REPORT OF SWAMP BUFFALO PAMPANGAN, BUBALUS BUBALIS (LYDEKKER, 1913) HABITAT AT BANYUASIN (RAMBUTAN) AND OGAN ILIR (INDRALAYA) DISTRICT, SOUTH SUMATRA, INDONESIA

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REPORT OF SWAMP BUFFALO PAMPANGAN, *BUBALUS BUBALIS* (LYDEKKER, 1913) HABITAT AT BANYUASIN (RAMBUTAN) AND OGAN ILIR (INDRALAYA) DISTRICT, SOUTH SUMATRA, INDONESIA

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ABSTRACT

Habitat analysis, include biophysics environmental conditions of swamp buffalo (*Bubalus bubalis*) has been conducted in June until December 2017 in Rambutan (Banyuasin) and Ogan Ilir (Indralaya) district, south Sumatra and the laboratory of Animal Physiology, Department of Biology, Faculty of Mathematics and Natural Sciences, University of Sriwijaya, Indralaya. The purpose of research is to know swamp buffalo habitat characteristics at the district of Rambutan (Banyuasin) and Indralaya (Ogan Ilir) by physical, chemical, soil and vegetation conditions in the habitat of buffalo. The sampling method of buffalo was used purposive sampling method wheareas vegetation sampling using the quadrant method or plot. Data analysis techniques used are in qualitative and quantitative. The data is then presented in the form of tables and diagrams and narratives to interpret the data. Based on identification and field observations of vegetation conditions, Rambutan vegetation was consist of 15 species and Indralaya vegetation was consist of 9 species for swamp buffalo food. Temperature inside and outside of cage in Indralaya is 22.3 to 31.3°C while temperature in Rambutan is 23.2 to 32.8°C.

Potential of hydrogen soil is 5.10 to 5.60 and always inundated by water. It can be concluded that the form of lowland biophysics environmental. Conditions of swamp buffalo dominated by grasses belonging to the family of Cyperaceae, Graminae, Fabaceae and Poaceae as the main source of food, while the state of the temperature is very supportive for buffalo habitat.

Keywords: *Bubalus bubalis*, buffalo, Pampangan swamp buffalo, habitat, vegetation, temperature, soil, environmental

INTRODUCTION

Swamp buffalo (*Bubalus bubalis*) in Rambutan and Indralaya district is one of the original buffalo varieties and the richness of germplasm of south Sumatra. In 2010, the Government of Indonesia through the Director General of PKH at that time supported by experts from Balitbangtan-Kementan and teachers of Kemendikbud start a new level in the recognition of buffalo clumps in Indonesia as the original livestock owned by Indonesia. The results have been established seven clumps of buffalo cattle Indonesia namely buffalo Pampangan and Simelue (*Bubalus bubalis sumateranensis*). Its distribution covers only south Sumatra and one of the largest distributions in

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district of Pampangan (Ogan Komering Ilir: 4.799 buffaloes), Rambutan (Banyuasin: 1.623 buffaloes) and Indralaya (Ogan Ilir: 2.477 buffaloes) (BPS, 2015). So that this buffalo is often referred to as buffalo Pampangan.

Reported by Animal Husbandry Department Ogan Komering Ilir (2012), general characteristics of buffalo Pampangan in Rambutan, Indralaya and Pampangan or other areas nearby that has a body shape tall and big, black leather, head and ears with long hair, short horns circular heading back down, and then to direction in a circular spiral shape, elbow-shaped body, slender leads such as dairy cow type, udder developed good and symmetrical, and calm temperament.

Pampangan swamp buffaloes located in the district of Rambutan spend their lives and live in the swamp area of Rambutan which is a customary land that has a land area of approximately 1.200 hectares in Rambutan (Animal Husbandry Department Ogan Komering Ilir, 2012). and 700 hectares in Indralaya (Animal Husbandry Department Banyuasin, 2014). This area had not increased in size and experienced a reduction in land area, but the livestock population is always increasing, causing an increase in population without the provision of feed in the area where the buffalo foraging.

