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FORAGE AVAILABILITY AND QUALITY ON GRAZING RESERVE ALONG THE WATERWAYS FOR LIVESTOCK PRODUCTION AT TANJUNG AGAS, LEDANG, JOHOR

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CERTIFICATION

This project entitled “Forage Availability and Quality on Grazing Reserve along the Waterways for Livestock Production at Tanjung Agas, Ledang, Johor” was prepared by Muhammad Helmi Izzuddin Bin Yusof and summited 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 AGRICULTURE (ANIMAL SCIENCE).

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List of Abbreviation

DM	Dry Matter
CP	Crude Protein
NDF	Neutral Detergent Fiber
ADF	Acid Detergent Fiber
ADL	Acid Detergent Lignin
CF	Crude Fiber
Ca	Calcium
Ha	Hectare
Wt	Weight
g	Gram
cm	Centimeter
m^2	Meter Square
km	Kilometer
km^2	Kilometer Square
^{o} C	Celsius
SAS	Statistical Analysis System
SEM	Standard Error of Mean

ABSTRACT

The waterways along Tanjung Agas approximately 10km length, also used as grazing area. The purpose of this study is enable to identify the potential of this area and boost the development into larger livestock production. The general objective of the study is to evaluate the availability of vegetation and its quality to support livestock production at the grazing reserve along the waterways. The specific objectives of the study firstly are to identify the available vegetation along the waterways uses for livestock feeding, secondly are to determine the production and nutrient content of the forages grazed by livestock at patched and non-patched area of urine and dung forages, and thirdly are to quantify the population of livestock grazed on the studied area. Along the waterway, all types of plant either it was grasses, legumes, palatable plants was observed and identified. The documentation and classification of existing vegetation along the waterways, via observation, taken their pictures and further identified by their morphology and classified them. The most abundant palatable forages are *Axonopus compressus, Imperata cylindrica* and *Paspalum conjugatum*. The most abundant of non-palatable plants are *Acanthus ilicifolius, Morinda citrifolia* and *Acacia mangium*. Knowing the forage dry matter yield is important when making decisions about crop productivity, fertility, feeding, grazing schemes and stocking rates. The land area calculated was 10 km length and 30 meters width, was equivalent 10 hectares. The average dry matter (DM) content of the forages is 39.74 %. The forages dry matter yield at both area was calculated, the average dry matter yield of forages was 470.4 kg DM per ha. The 20 days intervals of regrowth period given to each location at patched area was 0.23 g/ day, whereas the average growth rate of the forages at non-patch area was 0.22 g/ day. The chemical analysis of forages, the

Crude Protein (CP) content for patched sites was 10.84%, whereas non-patched area was 8.64%. The chemical test showing that patched sites where CP, Ash and Acid Detergent Lignin (ADL) were significantly different ($P< 0.05$) to non-patched site. Whereas, DM, Acid Detergent Fiber (ADF), Neutral Detergent Fiber (NDF) and Crude Fiber was not significant different ($P< 0.05$) to non-patched site. Total cattle population were 48 head with different production levels which is Kedah-Kelantan cross and Brahman cross breed, and the total goat population calculated were 41 head with different production levels which is Katjang and Jamnapari cross breed. The livestock performance in relation to the palatable plant species regrowth rate throughout along the study area was not enough for the study area was not enough to meet livestock dry matter intake requirement daily. In conclusion, this study clearly shows that this area has high potential to be utilized as ruminant farming corporation between local farmers because of large planting area can be used for replant improved grasses species to sustain the livestock growth because of available palatable plant species was not sufficient to be used as main feed source for the currently total amount of grazing livestock, by improving in term of forages quality and facility, this land area suitable to be utilized as semi-intensive or extensive farming system.

