

学位論文の要旨 (論文の内容の要旨)  
Summary of the Dissertation (Summary of Dissertation Contents)

論文題目 :  
Dissertation title:

Analyses of Grazing Land Dominating Cattle Feed Plants

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The supply of forage depends on availability of plant species. To determine abundance and productivity of plant species could calculate using frequency each plant species in grazing area. Frequency is the number of times a plant species is present in a given number of quadrat of a particular size or at a given number of sample points. Frequency usually expressed as a percentage the concept of frequency refers to the uniformity of a species in its distribution over an area. Some of the important properties of plant species to evaluate the quality of grazing areas are the properties of plant species include the number of co-occurring species richness, specific abundance patterns and compositional (e.g., community types), functional, structural characteristics, and dominance of plant species. The supply of forage for cattle feed depends on pastures and it produces a wide variety of plant species which are superior in quantity and quality. To determining ideal cattle grazing area is difficult to predict, especially among within heterogeneous environments. Importance of conservation to increase management productivity and availability plant species related structure of this thesis divided 5 Chapters which consist of: Chapter 1 showed the general introduction; Chapter 2 is concerned on observation of abundant plant species; Chapter 3 is the main chapter, which focuses on determination frequency of plant species; Chapter 4 focuses on management of dominance plant species to increase productivity of grassland area; and Chapter 5 is general discussion.

The first section of chapter 2 is observation of abundant plant species. Data was collected using Braun-Blanquet method to analyze plant species in grazing areas, Hiroshima, Japan. Phytosociology of plant species were studied by using a line transect of 0-100 m at every 10 m interval. Specimens of each plant species were recorded in each plot of 1 m × 1 m quadrat (n = 11). One-meter square makes 16 parts of 0.25 m × 0.25 m sub-quadrat, the number of plant species was 32 in spring and 21 in summer.

The second section of the chapter 2 discusses about plant height. The statistically analyze showed significant difference ( $p < 0.01$ ) between spring (16.64 cm) and summer (21.55 cm). The plant height in spring is lower than summer. In summer plant height increased because of lack of competition among plant species. Lack of competition occurred due to extreme temperature, where some plant species died.

The third section of chapter 2 investigated vegetation cover rate between spring and summer season. Vegetation cover rate is an important part of an ecosystem, and it has been estimated to monitor vegetation growth. The vegetation cover rate of plant species in spring was 77.18% and summer 81.36%. Vegetation cover rate of could give contribution and estimate productivity of plant species during spring and summer season in the supply needed cattle feed.

The fourth section of chapter 2 determined chlorophyll contents using SPAD (Soil Plant Analysis Development) 502. It has been found chlorophyll content showed statistically significant difference ( $p < 0.01$ ) in spring 41.74 mg/g Fw and summer 36.28 mg/g Fw. In the spring season young leaf start growing which attributes high chlorophyll content and in summer reduces because leaf become old and fiber production increases automatically chlorophyll content decrease.

The fifth section of chapter 2 determined number of plant species diversity. The observation number plant species diversity of this study in spring 33 and summer 21. Number of plant species in spring high because many plant species phase growth and could adapt, whereas in summer decrease because some plant species could not adapt to extreme temperature.

The sixth section of chapter 2 determined productivity of plant species in spring and summer. Generally in this chapter, an productivity of plant species in spring and summer consists of plant height, vegetation cover rate, chlorophylls content, and species number. To determine influence abundance of plant species between spring and summer season show in chapter 2.

The first section of chapter 3 focused on plant species diversity between spring and summer season. In this chapter the properties of plant species assemblages include the number of species richness, interspecific of abundance patterns, compositional community types, functional and characteristics. Here, species richness of plant species is simply predicted present-absence, also to identification of each plant species. Diversity of plant species performs a variety of ecological productivity of food and feed, including recycling of nutrient. There is growing evidence that the level of internal regulation of functions in agro ecosystems largely depends on the level of plant species and animal present. Thus, biodiversity of plant species in grazing area is important not only as a tool to protect plant as cattle feed but also in sustaining their agriculture productivity.