Along with increasing demand for meat, original variant of swamp buffalo in Pampangan, Rambutan and Indralaya district began to be sidelined and maintained along with buffalo swamp taken from other regions in Indonesia such as Lampung. Conditions that lead to the original variant buffalo population in sub Rambutan Pampangan dwindling. Understanding of the buffalo habitat will can give information about what the buffalo needs in it's life. One of them is the area of land needed and how much the carrying capacity of the land for buffalo breeding and can support the fulfillment of buffalo nutrients. This information is important in the effort to condition the environment and design the management in accordance with the needs of buffalo so it is expected to increase the population of Pampangan swamp buffaloes in the Rambutan and Indralaya district.

MATERIALS AND METHODS

The tools used are stationery, notebook, GPS, camera, questionnaire, paper label, meter roll, pH meter water, soil tester, rope, and thermohygrometer. The materials needed are buffalo water samples and soil samples for analysis in the laboratory.

Method of sampling buffalo

Method used to take samples of buffaloes observed were purposive sampling method. Buffalo samples were determined by selecting samples among buffalo populations in accordance with the desired researchers with intent and purpose that the sample can represent the characteristics of the population of buffalo that has been known previously. Technique of collecting data by direct observation by seeing and recording directly condition of swamp buffalo habitat in district of Rambutan and Indralaya. The research data will be tabulated and analyzed descriptively to get buffalo habitat data.

Site determina tion and sampling method observation analysis of vegetation potential of buffalo feed

A. Sampling location

Based on location survey results, the

location of sampling is determined by purposive random sampling method. The sampling site consists of 4 observation sites based on different types of vegetation and often passed to buffalo feeding so that it can represent the type of vegetation in the buffalo habitat area (Figure 1a).

B. Sampling method

Sampling technique using quadrat sampling technique (Kusmana, 1997). Sampling by making 4 transects size 100x100 meter placed at each location. Making this plot to know the index of dominance of the types of vegetation that live in buffalo habitats that have the potential as buffalo feed. Potential vegetation types as a feed is usually from species of grasses and herbs. Because of grasses were main source of feed for survival of buffalo. The measured data was recorded in the tally sheet. In this survey activity used the growth criteria of herbs beginning sprouts up to <1.5 meters tall.

Observation of physical factors (temperature and humidity)

Measurement of temperature and humidity was used to determine the amount of temperature and humidity in swamp buffalo habitat in the district of Rambutan and Indaralaya so that the conclusions can be drawn on the survival of buffalo. This temperature and humidity measurement is carried out inside and outside the cage at a distance of 1 km from the cage. Temperature and humidity data is taken every once a week and during the month of June to August. Measurement of temperature and humidity by using thermohygrometer is by putting thermohygrometer in place to be measured humidity then wait and read the scale. Land measurements are also done inside and outside the cage using soil tester

Observation of soil pH and mineral content

Soil pH measurement was used to determine the value of soil pH from Pampangan swamp buffalo habitat in Kecamatan Rambutan so that it can be drawn conclusion of the magnitude of soil pH and its effect on the survival of buffalo by using tool that was Soil Tester that is by plugged soil pH into the soil to be measured soil pH then soil samples were analyzed for its contents.

Supporting data collection

Supporting data collection was done to support the data that have been obtained, the data obtained will be presented in the form of narration. The collection of supporting data is using interview method, field observation and documentation every thing done in every observation.

A. Interview

Data collection is done by direct interviews of people who have buffalo cattle to obtain information about buffalo. The questions asked are:

1. Where does the buffalo feed come from?
2. Which areas are often crossed by buffalo?
3. What is the daily activity and condition of the buffalo habitat?
4. What kinds of grass are buffalo eating?

B. GPS data

GPS data was used to determine the coordinates of latitude, longitude, with the system of writing Minutes Second Degree (DMS) from the observed location.

C. Documentation

Documentation is performed as authentic proof of any observations that have been made.

Samples of Pampangan swamp buffaloes in Rambutan and Indralaya were observed and each observation sampling activity was documented using a digital camera.

Identification of potential feed vegetation

Identification was done by observing and carried out morphological recordings and vegetation characteristics that have the potential to feed buffalo. Documentation was performed using the camera on each potential vegetation of feed found in each plot. Identification of vegetation by using the book of identification of the book essay Rose, 1989; Steenis *et al*., 2006; Banner, 2011; Brown, 1979; Undersander, 1996; Welsh, 2003.

Data analysis

Data obtained from observations will be presented in qualitative and quantitative.

A. Qualitatively

Data obtained from the results of the recording of the condition of swamp buffalo habitat in Rambutan and Indralaya subdistrict were either the result of the interview, observation of physical factors including temperature and humidity as well as observation of soil pH obtained and mineral soil content is described, and some data presented in the form of tables and drawings in accordance with the results obtained.

