AGRONOMIC PROPERTIES OF ALEMAN GRASS, PARA GRASS AND SETARIA GRASS MIXTURE AND ITS PALATABILITY IN SHEEP

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AGRONOMIC PROPERTIES OF ALEMAN GRASS, PARA GRASS AND SETARIA GRASS MIXTURE AND ITS PALATABILITY IN SHEEP

BY

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CERTIFICATION

This project entitles "**AGRONOMIC PROPERTIES OF ALEMAN GRASS, PARA GRASS AND SETARIA GRASS MIXTURE AND ITS PALATABILITY IN SHEEP**" was prepared by **Muhamad Hanif bin Mohd Nor** and submitted to the Faculty of Agriculture in fulfillment of the requirement of the course SHW 4999 (Final Year Project) for the award of the degree of **BACHELOR OF ANIMAL SCIENCE.**

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ABSTRACT

A study was conducted to evaluate the agronomic properties of Aleman grass (*Echinochloa polystachya*), Para grass (*Brachiaria mutica*) and Setaria grass (*Setaria splendida*) mixture and its palatability in sheep. The first objective of this study was to evaluate the agronomic properties in mix planting of Aleman grass, Para grass, and Setaria grass that includes the botanical composition, tiller count, grass height, and leaf to stem ratio. The second objective of this study was to evaluate the palatability of the mixture of Aleman grass, Para grass and Setaria grass by sheep. The grass were planted in single, two grass mixture and three grass mixture at the Field 2, Department of Animal Science University Putra Malaysia. The grass were planted for 2 months in a randomly complete block design (RCBD) and was cut about 15 cm for each grass and the data was collected every week. Botanical composition and grass tiller count showed no different among the grass planted as single grass to the planted two and three grass species. There was a significant difference ($P>0.05$) in grass height that decreased in two and three grass mixture. The study on palatability was conducted using single bowl and double bowl method. There were significant differences ($P<0.05$) in both tests that the single grass was more palatable than mixture of two and three grasses. The mixture of three grass takes more time for the sheep to finish the grass compared to the mixture of two and single grass species. In conclusion, this result showed that different mixture of planting and feeding to the animal have an effect on agronomic properties and its palatability in sheep.

ABSTRAK

Satu kajian telah dijalankan ke atas ciri-ciri agronomi bagi rumput Aleman (*Echinochloa polystachya*), rumput Para (*Brachiaria mutica*) dan rumput Setaria (*Setaria splendida*) yang ditanam secara gabungan dan diuji citarasa pada biri-biri. Objektif pertama kajian ini adalah untuk menilai ciri-ciri agronomi antara gabungan rumput Aleman, rumput Para dan rumput Setaria yang merangkumi komposisi botani, jumlah tiler, ketinggian rumput, dan nisbah daun dan batang. Objektif kedua kajian ini adalah untuk menilai citarasa rumput dalam gabungan rumput pada biri-biri. Rumput ditanam secara tunggal dan gabungan di Ladang 2, Universiti Putra Malaysia. Rumut ditanam selama 2 bulan menggunakan design blok secara rawak dan hasil dituai pada ketinggian 15 sentimeter dari paras tanah. Tiada perbezaan ($P>0.05$) bererti pada komposisi botani dan jumlah tiler pada rumput yang ditanam secara tunggal dan gabungan. Terdapat perbezaan bererti ($P<0.05$) pada ketingian rumput yang ditanam secara tunggal dan gabungan. Kajian ujirasa rumput pada biri-biri menggunakan kaedah satu mangkuk dan dua mangkuk. Terdapat perbezaan bererti ($P<0.05$) pada kedua-dua kajian satu dan dua mangkuk yang menunjukkan rumput tunggal lebih tinggi citarasa berbanding gabungan jenis rumput. Kajian citarasa pada biri-biri menunjukkan gabungan tiga rumput mengambil masa yang lebih lama berbanding gabungan dua rumput. Kesimpulannya, keputusan kajian menunjukkan penanaman rumput dalam gabungan mempunyai kesan terhadap ciri agronomi dan citarasa pada biri-biri.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The production of animals depends on production and quality of the grass would be the main factor to produce optimal production in animal industry (Jusoh *et al*., 2014). In Malaysia, most of the ruminant animals are fed low nutritive value forage as most of the forage fed to animals are low in nitrogen content, low digestibility and low in palatability. This is due to improper pasture management and also high cost on imported feed. Therefore, many studies required for choosing the best forage for the animals to achieve high production level.

