Effect of Grass Growth *Pennisetum purpereum* Cv. Mott Uses Cattle Manure

Syamsuddin Syamsuddin[1*], Natsir Sandiah[1], La Ode Muh. Munadi[1], Muhammad Ulaasa[1]

[1]*Faculty of Animal Husbandry, Halu Oleo University*
Jl. H. E. A. Mokodompit, Kampus Hijau Bumi Tridharma Anduonohu, Kendari City, Southeast Sulawesi
[*]*Corresponding author. Email: syamsuddin7514@uho.ac.id*

ABSTRACT
The study aims to determine the effect of cow manure feeding at different levels on the growth of grass *Pennisetum purpereum cv.* Mott as fodder. The study used a randomized group design method (GDM) with 4 treatments and 5 replays which were then maintained for 60 days. The treatment applied, namely P0 (Without the use of manure), P1 (Use of Fertilizer 4.5 kg), P2 (Use of Fertilizer 9 kg), P3 (Use of Fertilizer 13.5 kg). The observation data were analyzed using fingerprint analysis and Duncan test, to see the best influence of cow manure feeding at different levels on the growth of *Pennisetum purpereum cv.* Mott. The results showed that the treatment did not have a real influence (P>0.05) on the height of the plant, the diameter of the stem, the number of saplings, and the number of leaves.

Keywords: *Pennisetum purpereum cv. Mott, Manure, Animal Feed.*

1. INTRODUCTION

Forage is a determining factor in the success of the development of farms, especially ruminants such as cows and goats. The availability of forage is not adequate both in quantity and quality, becoming an obstacle to the development of livestock businesses. So, it needs efforts to provide good forage and can be guaranteed continuity, one of these efforts is the cultivation of forage fodder. Forage potential feed as ruminant fodder is *Pennisetum purpereum* cv. Mott [1]. *Pennisetum purpereum cv.* Mott is the superior grass of Filipina, has a production of up to 60 tons/ha/ harvest [2]. Produces a lot of saplings, strong rooting, stems are not hard stem segments are many as well as the structure of the leaves are not hairy so favored by ruminant livestock [3], [1].

Pennisetum purpereum cv. Mott is expected to be a forage availability solution. *Pennisetum purpereum cv.* Mott is a superior type of grass with high productivity and nutritional value, has high palatability for ruminants. This plant can grow in various places, tolerant of shade, respond to fertilization, as well as high soil fertility rates [4]. *Pennisetum purpereum cv. Mott* grows sized with fiber rooting, producing saplings when trimmed regularly [5]. Livestock forage cultivation is often constrained on less fertile land, because fertile land is usually used for crops that have high economic value, this becomes an obstacle in the provision of forage for ruminant livestock [6]. The solution to deal with the provision of forage land fodder is to use less productive land with the addition of nutrients needed by plants such as organic fertilizer [7], [8].

The use of organic fertilizers can maintain the physical properties of soil chemistry and biology that can increase nutrients in the soil [9]. Organic fertilizer has a function in the physical, chemical and biological properties of the soil, so that the soil can provide nutrients in a balanced amount [10]. Increase the production and nutrition of *Pennisetum purpereum cv.* Mott needed nutrients for its growth. The provision of nutrients can be done by fertilizing, either inorganic or organic fertilizers [11]. Organic fertilizer comes from the material of living things that have died, in the form of animal manure, plant remains, and various products of living organisms. Based on these introductions, research needs to be done to determine the growth of

Pennisetum purpereum cv. Mott was given a different dose of cow manure.

2. MATERIALS AND METHODS

The research was conducted in January-March 2021. Planting and harvest of *Pennisetum purpereum* cv. Mott was conducted in the Agrostology laboratory of the Faculty of Animal Husbandry, Halu Oleo University. The seeds of the experiment are 15 cm long. The soil used is dry textured. The fertilizer used in experiments is cattle manure. The nutrient contents are N (1.390%), P_2O_5 (1.890%), K (3.081%), and organic C (13.747%). The research was prepared based on a randomized group design (RGD), consisting of 4 treatments in which each treatment consisted of 5 repetitions with a tile size of 3x3 cm^2. The treatment observed is P0: control, P1: Fertilizer dose 5 Ton/ha (4.5 kg/plot), P2: Fertilizer dose 10 Ton/ha (9 kg/plot), and P3: Fertilizer dose 15 Ton/ha (13.5 kg/plot).

Research variables include plant height, stem diameter, tiller number, and leaf number on *Pennisetum purpereum cv* Mott. The data obtained is analyzed with fingerprints, if different real or very real Duncan distance test conducted [29].

3. RESULTS AND DISCUSSION

The results of the study influence of manure administration are different from the growth of *Pennisetum purpereum cv.* Mott to plant height, stem diameter, number of saplings, and number of leaves is presented in Table 1.