B. Quantitatively

The data obtained from observation of Vegetation Analysis of the potential of feed is calculated quantity quantitative value of vegetation parameter, especially in determining index of important value According Kusmana (1997), done with the following formula:

$$IV = KR+FR$$

Furthermore, Shannon's index (Shannon's index) is used to determine the diversity of plant species. According Odum (1994) with the following formula:

$$H' = - \Sigma (ni/N) \log (ni/N) \text{ or } - \Sigma Pi \log Pi$$

where H' was the index of Shannon's diversity, *ni* was the value of importance for each species, N is the total kepentigan value and Pi is the probability of interest for each species that is ni/N. According to Barbour *et al*. (1987) that the H' values range from 0 to 7 with criteria (a) 0 to 2 being low, (b) 2 to 3 are moderate, and (c) 3 or more are high.

RESULTS AND DISCUSSION

Environmental condition of swamp buffalo habitat

Maintenance of buffalo in Rambutan and Indralaya is one of the main efforts of the population there, apart from agriculture such as rubber, palm and cultivation. This livestock business is done by the people of Rambutan and Indralaya districts on the swamp land. Business buffalo cattle carried out by removing buffalo from the cage in the morning in the swamp land and lead back in the afternoon. The environment of buffalo habitats in Rambutan and Indralaya has source of feed derived from wild grass vegetation in pastures where buffalo foraging. There are no breeders who provide additional feed or processing of animal feed. The availability of feed and water availability is closely related to seasonal changes occurring in the Rambutan and Indralaya regions. This greatly

affects the buffalo to wallow and drink, the source of water in the dry season comes from streams flowing along the buffalo habitat.

Environmental conditions of swamps form made this area very difficult to find a source of clean water for the needs of buffalo breeders, to get a source of clean water buffalo breeders must travel a distance of ±300 m (Windusari *et al*., 2014). In the dry season, the river is very useful for buffalo bath and wallow because in this season almost all the dry puddles. The water pH conditions at some sampling points showed that water content was acid with pH value of 3< pH <4. Rainfall greatly affects the water content and the fibers contained in the growing grass. forage that grows in conditions of considerable rain and high humidity will contain more water, in addition to forage more nutritious in the rainy season than in the dry season (Figure 2 to Figure 7).

Temperature and humidity

Based on observation and temperature measurement by using thermohygrometer in 2 locations that is inside and outside the cage as far as 1 km to saw the difference of both, got data of temperature result which increase its temperature during afternoon and temperature decrease during evening until morning. This temperature is strongly influenced by the weather in the rainy season and dry season. Temperature in buffalo buffalo habitat area (*Bubalus bubalis*) Rambutan and Indralaya could be seen in Table 1 and Table 2 below.

Average temperature (June to August) in Rambutan for cage inside was 21.3±33.6 and outside the enclosure ranged between 22.6±39.7°C while the average temperature in Indralaya for in a cage that was 21.5±38.4°C and outside the cage ranges 22.1±38.8°C. The temperature indicates that the habitat was very suitable for swamp buffalo breeding. Normal temperature for swamp buffalo was 38.4°C (Ihsanimmuddin, 1975) and in temperature (27.47°C) corresponding to the normal rectal temperature of 38.33°C as derived by the linear regression equation ST = 9.343 x RT-330.7 (R2 = 0.79) (Kumar and Kumar, 2013). According to Parakkasi (1995), temperature and humidity greatly affect mechanism of regulating temperature of buffalo body, heat expenditure, for example by sweating or through repiration will be faster.

Soil pH, moisture and mineral content

Based on measurements of soil pH on Rambutan and Indralaya showed values ranging between 5.10 < pH > 5.60, this shows that soil pH is acidic. Poerwowidodo (1991), cause soil acidity was H^+ and AL^{3+} ion which are in soil solution and absorption complex. Both of these cations affect acidity of soil in different ways. The difference was related to the source and nature of charge that absorbs the cations. Meanwhile, according to Michael (1991), soil pH value was good for plant growth that is between 5.0 to 8.4 and soil fertility bacteria were very much found in soil pH between 6.0 dan 8.2. Generally, plants can withstand ups and downs of pH in the range that was not too extreme Rao (1994), carbon (C), nitrogen (N), kalium (K), calcium elements (Ca), and magnesium (Mg) were macro elements needed for large growth grasses so that Rambutan and Indralaya were suitable places for swamp buffalo development.