ABSTRAK

Sistem pengairan di sepanjang Tanjung Agas sepanjang 10km, kawasan ini juga digunakan sebagai kawasan ragutan untuk haiwan ruminan. Penyelidikan ini ialah bertujuan untuk mengenalpasti potensi kawasan ini dan dapat digunakan untuk mengembangkan dan kemajuan produksi haiwan ternakan. Objektif utama kajian ini adalah untuk menilai kesediaan tumbuhan dan kualitinya untuk menampung produksi haiwan ruminan di kawasan ragutan sepanjang sistem saliran tersebut. Objektif khusus kajian ini yang pertama ialah untuk mengenalpasti kesediaan tumbuhan yang berada di sepanjang sistem saliran yang digunakan untuk pemakanan haiwan ternakan, dan objektif ke dua ialah untuk mengenalpasti produksi dan kandungan nutrien tumbuhan yang diragut oleh ternakan di kawasan tompokan air kencing dan najis serta di kawasan tiada tompokan, dan juga yang ke tiga ialah untuk mengenalpasti jumlah populasi haiwan ternakan yang meragut di kawasan kajian. Di sepanjang sistem saliran, semua jenis tumbuhan seperti rumput, kekacang, tumbuhan bukan rumput yang dimakan oleh ternakan dan tumbuhan yang tidak dimakan oleh ternakan telah dikenalpasti dan direkodkan. Bagi prosedur dokumentasi dan pengkelasan tumbuhan yang wujud sepanjang sistem saliran, tumbuhan ini diperhatikan dan dinilai, diambil gambar individualnya dan seterusnya dikenalpasti melalui morfologi dan kelas mereka yang tersendiri. Rumput yang paling banyak ialah *Axonopus compressus*, *Imperata cylindrica* dan *Paspalum conjugatum.* Manakala tumbuhan yang tidak dimakan oleh ternakan ialah *Acanthus ilicifolius, Morinda citrifolia* dan *Acacia mangium*. Pengetahuan berkaitan bahan kering (DM) tumbuhan adalah faktor yang amat penting untuk membuat keputusan berkaitan produksi tanaman, kesuburan, pemakanan, skema ragutan dan kadar penstokan haiwan ternakan. Kawasan ini kira-kira sepanjang 10 km dan 30 kaki lebar, bersamaan berukuran kasar 10 hektar. Kadar purata bahan

kering (DM) yang terkandung ialah 39.74 %, dan kadar penghasilan bahan Kering (DM) di kedua-dua kawasan telah dikenalpasti, kadar purata penghasilan ialah sebanyak 470.4 kg DM per ha. Bagi tempoh jarak waktu kadar pertumbuhan semula yang diberikan selama 20 hari di setiap lokasi, kadar purata pertumbuhan per hari untuk kawasan bertompok ialah sebanyak 0.23 g/ hari, manakala kadar purata pertumbuhan semula tumbuhan di kawasan tidak bertompok ialah sebanyak 0.22 g/ hari. Analisa kimia untuk menentukan kadar kandungan nutrien, purata untuk protein mentah (CP) di kawasan bertompok ialah 10.84 %, manakala di kawasan tidak bertompok ialah 8.64 %. Di dalam ujian kimia menunjukkan bahawa kawasan bertompok dimana CP, abu, dan asid detergen lignin (ADL) mempunyai kadar perbezaan ($P<0.005$) berbanding kawasan tidak bertompok. Mankala DM, Asid Detergen Serat (ADF), Neutral Detergen Serat (NDF) dan Serat Mentah (CF) menunjukkan tiada perbezaan ($P<0.05$) kepada kawasam tidak bertompok. Jumlah populasi lembu hidup ialah sebanyak 48 ekor dengan peringkat produksi merangkumi baka kacukan Kedah-Kelantan dan kacukan Brahman, dan jumlah populasi kambing ialah sebanyak 41 ekor dengan peringkat produksi yang berbeza merangkumi baka Katjang dan kacukan Jamnapari. Prestasi haiwan ragutan dan keadaan kadar pertumbuhan spesis tumbuhan yang boleh dimakan di sepanjang kawasan penyelidikan menunjukkan bahawa jumlah tumbuhan yang dihasilkan adalah tidak mencukupi untuk menampung keperluan tumbesaran haiwan ternakan dengan kandunagn bahan kering yang sedia ada. Kesimpulannya, kajian ini menunjukkan bahawa kawasan ini mempunyai potensi yang tinggi untuk digunakan sebagai kawasan peternakan ruminan dikalangan penternak tempatan kerana mempunyai kawasan penanaman yang luas dan sesuai untuk digunakan sebagai penanaman semula dengan spesis rumput yang lebih tinggi produksinya. Oleh hal yang demikian, dapat mengekalkan kelestarian dan sumber makanan yang mencukupi untuk menjamin tumbesaran

ternakan kerana spesis pokok sedia ada yang boleh dimakan oleh ternakan tidak mencukupi untuk digunakan sebagai sumber makanan utama untuk menampung jumlah haiwan ternakan terkini. Tambahan, penambahbaikan perlu dilakukan dari segi kualiti tumbuhan dan kemudahan infrastruktur, kawasan ini amat baik digunakan sebagai kawasan peternakan ruminan secara semi intensif atau sistem ragutan bebas.