The second sections of chapter 3 were determination frequency of plant species. The frequency of plant species between spring and summer season consist of: feed plant clover (spring = 17.45% and summer = 16.76%), feed plant grass (spring = 27.49% and summer = 61.90%), grassland plant native (spring = 9.40% and summer = 6.92%), other plant native (spring = 6.13% and summer = 9.73%), alien plant (spring = 39.53% and summer = 4.69%). Abundance of plant species diversity (functional group) consists of: feed plant clover (spring = 245 and summer = 143), feed plant grass (spring = 386 and summer = 528), grassland plant native (spring = 132 and summer = 59), other plant native (spring = 86 and summer = 83), alien plant (spring = 555 and summer = 40). Therefore, it is ideal to determine the productivity of functional group. So, I can compare each season based on plant species abundance. This research can measure suitable and abundance of plant species between spring and summer. In case of both season clover and grass are more effective than weeds. Weeds can grow in spring and decrease in summer because some weed cannot survive to extreme temperature. The appearances weed species in spring obstructing appearance of clover and grass species. Thus is not good for productivity of plant species in grazing area.

The first section of chapter 4 is vegetation analysis of dominance plant species between spring and summer season. Dominance of plant species refers to the number of plant species and their relative abundance. Diversity measurements incorporate species richness and species evenness which appear in grazing area. Measurement of dominance of plant species could be used for management rehabilitation of plant species for develop and conservation. Among spring and summer season plant species which are resistant and could adapt in spring consist of: *Trifolium repens* (clover) = 73.86%; *Paspalum dilatatum* (grass) = 69.32%; and *Paspalum notatum* (grass) = 47.73%, whereas in summer *Trifolium repens* (clover) = 81.25%; *Paspalum dilatatum* (grass) = 78.98%; and *Paspalum notatum* (grass) = 98.30%. Mixture frequency dominance of plant species could increase productivity, and quality as cattle feed in grazing area.

The second section chapter 4 determined midpoints cover range of plant species (%). Midpoints cover range of plant species observed are more than 70%, where in spring 75.57% and summer 86.17%. To identify potential and productive plant species as cattle feed floristic-sociological approach is important. Plant community types are units recognized by the total floristic composition of plant community.

The third section chapter 4 determined diversity index, evenness index, and species number. Species number in spring 33 and summer 21. In summer, species number decreased because some plant species could not adapt due to extreme temperature and also influenced the quality of plant species. These indices all combine data on richness and dominance (evenness) using Shannon and Weaver (1963) diversity index to express diversity in the ecological community of plant species. Diversity index, evenness index, and species number are high in spring compared in summer because in spring the plant species still grow up and many plant species could adapt to the cool weather.

The fourth section chapter 4 discussed about the influence of temperature spring and summer to the plant species diversity. In the spring season average temperature was 13.4 °C (minimum 8.9 °C, and maximum 18.2 °C) which increased to average 26.9 °C in summer (minimum 23.6 °C, and maximum 30.9 °C). A similar response has been found in annual specialty plant species in which temperature. The major environmental factor affecting

productions with specific stress, such as periods of extreme temperature, overall growth and adapt to plant species depend on season climate, minimum and maximum daily temperatures, and timing of stress in relationship to developmental stages.

The fifth section chapter 4 discussed about management frequency of dominance plant species. Generally frequency of dominance plant species could adapt and resistant in spring consist of: *Trifolium repens* (73.86%), *Paspalum dilatatum* (69.32%), and *Paspalum notatum* (47.73%), whereas in summer *Trifolium repens* (81.25%), *Paspalum dilatatum* (78.98%), and *Paspalum notatum* (98.30%). Sustainability of dominance plant species can use as a management potential solution to the conservation of grazing areas and increase the supply cattle feed because about 70% of cattle feed depend on grass.

Chapter 5 is general discussion. The study was conducted in Setouchi Field Science Center, Hiroshima, Japan. This study focuses on management grazing to select dominance of plant species to increase productivity and conservation grazing area. The important to validate observation number of plant species series a straight line on a plot of a bundance plant species between spring and summer. The dominance of plant species in this study consist of *Trifolium repens*, *Paspalum dilatatum*, and *Paspalum notatum* can use for conservation and management to increase productivity as cattle feed in grazing area for future.

備考 論文の要旨はA 4判用紙を使用し、4,000 字以内とする。ただし、英文の場合は 1,500 語以内とする。

Remark: The summary of the dissertation should be written on A4-size pages and should not exceed 4,000 Japanese characters. When written in English, it should not exceed 1,500 words.