Food vegetation conditions for habitat buffalo (*Bubalus bubalis*) of Rambutan and Indralaya

Based on identification and field observations of vegetation conditions, Rambutan vegetation was consist of 15 species that includes *Andropogon ischaemum, Brachiaria decumbens, Digitaria sanguinalis, Echinochloa stagnina,*

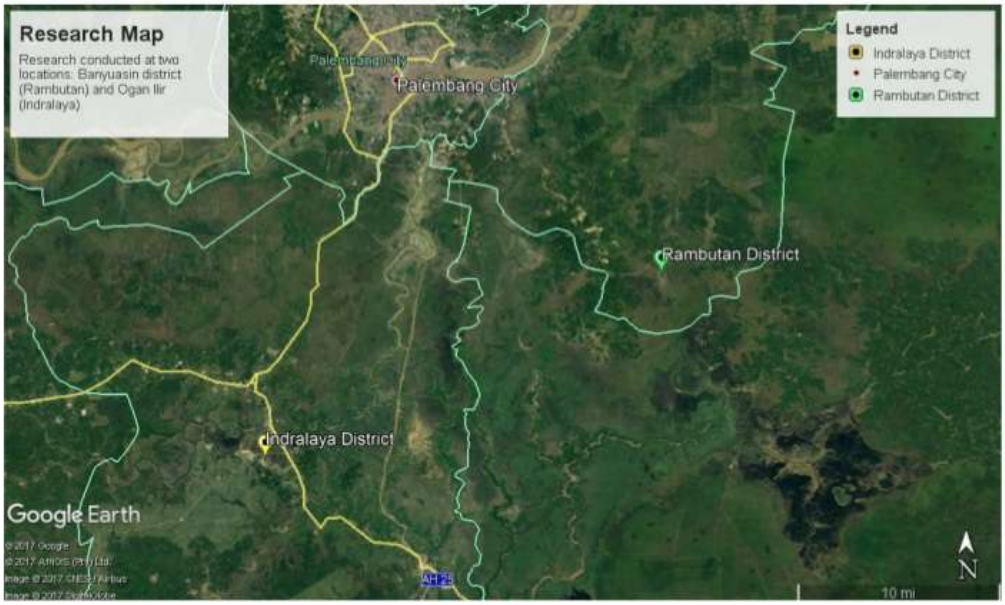

Figure 1. Research map: research conducted at two locations: Banyuasin district (Rambutan) and Ogan Ilir (Indralaya).

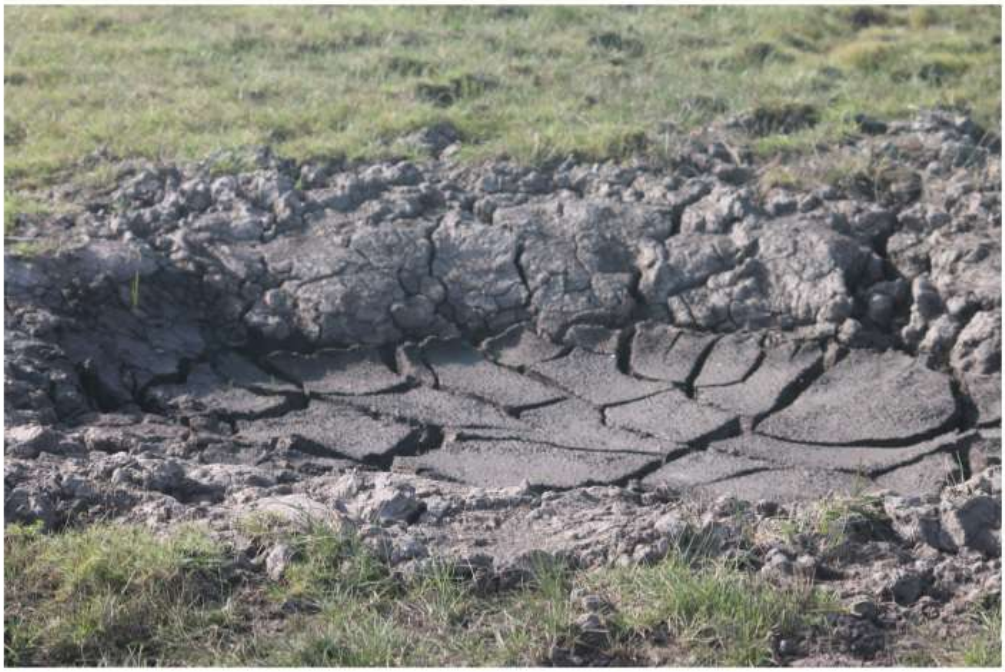

Figure 2. Puddles conditions during dry season.