1.2 Background of Study

Aleman grass, Para grass and Setaria grass are known as forage species that grow well on moist soil. This species dominated moist pasture land and poorly drained soil. However, the production of these grasses in mixtures is not known due to less study

conducted on this aspect. There are two ways to plant a grass that are conventional tillage uses plowing and disking but sometime used herbicides way to prepare the seed bed to ensure proper seed to soil contact and depth.

Aleman grass (*Echinochloa polystachya)* is one of the grass that have been used to feed animals. It is mainly sown as a permanent pasture for grazing, in wet and flooded areas. This grass is well adapted to tropical lowland environments. Aleman grass pastures should be fenced off to prevent access by grazing animals during the wet season. This spells the pasture and allows it to regenerate each year. The grass is palatable to ruminant. The strength of this grass are can grow in standing water to 3 m deep, high quality feed during cool dry season with ponding and tolerates high stocking rates under rotational grazing. The limitation of this grass are have no seed but spread from pieces of stem, cannot tolerate low rainfall or drought and potential environmental weed in wetlands.

Para grass (*brachiaria mutica)* commonly used as a fodder that is very valuable in this regard, as its environment is such that soil moisture persists well into the dry season so green growth is usually available for livestock at a crucial time. This grass planted for grazing in flat, poorly drained or high rainfall environments. Also used as a cut and carry forage. Can be cut for hay but is generally slow to dry in the humid environments where it grows productively. Leaf is highly palatable and selectively grazed. Mature stolons and stems are much less palatable but will be consumed by grazing as alternative feed.

Setaria grass (*Setaria splendida)* commonly used as permanent pasture, hay, and cut and carry. In the Philippines, Setaria grass is used in order to prevent soil erosion on hillslopes as a hedgerow species in alley cropping systems (Exconde *et al*., 2000). This grass well eaten by all classes of livestock, but should not be fed to horses. The strength of this grass can be used as high quality feed, good for cut and carry system, tolerates poor drainage and can survive in low fertility environments.

The agronomic properties of the grass are the measurements include botanical composition, tiller count or plant and leaf to stem ratio. Agronomic properties such as leaf to stem ratio is the most important structural characteristic of pasture grasses (Rodrigues *et al*., 2014). The botanical composition refers to the percentage of weed species and sown grass established in the same area, where all vegetation within one meter^2 will be cut and separated. The number of tiller per plant will be measured from the five clumps. Measurements taken before each harvest included plant height and density of tillers. Plant height was based on five culms taken randomly in each plot, measured using a steel tape from the ground level to the highest leaf.

The term palatability usually designates those characteristics of a feed that invoke a sensory response in the animal, and is considered to be the corollary of the animal's appetite for the feed. When only one feed is given to the animal fed indoor, palatability can be evaluated by the eating rate at the beginning of the meal. Palatability is the measure of intake of a food that indicates acceptance or the measure of preference of one food over another (Aldrich and Koppel, 2015). Palatability is the perception derived at the time food is consumed and accounts for the flavor and the animals'

perception of the appearance, temperature, size, texture, and consistency and perhaps prior experiences (Kitchell, 1978; Bradshaw, 2006).

1.3 Problem Statement

The selection of grass in feeding the animals is important as it is the most important factor of converting it into body weight. Poor selection of grass can give impact to the animals' body weight. Most farmers lack the knowledge about the palatability of the grass. If the grass is low in palatability, the animals may not feed the grass. It will decrease the animals' feed intake. Next, poor of land pasture management. Most of the pasture lands in Malaysia is low in quality because the lands have more weed than main grasses. The pasture land management is very important for the good grass production as ruminant feed.

1.4 Objective of Study

The objective in this study divides into general and specific objectives.

General objective:

To evaluate the agronomic properties and palatability of Aleman grass, Para grass and Setaria grass mixtures.

Specific objective:

1. To measure and compare the agronomic properties of the Aleman grass, Para grass and Setaria grass.

2. To determine the palatability of Aleman, Para grass, Setaria grass and its mixtures in sheep.

1.5 Research hypothesis

There are two research hypotheses in this study:

1. The single grass species has better agronomic properties than the mixture of grasses
2. The single grass species more palatable than the mixture of grasses to sheep.

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