



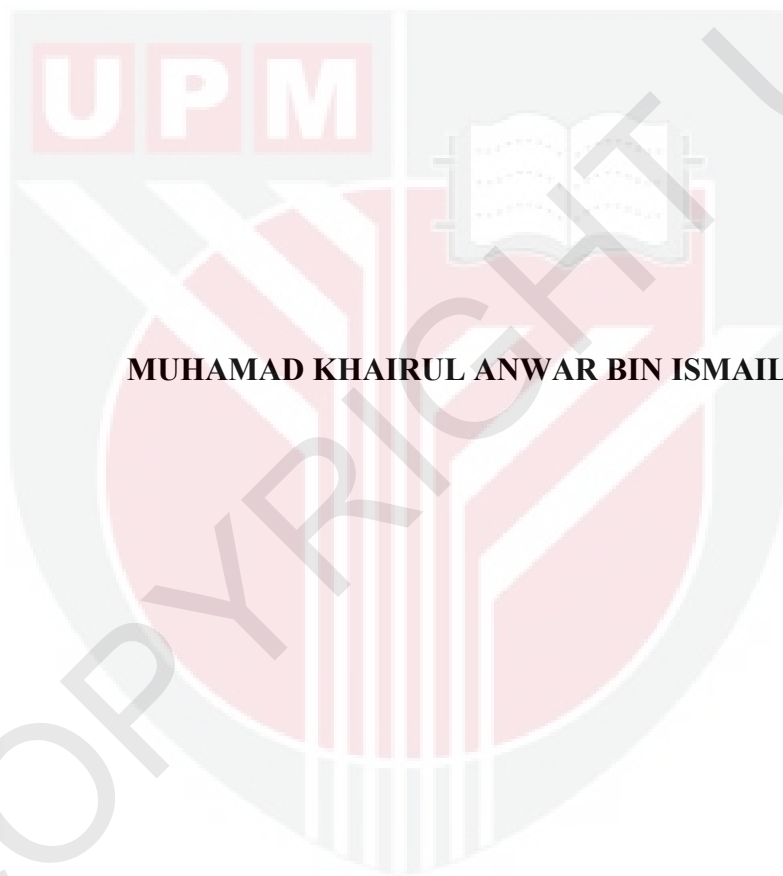
UNIVERSITI PUTRA MALAYSIA

**THE GROWTH PERFORMANCE AND NUTRITIVE VALUE OF THREE
VARIETIES OF GUINEA GRASS AT TWO DIFFERENT CUTTING
INTERVAL**

MUHAMAD KHAIRUL ANWAR ISMAIL

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SERDANG, SELANGOR**

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By

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A project submitted to the Faculty of Agriculture,
Universiti Putra Malaysia.

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for the award of the degree

BACHELOR OF AGRICULTURE (ANIMAL SCIENCE)

**FACULTY OF AGRICULTURE
UNIVERSITI PUTRA MALAYSIA
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2014/2015

CERTIFICATION

This thesis entitled “**THE GROWTH PERFORMANCE AND NUTRITIVE VALUE OF THREE VARIETIES OF GUINEA GRASS AT TWO DIFFERENT CUTTING INTERVAL**” was prepared by **MUHAMAD KHAIRUL ANWAR BIN ISMAIL** and submitted to the Faculty of Agriculture in fulfillment of SHW 4999 (Final Year Project) for the Degree of Bachelor of Agriculture (Animal Science.)

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LIST OF ABBERVATION

DM - Dry Matter

OM - Organic Matter

CP - Crude Protein

NDF - Neutral Detergent Fibre

ADF - Acid Detergent Fibre

ADL - Acid Detergent Lignin

Ca – Calcium

N - Nitrogen

P - Phosphorus

K - Potassium

AOAC - Association of Official Analytical Chemist

CTAB - Cetyl Trimethylammonium Bromide

H₂SO₄ - Acid Sulfuric

DOMI - Digestible Organic Matter Intake

ANOVA - Analysis of Variance

SAS – Statistical Analysis Software

SE - Standard Error

TITLE : THE GROWTH PERFORMANCE AND NUTRITIVE VALUE OF THREE VARIETIES OF GUINEA GRASS AT TWO DIFFERENT CUTTING INTERVAL.

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Key words: *Panicum maximum*, Guinea grass, Cutting interval, Nutritive value, Growth performance.

ABSTRACT

A study was conducted to measure the growth performance and nutritive value of 3 different varieties of *Panicum maximum cv.* (Common guinea grass, Purple guinea grass, Mambosa guinea grass) at 2 different cutting interval 28 days and 35 days. The grasses were sampled at 28 days and 35 days of age and analyzed for dry matter yield (DM yield), neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL) and crude protein (CP). There was significant difference ($P < 0.05$) in height, leaf percentage, ASH and NDF among the varieties. There was no significant difference ($P > 0.05$) on DM yield, CP, ADF and ADL among the 3 varieties. The study also concluded that among of 3 varieties of *Panicum maximum*, Purple guinea and Mambosa guinea was superior in term of DM yield, plant height, and CP. There was highly significant different ($P < 0.01$) on DM yield, height of grass, leaf percentage, CP, ADF and ADL between 28 days and 35 days cutting interval. The study showed that the most suitable cutting interval for the *Panicum maximum* grass was at 28 days in term of growth performance and nutritive value. Also overall there was no interaction affect on the growth performance and nutritive value between the cutting interval and among of the three varieties of guinea grass.

**TAJUK : KADAR PERTUMBUHAN DAN NILAI NUTRIEN TERHADAP
TIGA JENIS RUMPUT GUINEA PADA DUA PERBEZAAN SELANG
PEMOTONGAN BERBEZA.**

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Kata kunci: *Panicum maximum*, Rumput Guinea, Kemantangan, Nilai nutrien, Kadar pertumbuhan.