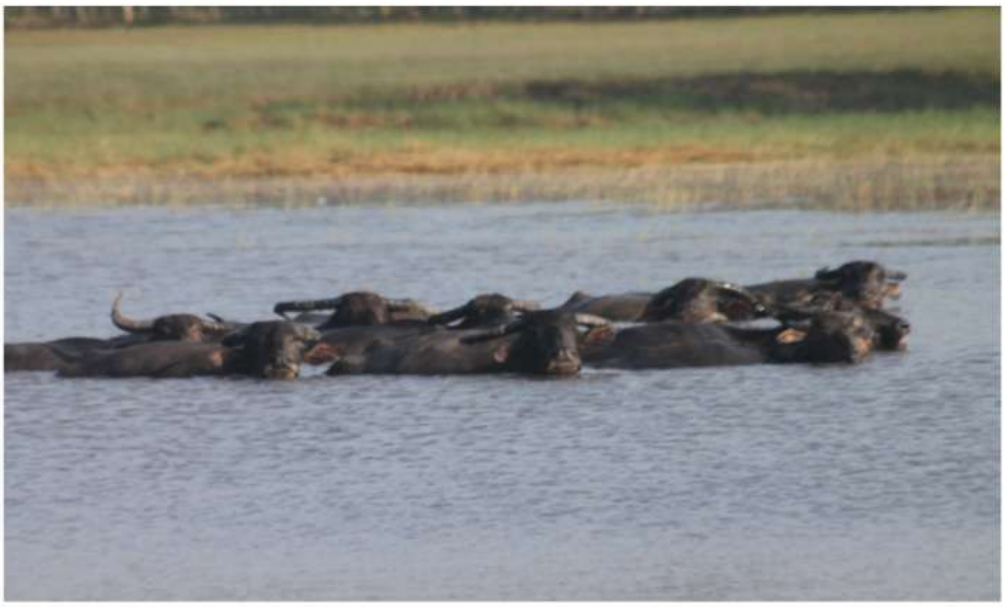

Figure 3. Swamp buffalo much time to soak.

Figure 4. Buffalo condition in Rambutan district when looking for food.

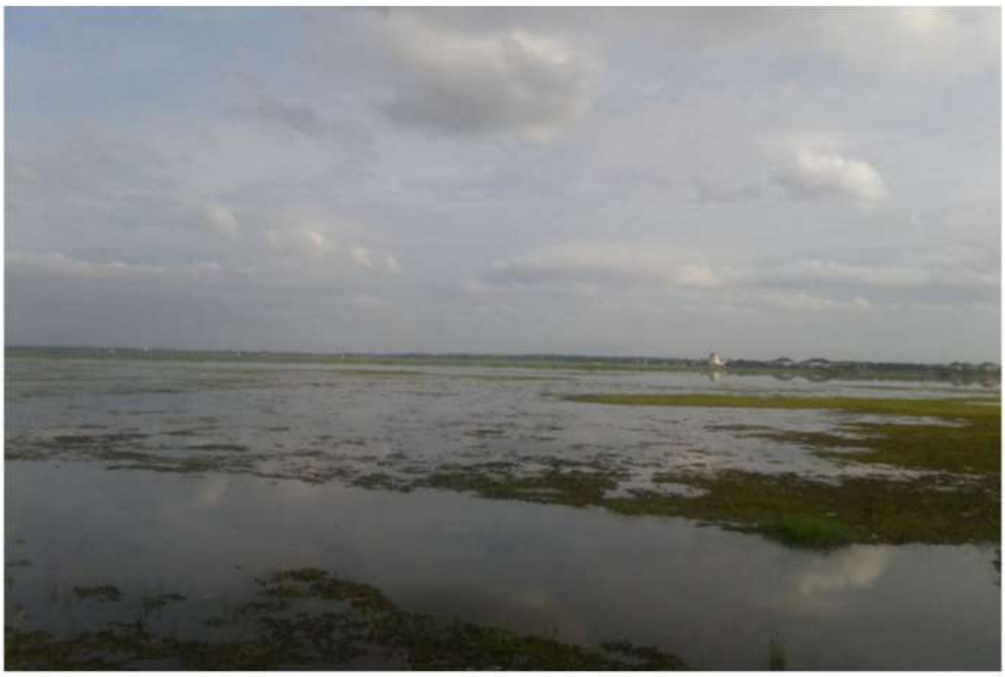

Figure 5. Condition of buffalo habitat in Indralaya district.

