The Effect of Using Some Kind of Manure on the Content of Dry Matter, Organic Matter and Crude Protein of Elephant Grass Cv. Taiwan (Pennisetum purpureum) on the First Harvest

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Abstract. This research aimed to determine the effect of different types of manure on dry matter content, organic matter and crude protein of elephant grass (Pennisetum purpureum) cv. Taiwan on the first harvest. This study used a completely randomized design, with 4 treatments and 4 replications for each treatment. The treatment were P1 = 100% acid soil (without manure/control), P2 = 80% acid soil + 20% cow manure, P3 = 80% acid soil + 20% goat manure, P4 = 80% acid soil + 20% of poultry manure. The best results on this researched obtained the highest dry matter content of elephant grass was P2 (16.07), organic matter on P2 (86.36), and the highest crude protein was P3 (14.12). It can be concluded that the using of different manure on the elephant grass (Pennisetum purpureum) cv. Taiwan has a highly significant effect (P <0.01) on dry matter content, and has a significant effect (P <0.05) on the content of organic matter and crude protein of elephant grass (Pennisetum purpureum) cv. Taiwan at the first harvest.

1. Introduction
The Forage was very important role because of it contains almost all substances needed by livestock such as carbohydrates, fats, proteins, vitamins, and water in large enough quantities. Grass is one of the forages which has an important role for ruminants. One of the most potential grasses and often given grasses for ruminants is elephant grass (Pennisetum purpureum) cv. Taiwan. This grass is one of the superior types of grass that is highly favoured by cattle. Derived from the Taiwan region and first planted in Indonesia at the Livestock Embryo Hall (BET) in Cipelang-Bogor, West Java. This grass has soft and smooth leaf texture, the stems are not hard and have short sections, many tillers, and have strong roots and have fine hairs on leaves and stems. The Elephant grass production cv. Taiwan reaches 500-800 tons / ha / year [1]. This grass has a strong and long root system and can grow upright to form a clump with a height that can reach 1.8 to 3.6 meters. The nutrient content of elephant grass consists of: 19.9% dry matter; 10.2% crude protein; 34.2% crude fibre; 11.7% ash; and 1.6% fat [2]

The first harvest was done after the plants are 50-60 days old, after the plant reaches ±1 meter (60 - 90 cm) if it has reached 50-60 days it must be forced to cut with the intention of growing new tillers. The next harvest be done every 40 days in the rainy season and every 60 days in the dry season, with a cutting height of 10-15 cm from the soil. The optimal cutting is better done if the plant reaches ±1 meter high [3]. The problem of providing quality and sustainable forage were fertile or productive soils for growing livestock forage, because of the use of productive land is used for high economic value crops. One solution to overcome this problem is the use of marginal or less productive lands with the provision of nutrients needed by plants by fertilizing in accordance with the needs of plants [4], for to
get the high production on low fertility land, it could be done by using organic fertilizer. Provision of nutrients, especially nitrogen (N), phosphorus (P), and potassium (K) in the soil optimally for plants can increase crop production [5]. The fertilizer was an effort to stimulate growth and maintain high production. [6] The poultry Manure has a greater nitrogen (N) content than other types of livestock, the cause was that solid waste in poultry be mixed with liquid droppings, and generally nitrogen (N), in urine was always higher than solid faeces. Nutrient content in chicken manure was 1.00% N; 0.80% P; 0.40% K. [7]. Goat Manure was consist of 67% solid and 33% liquid material, the elemental composition of the ingredients was 0.95% N; 0.35% P2O5; and 1.00% K2O. Goat faeces content 40-50% dry matter and nitrogen 1.2-2.1. Water content of 64%, organic matter 31%, N - 0.7%, P2O5 0.4%, K2O 0.25%. The Nutrients of cow fesses were 80% water content, 16% organic matter, 0.3% N, 0.2% P2O5, 0.15% K2O. [8].

This research aimed to determine the effect of several types of manure on dry matter, organic matter, and crude protein of elephant grass (*Pennisetum purpureum*) cv. Taiwan at the first harvest.

2. Materials and Methods

This research was conducted in a green house with a size of 10 x 3 M with a flat land location. Green house land was tightly closed free from weeds and other disturbing plants. The main ingredients used in this research were:

Elephant grass cv. Taiwan as many as 16 cuttings, manure from cow as much as 8 kg, Manure of goat drop as much as 8 kg, manure from broiler manure as much as 8 kg, acid soil (pH 4.3) as much as 136 kg. The soil was weighed according to treatment, then the soil and manure were mixed base on the treatments to homogenize the soil and manure, then put into each polybag, and incubated for 3 days before planting, then the polybag was arranged in a greenhouse at a distance at 50 x 50 cm. Planting was carried out 3 days after incubation, cuttings were planted 1 cut / polybag. After planting cuttings the soil was pressed tightly against the cuttings so as not to fall easily and not dry so that the prospective root could easily contact with land. Harvesting was done 60 days after planting by cutting the grass 5 cm from the ground. The grass be dried and then finely chopped and then put into an oven of 60oC, then finely ground and stored in a closed container. Ready to be analysed on the laboratory.