ABSTRAK

Satu kajian telah dijalankan untuk mengkaji kadar pertumbuhan dan nilai nutrien terhadap 3 jenis rumput yang berbeza iaitu *Panicum maximum* cv. (Common guinea, Purple guinea, Mambosa guinea) pada kadar kematangan 28 hari dan 35 hari. Sampel rumput telah diambil pada umur 28 hari dan 35 hari dan analisis dijalankan terhadap bahan kering (DM), serat neutral detergent (NDF), serat acid detergent (ADF), lignin asid detergent (ADL) dan serat protein (CP). Terdapat perbezaan bererti ($P < 0.05$) terhadap ketinggian, peratus daun, ASH, dan NDF antara jenis rumput. Tiada perbezaan erti ($P < 0.05$) terhadap DM hasil, CP, ADF, dan NDF antara jenis rumput. Rumusan kajian menunjukkan antara 3 jenis *Panicum maximum*, Purple guinea dan Mambosa guinea menunjuk ciri – ciri terbaik, iaitu DM hasil, ketinggian dan CP. Perbezaan bererti yang tinggi ($P < 0.01$) terhadap DM hasil, ketinggian rumput, peratus daun, CP, ADF, dan ADL pada perantaraan kematangan 28 hari dan 35 hari. Kajian menunjukkan kadar kematangan yang paling sesuai untuk *Panicum maximum* adalah pada 28 hari kerana kadar pertumbuhan dan nilai nutriennya. Juga secara keseluruhan tidak terdapat kesan perkaitan antara kadar pertumbuhan dan nilai nutrien dengan selang permotongan berbeza antara tiga jenis rumput guinea.



CHAPTER 1

INTRODUCTION

Producing high quality forages is important for the development and economic sustainability of ruminant farming in Malaysia. In many farms particularly in the smallholder system for the rearing of goats and cattle, farmers or operators do not serious emphasis on the establishment of pasture which is the main diet of these ruminants. Most of our farmers feed their animals with forages of main diet of low digestibility and also low nutritive values that are sourced from poorly managed pasture or wild forages and high cost commercial concentration feed (Chaisang *et al.*, 1999). For a successful ruminant farming industry in Malaysia, there is an urgent need to develop sustainable feeding system through the use of pasture that contains high nutritive values and good digestibility (Chaisang *et al.*, 1999).

1.1 Pasture Development in Ruminant Farming

The pasture/livestock production should be viewed as an integrated production system. An important step in improving the production efficiency of the system is to consider the interrelationship between the cattle and the pasture forage supply (Mott and Moore, 1970). Management of stocking density is one such relationship between grazing cattle and pastures. The stocking density of pastures can impact beef cattle production, forage production, and enterprise profitability. The overall goal of managing grazing animals is to utilize the forage that a pasture already produces to its optimum potential.

1.2 Growth Performance and Nutritive Value

Panicum maximum (guinea grass) is a clump-forming perennial which grows best in warm frost-free areas. Guinea grass can withstand continuous heavy grazing with stocking rates of 2.5 cattle/ha for long periods under heavy annual rainfall and it performs better under rotational grazing. For the most nutritious grass it is best cut when it is 60-90 cm tall, but for higher yields it can be cut when it is up to 1.5 m tall. In order to maintain yields one third or one fourth of the plants should be replanted each year. Mixtures with legumes have been successfully established (Humphreys and Partridge, 1995).

Guinea grass is tolerant of shade and fire but not water logging or severe drought. It produces high yields of palatable fodder and responds well to fertilizer, but rapidly decline in nutritive value with age. It dies if continually grazed closed to the ground and needs rest late in the growing season (FAO, 2003).

Panicum maximum is useful to be the most valuable fodder plant because it has a high leaf percentage and seed production and is very palatable too as a feed supplement for livestock. It is widely cultivated as pasture and is especially used to make good quality hay and silage. If it receives adequate water, it grows rapidly and occurs in abundance in yield that is in a good condition (FAO, 2003).

This guinea grass can easily be cultivated from seed that is obtainable from seed distributors. Sow seed in spring and early summer in fertile, well-prepared soil. It prefers shade and damp areas and will do well under trees and shrubs. Water

regularly, if the grass is already established and conditions are favorable, it will multiply quickly and form a luxuriant growth. According to Van Soest (1969), grasses may contain up to four times the amount of hemicellulose found in legumes. Hemicellulose has long been overlooked as an important component of forages, and yet appears to be one of the most important fractions relating to the nutritive character of grasses and legumes. Hemicellulose appears to have a special relation to lignin.

Van Soest (1969) reported that digestibility of grasses decreases with maturity, implying that forage should be fed at a younger stage for maximum energy digestibility. A wide range of digestibility occurs both between and within pasture species. One has to compromise between maximizing forage yield and quality and try to improve the latter by using better species for milk production (Aminah and Chen, 1989).

1.3 OBJECTIVES

The general objective of this study is to measure the growth performance and nutritive value of three different varieties of guinea grass at different cutting interval.

The specific objectives of the experiment are:

1. To determine the dry matter production of three different varieties of guinea grass different cutting interval.
2. To measure the nutritive value of three different varieties of guinea grass at different cutting interval.
3. To measure plant height and leaf percentage of three different varieties of guinea grass at different cutting interval.

1.4 Hypothesis

The different levels of cutting interval will affect the growth performance and nutritive value of guinea grass.

1.5 Significance of the study

New information on the variety (in term of production and quality) and suitable cutting interval that is suited for fodder crop.

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