STRUCTURE USING MULTIVARIATE ANALYSIS

More than half of the world's population depends on rice as a staple food, and it is grown in more than 100 countries, with Asia producing 90% of the world's rice. In addition to the enormous amount of rice being produced in the warehouse, world also had to deal with the rice weevil *Sitophilus oryzae*, which is one of the most devastating pests of stored grains in the world. This insect's larvae grow internally in the grain and can eat up to 60% of each individual kernel's weight. Their behaviour, life cycle, and habitat have all contributed to the crop's diminished commercial worth. Currently, the standard method of eradicating *S. oryzae* involves fumigating stored grain insect pests with methyl bromide and phosphine. The widespread use of pesticides harms people and the environment while also increasing pesticide resistance. Using alternative control methods is one strategy to cut back on the use of pesticides. The morphometric properties of *S. oryzae* are presented in this work in several forms, including age structure and morphological measurement capabilities. Knowing the age structure of *S. oryzae* is crucial for determining when the bug first began to infest stored grains, particularly rice, and for managing the *S. oryzae* population. Morphological measurements have been used to differentiate between *Sitophilus oryzae* ages. The objective for this study is to evaluate age of *S. oryzae* based on morphological structure, to analyse morphometric analysis based on logistic regression for 8 weeks and also to make use of morphological analysis on *S. oryzae* based on weekly measurement on its structure which are the body length, body width, prothorax width, thorax width, head width, rostrum width and rostrum length. This model was created using numerical data about the morphological characteristics of *S. oryzae* organised by week. The findings indicate that Model 1, which consists of measurements of the body and head widths, was the was the best yet to utilised in creating a model for identifying and predicting the age of *S. oryzae*, with 30% accurate classification. The developed model will be beneficial for calculating the average ageing rate, for agricultural purposes, and to help lessen the harm that these insects do to food storage.

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