Figure 6. Cage buffalo in Indralaya district no roof cage.

Figure 7. Buffalo cage in Rambutan has cage roof.

Tabel 1. The temperature conditions of cage inside and outside in Rambutan district.

Temperature	Observation	Cage inside	Cage outside
June	First week (June 01 2017)	22.1-29.4ºC	23.3-29.8ºC
	Second week (June 08 2017)	23.5-27.5ºC	24.2-28.4ºC
	Third week (June 15 2017)	25.6-28.6ºC	26.3-29.2ºC
	Fourth week (June 22 2017)	22.3-30.3ºC	23.5-31.4ºC
	Fifth week (June 29 2017)	24.7-31.7ºC	25.2-36.5ºC
July	First week (July 06 2017)	25.3-29.6ºC	26.5-29.8ºC
	Second week (July 13 2017)	21.3-27.1ºC	22.6-28.7ºC
	Third week (July 20 2017)	26.1-33.6ºC	26.2-34.3ºC
	Fourth week (July 27 2017)	23.4-28.6ºC	24.4-28.9ºC
August	First week (August 02 2017)	27.6-30.2ºC	27.5-39.7ºC
	Second week (August 09 2017)	21.9-31.7ºC	22.7-32.5ºC
	Third week (August 16 2017)	24.3-30.2ºC	25.2-33.1ºC
	Fourth week (August 23 2017)	26.1-29.8ºC	26.5-30.3ºC
	Fifth week (August 30 2017)	23.3-30.5ºC	24.2-34.5ºC

Table 2. The temperature conditions of cage inside and outside in Indralaya district.

Daily temperature	Observation	Average temperature in cage inside	Average temperature in cage outside
June	First week (June 02 2017)	23.2-33.4ºC	23.8-33.9ºC
	Second week (June 09 2017)	22.6-29.8ºC	23.2-30.1ºC
	Third week (June 16 2017)	25.2-35.2ºC	25.8-35.4ºC
	Fourth week (June 23 2017)	23.4-33.2ºC	23.9-33.5ºC
	Fifth week (June 30 2017)	21.5-28.5ºC	22.1-29.6ºC
July	First week (July 07 2017)	24.1-28.4ºC	24.9-32.2ºC
	Second week (July 14 2017)	22.4-31.2ºC	22.8-31.5ºC
	Third week (July 21 2017)	25.2-38.4ºC	25.9-38.8ºC
	Fourth week (July 28 2017)	23.2-30.4ºC	23.8-30.7ºC
August	First week (August 03 2017)	24.1-28.4ºC	24.8-28.8ºC
	Second week (August 10 2017)	23.2-29.8ºC	24.1-30.4ºC
	Third week (August 17 2017)	22.4-29.2ºC	23.1-29.6ºC
	Fourth week (August 24 2017)	23.5-29.8ºC	24.0-30.1ºC
	Fifth week (August 31 2017)	22.9-29.3ºC	23.7-30.5ºC

Tabel 3. Soil pH, moisture and mineral content in Indralaya and Rambutan district.

Location	Parameter		Soil mineral content					
	pH	Humidity	C	N	K	Na	Ca	Mg
Rambutan	5.10	3.90	2.89	0.39	0.19	0.22	0.68	0.10
Indralaya	5.20	4.50	0.27	0.27	0.96	0.22	0.90	0.18

Table 4. Food vegetation composition at swamp buffalo habitat in Indralaya and Rambutan.