The method used in this study was an experimental method using a completely randomized design with 4 treatments and 4 replications for each treatment. The treatments were:

- **P1** = 100% acid soil (without feed / control)
- **P2** = 80% acid soil + 20% manure of cow
- **P3** = 80% of acid soil + 20% manure of goat
- **P4** = 80% acid soil + 20% manure of chicken

The difference between the middle values of the treatment was done by testing with DNMRT (Duncan's New Multiple Range Test) [9].

The parameters measured in this study were: the content of Dry matter, organic matter, and crude protein.

3. Result and Discussions

The average of dry matter, organic matter, and crude protein content of Elephant Grass (*Pennisetum purpureum*) Cv. Taiwan at first harvest on Table 1.

The analysis of statistical showed that the dry material of elephant grass (*Pennisetum purpureum*) cv Taiwan which was given different manure gave a very significant different effect (P <0.01) on dry matter. Further testing with DNMRT showed that the using of manure on Elephant Grass was different effect from than control treatment of dry matter content. The best results in this treatment are found on goat manure. According [10] factors affecting plant nutrient content are plant species and soil fertility. Besides that, the type of soil used was soil that has acidic pH (pH) around 4.3. To increase fertility from acid soils can be done by fertilizing. Using manure (cows, goats and chickens) could give effect to acid soils. [11], the nutrient content N of manure of cow 0.3%, goat 0.7%, and chicken 1.5%. The results obtained in this research were still low compared with [12], study using N, P and K fertilizers, which is 24.56%. This was because the levels of N, P and K from manure were still low.
Table 1. The average Content of Dry matter, organic matter, and crude protein of Elephant Grass (Pennisetum purpureum) Cv. Taiwan at first harvest (%)

| Treatments | dry matter | organic matter | crude protein |
|------------|------------|----------------|---------------|
| P0         | 12.25b     | 68.89b         | 7.38b         |
| P1         | 15.71a     | 84.23a         | 10.17a        |
| P2         | 16.07a     | 86.36a         | 11.22a        |
| P3         | 15.93a     | 84.35a         | 14.12a        |
| SE         | 0.48       | 4.12           | 1.30          |

Note: P0 = Control, P1 = 80% acid soil + 20% manure of cow, P2 = 80% of acid soil + 20% manure of Goat, P3 = 80% acid soil + 20% manure of chicken.  a-c= Significant differences between the Cells (p<0.01),

Based on Table 1. It could be seen that the treatment had a significant effect (P <0.05) on the organic matter of elephant grass (Pennisetum purpureum) cv. Taiwan at the first harvest. This was due to the addition of manure (cows, goats and chickens) could contribute to the N content of the soil which was important for growth, where N was the most accumulated element in organic matter because it was an important element in microbial cells involved in the process of organic matter reform soil. The low organic matter content in treatment P0 (68.89%) was influenced by soil acidity and nutrient content which was unable to give effect to growth on plants. In accordance statement of [12], N was the most accumulated element in organic matter because it was an important element in microbial cells involved in the process of overhauling soil organic matter. Organic material is produced by plants through photosynthesis so that the carbon element is the main constituent of the organic material. Different effect (P> 0.05) organic matter between treatments using manure, this could be caused by manure (Goat, Cattle and Chicken) can provide organic material in soil media. [13] Stated that the using of organic fertilizer has a positive effect on nutrient content and production of forage dry matter. An increasing in the content of organic matter in the soil could provide nitrogen, pospor, and improved soil structure which has an impact on forage production. The high organic matter content in P2 (86.36) treatment in this research could be due to the high influence of N availability in the soil. The results obtained in this study are almost close to the opinion of states [10] that the organic matter of elephant grass (Pennisetum purpureum) cv. Taiwan contains organic materials ranging from 84.20 to 89.90%.

The treatment had a significant effect (P <0.05) on the crude protein content of elephant grass (Pennisetum purpureum) cv. Taiwan at the first harvest. This was due to the provision of manure (cattle, goats and chickens) contributing nutrients to the soil so that it could increase the crude protein content of plants. Table 1 shown the highest content of crude protein obtained from chicken manure. [15] Chicken manure could improve the physical and chemical properties of soil so that the soil becomes loose. The provision of manure tends to increase crude protein content compared to treatment without fertilization. This was consistent with [14] the addition of fertilizer has an effect on the crude protein content of plants.

4. Conclusion
Based on the results of this research can be conclude that using the manure of cow, goat, and chicken had the significant different effect than control on dry matter content, organic matter and crude protein content of elephant grass (Pennisetum purpureum) cv. Taiwan at the first harvest.

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