

UNIVERSITI TEKNOLOGI MARA

**RELATIONSHIP OF NUTRIENT
CONTENT IN THE LEAVES AND
THE EFFECT OF DIFFERENT
PESTICIDE USAGE OF
SMALLHOLDERS TOWARDS
Oryctes rhinoceros AND ITS
NATURAL ENEMIES IN OIL PALM**

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ABSTRACT

A field study was carried out at Tangkak, Johore for ten months starting from January until October 2017. This study is meant to examine the relationship of different insecticides usages and leaves nutrient content with the presences of *Oryctes rhinoceros* in the oil palm areas. Three treatments with four replications were applied. The treatments for insecticides usages are Cypermethrin, Carbofuran and one acted as a control which was untreated. Twelve smallholders with three different insecticides usage had been chosen and twelve samples had been taken as replications. As in determining the leaves nutrient content, 7th or 9th fronds were used and were brought back to the laboratory for further analysis using Dry Ashing method. The results revealed that insecticides showed a highly significant effect towards the presence of *Oryctes rhinoceros*. The least presence of *Oryctes rhinoceros* was detected at untreated area with total mean of 0.21, followed by Carbofuran with total mean of 2.63 and Cypermethrin with 3.12. This study also indicated that these insecticides had no significant effect towards three natural enemies found in oil palm area in Tangkak which were *Playtymmeris laevicollis*, *Harpalus caliginosus* and *Pherosophus jessoensis*. Not only that, these three natural enemies also showed no relationship with the presences of *Oryctes rhinoceros*. As for the relationship between leaves nutrient content with the *Oryctes rhinoceros* presences in the oil palm, Phosphorus (P) and Magnesium (Mg) showed a positive relationship with the *Oryctes rhinoceros* presences while Potassium (K) and Calcium (Ca) showed a negative relationship. In addition, Zinc (Zn) and Copper (Cu) showed no relationship with the *Oryctes rhinoceros* presences in the oil palm. As a conclusion, this study suggested that *Oryctes rhinoceros* might develop resistance to the Cypermethrin and Carbofuran insecticides. Moreover, this study also suggested that over-insecticides usages by the growers had killed the natural enemies as low presence of natural have been recorded during ten months of sampling time. In addition, ineffective environment that did not support the enhancement of the natural enemies also might be the reason of low presence of these natural enemies in the sampling areas. As for the leaves nutrient content, it is proved that these nutrients did give effect towards the presence or *Oryctes rhinoceros* in the field, thus as study should be further to fully acknowledge on this factor.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Oil palm, *Elaeis guineensis* is an estate crop and major crops for Malaysia, where these crop usually is being grown in a large scale estate around 3 000 to 5 000 ha (Verheye, 2010). It is known to be originally from the West of Africa. The main area of oil palm production in the West of Africa is Ghana, Togo, Cameroon and Nigeria (Atinmo and Bakre, 2003). It is said that African processed this oil palm fruit to obtain the edible oil due to the oil has a good and high coloured and flavoured. Besides, the oil is widely used in the cuisine of the West Africa.

Oil palm is usually being planted in area with rainy tropical lowland. In order to produce a good high and quality of oil palm fruits, it needs to meet specific requirements which the crops need a suitable temperature, deep soil and also suitable moisture throughout the year. The quality and the output of the fruit brunches will be badly damaged if the dry season more than 2-3 months. But in all circumstances, the yield of the oil palm is not only can be affected by the temperature and the soil moisture, it is also affected by the presence of the pest and diseases.

However, oil palm has a high risk to be infected with one common pest which is *Oryctes rhinoceros* (Bedford, 2014). *Oryctes rhinoceros* is commonly known as 'kumbang badak' or rhinoceros beetle in Malaysia. The occurrence of this beetle in Malaysia is due to the cultivation of coconut. Manjeri *et al.* (2014) claimed that their presence is related with the migrating activities through nursery trade and transportation, timbers' shipping and cargo activities.

Rhinoceros beetle is a nocturnal insect. They will feed and mate at night. One single crop can be attacked by a large population of this beetles where it can damage and harm the palms to about 40% - 92% at the first year of harvesting. These beetles favour old palms and stumps for their breeding site. A survey showed that 25% of 180,068 hectare of young palms was attacked by this pest in Malaysia and the beetles were also present in replanting sites as early as six months after replanting. (Manjeri *et al.*, 2015).