No	Family	Species	Local name	Attendance on transects							
				Rambutan				Indralaya			
				I	II	III	IV	V	VI	VII	VIII
1.	Fabaceae	*Aeschynomene sensitive*	Rumput Pete	-	-	-	-	+	-	-	+
2.	Graminae	*Andropogon ischaemum*	Rumput Pasir	+	-	+	+	-	-	-	-
3.	Graminae	*Brachiaria decumbens*	Kumpai Tembaga	-	+	+	-	-	-	-	-
4.	Graminae	*Brachiaria muticum*	Rumput Malela	-	-	-	-	-	+	-	+
5.	Graminae	*Digitaria sanguinalis*	Kumpai Bebulu	+	-	+	-	-	-	-	-
6.	Poaceae	*Echinochloa stagnina*	Rumput Burgu	+	-	-	+	-	-	-	-
7.	Cyperaceae	*Eleocharis dulcis*	Rumput Kasur	+	+	-	+	+	+	-	+
8.	Graminae	*Eleusine indica*	Rumput Belulang	-	+	-	+	+	-	+	-
9.	Cyperaceae	*Fimbristylis annua*	Alang Lebak	-	-	+	-	+	-	+	+
10.	Poaceae	*Hymenachne acutigluma*	Rumput Kumpai	+	-	-	+	-	-	-	-
11.	Graminae	*Imperata cylindrica*	Ilalang	-	-	+	-	-	-	-	-
12.	Poaceae	*Ischaemum rugosum*	Blemblem	+	-	-	+	-	-	-	-
13.	Cyperaceae	*Kyllinga brevifolia*	Rumput Teki	-	-	+	-	+	-	-	-
14.	Poaceae	*Leersia hexandra*	Rumput Banta	-	+	-	-	-	-	+	+
15.	Poaceae	*Pennisetum purpureum*	Rumput Gajah	-	-	-	-	-	+	-	+
16.	Graminae	*Oryza rupifogon*	Kumpai Padi	-	-	+	+	+	-	+	-
17.	Graminae	*Paspalum conjugatum*	Kumpai Minyak	+	+	+	-	-	-	-	-
18.	Poaceae	*Saccharum spontaneum*	Rumput Gelagah	-	+	-	-	-	-	-	-
Number of family / species				3/7	3/6	2/8	3/7	3/6	3/3	3/4	4/6

Eleocharis dulcis, Eleusine indica, Fimbristylis annua, Hymenachne acutigluma, Imperata cylindrica, Ischaemum rugosum, Kyllinga brevifolia, Leersia hexandra, Oryza rupifogon, Paspalum conjugatum, *Saccharum spontaneum* and Indralaya vegetation was consist of 9 species that includes *Aeschynomene sensitiva, Brachiaria muticum, Eleocharis dulcis, Eleusine indica, Fimbristylis annua, Kyllinga brevifolia, Leersia hexandra, Pennisetum purpureum* and *Oryza rupifogon.* Environmental conditions of swamp buffalo dominated by grasses belonging to the family of Cyperaceae, Graminae, Fabaceae and Poaceae as the main source of food.

Viewed from presence in Table 4, *Eleocharis dulcis, Eleusine indica, Fimbristylis annua*, and *Oryza rupifogon* has the highest presence in Rambutan and Indralaya Transects. This was indicated by presence *Eleocharis dulcis* at 6 research transects while *Eleusine indica, Fimbristylis annua*, and *Oryza rupifogon* found on 4 transects and the lowest attendance was *Imperata cylindrica* and *Saccharum spontaneum* founded only in 1 transects of the study. *Eleocharis dulcis* very much found on the plot as it suits its habitat. In addition, this species was very useful in erosion control in swamplands (Banner, 2011).

Important value (IV)

Based on Important Value (IV), *Eleocharis dulcis* was 33.32613% and *Paspalum conjugatum* with 32.94816% while the lowest important value was *Leersia hexandra* and *Imperata cylindrica* 5.223182% in Rambutan district and *Eleocharis dulcis* also dominates in Indralaya district with important value was 35.47451% and *Brachiaria muticum* 28.11162% while the lowest important value was *Aeschynomene sensitive* 13.67592% this indicates that *Eleocharis dulcis* and *Paspalum conjugatum* dominates and had important role in the habitat of swamp buffalo in Rambutan and Indralaya district. Index of diversity of feed species in Habitat Rambutan was 0.998167154 while for Indralaya was 2.679957417. Based on the benchmark value of the species diversity index, the level of diversity of feed in region was relatively low Rambutan namely 0<H' <1 while feed in the Indralaya region was moderate 2<H' <3 (Barbour *et al*., 1987).

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