CHAPTER 1

INTRODUCTION

Ledang is a new district in Johor, Malaysia, with the principal town is Tangkak. The Ledang district covers Tangkak town, Tanjung Agas, Kesang, Sungai Mati, Serom, Sagil and Bukit Gambir. The district was formerly as the northern part of the Muar district which is separated from the southern part by the Muar River. Muar district (inclusive of Ledang) formerly covers 2346.12 km², roughly the size of two and a half Singapore. It lies close to the neighboring state of Melaka, especially to Jasin town and district of Melaka (Wikitravel, 2015).

The waterways along the Tanjung Agas, Ledang approximately 10 kilometers length beginning from Masjid Sultan Ismail, Tanjung Agas to the Malay Reserve Land at Sungai Rambai, Melaka. It is located near to the riverbank of Muar, where plenty of mangrove trees that grow well on the riverbanks (Wikitravel, 2015). The waterways provide fresh water from the headwaters and sea water may flowing in into the waterways as the dam doors open during high tide. The main purpose of constructing waterways are to collect runoff from contour banks for erosion control and avoiding excess water flooded into the housing area. They convey runoff at a safe velocity to a drainage line then out into the open water into the sea. There are plenty of lands as a reserved land area belongs to the State of Johor Department of Irrigation and Drainage. The abundant of usable land area act as a strategic grazing area for livestock farming (Picture 5.4f – Page 46).

There are some farmers used to plant sugarcane for beverages product sold to the local vendor around the district of Ledang. That particular area also was use as a grazing area for ruminant. The area along the waterways easy to be access, farmers and the livestock have easy access to enter the land area, so cattle and goat can graze anywhere (Picture 5.4d and Picture 5.4e – Page 46).

Vegetation such as native forages is the most abundant in this particular area as they can survive in hot and humid condition, immune to diseases and hardy plant yet low nutrients content and high in indigestible lignin. We knew that high-quality forage is an important requirement for maintaining maximum production of ruminant livestock production. The most important forage quality measures are the fiber, protein and energy contents.

It is important to understand the nutrient content of the main forages to consume by the cattle and to identify the forage available at the particular area. There is no any existence of scientific report about the available vegetation along the waterways and the nutrient content of the forages. In addition, a study is needed to identify forage availability and its nutrient content in order to improve livestock production in the particular area.

1.1 Objectives

The general objective is to evaluate the availability of vegetation and its quality to support livestock production at the grazing reserve area along the waterways.

The specific objectives of this study are:

1. To identify the available edible vegetation along the waterways uses for livestock feeding.
2. To determine the production and nutrient content of the forages grazed by livestock at dung and urine patched and non-patch forages areas.
3. To quantify the population of livestock grazed on the studied area.

1.2 Significance of Study

The quality of the forages dependent on the soil they were grown. Matching forage quality to animal needs is part of ruminant management as the nutrient requirements of ruminant changes throughout the year based on the stage of the production cycle, and the location where it is grown. There are several factors that influence the quality of forage with palatability being primary importance. Palatability is the ability of the animals to consume the forage (The Cattle Site, 2010). To be useful, the forage quality information and its palatability must be available before feeding. Therefore, the forage quality is the most important attributes to be considerate. There is plenty of contribution can be achieved with this study such as identify the vegetation along the waterways and classified them into their own classes either grasses, legume, palatable or non-palatable plants species.

Moreover, the area along the waterways could be suitable for livestock production as the ruminant is the main economic production units for local farmers. Unfortunately, the record of overall numbers and survival rate information is not available. This is an opportunity to investigate the demographics of livestock within the study area as the potential of this area in boosting the development into larger livestock production area by improving forages quantity and quality for sustainable livestock production.

1.3 Research Hypothesis

It is believed that vegetation along the waterways on dung and urine patches provide higher nutritive value compare to normal forages, but still do not provide sufficient amount of nutrient to support livestock production due to low yield and quality of forages at the study area.

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