EFFECTIVENESS OF SOIL COVER IN CONTROLLING SOIL EROSION IN OIL PALM PLANTATION

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TABLE OF CONTENTS

ABSTRACT

EFFECTIVENSS OF SOIL COVER IN CONTROLLING SOIL EROSION IN OIL PALM PLANTATION

Soil erosion has causes serious problem in damaging the soil productivity at oil palm plantation especially at hilly area. This research was conducted to find another alternative to control soil erosion instead using Legume Cover Crop (LCC) such as *Mucuna braceata*. The purpose of this research project is to determine the best soil cover practices in controlling soil erosion at hilly area on oil palm plantation. Three treatments were used for this project; Carpet grass (*Axonopus compressus*), plant residue and bare soil (control). Three criteria were tested to determine the most effective soil cover; firstly by measuring the amount of eroded sediment, secondly by determining the volume of runoff water and lastly by measuring the nutrients loss from soil eroded. The test was run with a 15 degree slope gradient stand-up apparatus by using watering can with four liter of water. Data of amount eroded sediment and volume runoff water were collected once the test was finished. The eroded sediment will then be brought to a laboratory for soil analysis and Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) to determine the nutrient loss from the soil erosion. The research project results shows that, Carpet grass gave the lowest amount of eroded sediment with average mean 6.47 g, lowest volume of runoff water with average mean 1246.4 mL and less nutrients loss (phosphorus with average mean 611.22 mg/Kg and potassium with 48.27 mg/Kg) in soil compared to plant residue and bare soil. This result has proved that applying carpet grass as soil cover can help in reducing the soil erosion and nutrient loss. Therefore, it is recommended to use carpet grass for controlling soil erosion at hilly area.

Keywords: Carpet grass (*Axonopus compressus*), Plant residue, Bare soil (control)

CHAPTER 1

INTRODUCTION

1.1 Research Background

Soil erosion known as the removing the outer layer of soil or destruction of soil structure which cause the top soil eroded from soil surface. This phenomenon will cause the soil lack of importance nutrient to support plant growth (Garcia-Ruiz, 2010). The result from soil erosion will causes plant cannot growth in normal development which affects their growth progress (Meijer, 2013). This lead into plant stunted, yellowing of leaves and produce small or lack yield.

Soil erosion can be caused from various sources; wind, ground, river and water erosion is the example of this problem to happen (Pimentel, 2006). Mostly soil erosion is causes by water and this type of erosion also is the major problems that can destructive soil structure. In this research, it will focuses on soil erosion caused by water. Soil erosion through water is become problem in plantation because it can causes destruction to soil which resulting soil is not suitable for growing of crops. This is due to lack of nutrient or removing of nutrient by water on the surface of soil especially during raining season on hilly area or steep area.