3.1 Plant Height

Plant height is a parameter used in knowing the vegetative growth of plants. The results of the analysis showed that the administration of fertilizers with different doses had no noticeable effect (P>0.05) on the height of the plant *Pennisetum purpereum cv*. Mott and fertilizer at different levels give the same effect on the height of plants. Average high plant *Pennisetum purpereum cv*. Mott ranges from 41.26-56.61 cm. The average height of plants tends to be higher by providing higher levels of fertilizer, but statistics shows that the treatment of fertilizer in this study has no real effect on the height of plants. Treatment of cow feces fertilizer in *Pennisetum purpereum cv.* Mott shows a higher height of 74.02 cm [12]. The difference in plant height is thought to be due to the location of the study having a different nutrient content. Based on the results of soil analysis at the research site showed that the low nitrogen content in the soil is 0.18% and the content of C-Organic in the soil is 1.60%. The normal nitrogen content of the soil is between 0.20%-0.30% and C-Organic ranges from 2.1%-3.0% [13]. If a fertilizer contains a little nutrient then plants that need a lot of nutrients will not maximize their growth [14]. Fertilizer is a material given to improve soil fertility and replace nutrients lost from the soil [15].

3.2 Stem Diameter

The diameter of the stem is a dimension of plants that is easy to measure, especially on the part of plants. The results of the analysis of variety suggest that the administration of fertilizer with different doses has no noticeable effect (P>0.05) on the diameter of the stem *Pennisetum purpereum cv*. Mott. The average diameter of the stem ranges from 10.45 mm – 12.88 mm and all treatments on the *Pennisetum purpereum cv.* Mott gave the same response. Diameter in plants is strongly influenced by the availability of nutrients found in the soil [16]. The rate of cell division and tissue formation runs fast, the growth of stems, leaves, and roots will also run quickly, when there is good availability of nutrients in the soil [12],[17]. If the fertilizer contains a small amount of nutrients, it will cause not maximum growth. Soil is a growing medium and factors that can affect the growth and development of feed plants [18].

3.3 Leaf Number

Leaves are an important organ for plants because it is the place where the process of photosynthesis occurs for the nutritional needs of plants. Gift of fertilizer at different doses has no noticeable effect (P>0.05) on the number of leaves *Pennisetum purpereum cv.* Mott. The average number of leaves obtained was 32.06-49.26. However, for all treatments the average number of leaves in P2 (49.26) showed good growth in comparison to other treatments. The number of leaves is closely related to the height of the plant, the higher the plant, the more leaves are formed.

Fertilizer administration containing high Nitrogen serves to spur the process of forming leaves *Pennisetum purpereum* cv. Mott. Because Nitrogen is a nutrient forming amino acids and proteins as the basic

Table 1. The average height of plants, stem diameter, leaf number, and tiller number *Pennisetum purpereum* cv. Mott with manure with different doses.

Treatment	Research Variables			
	Plant Height (cm)	Stem Diameter (mm)	Leaf Number	Tiller Number
P0 (No Fertilizer)	41.26±8.64	10.45±1.84	32.06±9.44	6.81±1.30
P1 (5 Ton/ha)	48.43±4.31	11.00±0.42	43.46±4.83	9.33±1.97
P2 (10 Ton/ha)	52.17±6.51	12.37±1.35	49.26±8.04	9.42±0.90
P3 (15 Ton/ha)	56.61±7.42	12.88±1.41	48.47±6.50	10.36±1.70

ingredients of plants in the preparation of leaves [19]. This is thought to be due to the higher content of nutrients in the form of Nitrogen and able to be absorbed well and meet the needs of nutrients needed *pennisetum purpereum* cv. Mott. Nitrogen (N) is the main nutrient for plant growth for the formation and growth of vegetative parts of plants [20]. Sufficient amounts of nitrogen, accelerating the growth of stems and leaves [8]. The increase in the number of leaves is also related to the increase in stem diameter due to the presence of the hormones *auxin*, *gibberellin*, and *cytoconin* active in the process of photosynthesis [21]. Thus, it is easy to absorb food for stem growth and followed by the growth of leaf buds [22]. The amount of growth percentage is highly dependent on the availability of nutrients in the soil [23].

3.4 Tiller Number

Giving organic fertilizer is very good because organic fertilizer will improve the structure of the soil and increase the number of pores in the soil so as to make it easier for new shoots to grow through the surface of the soil [25],[26]. The formation of plant saplings will increase along with the addition of organic matter in the form of nutrients. In the vegetative growth phase plants need nutrients for meristem tissue builders, especially C and N [27]. The availability of nutrients in the soil will result in better growth, so that the absorption of nutrients will also be more and meet the needs of plants [28]. In addition, different manure level factors greatly affect the development of the number of samples. The more fertilizer will be given the more the number of saplings that grow on the grass *Pennisetum purpereum* cv. Mott.

4. CONCLUSION

Saplings in plants are new parts that grow above ground level. The results of various analyses showed that fertilizer administration at different doses had no real effect (P>0.05) on the number of grass plants *Pennisetum purpereum cv.* Mott. The average amount of growth in the number of saplings ranges from 6.81-10.36. Average number of saplings lower 3.58-4.97 [24]. This indicates that the number of saplings is influenced by nutrients in the soil.

Based on the results of research on the provision of cow manure at different levels to the growth of grass *Pennisetum purpereum* cv. Mott, has no noticeable effect on plant height, stem diameter, number of leaves, and number of saples in each treatment.

REFERENCES

[1] U. Boonmeerati And P. Sampanpanish. Enhancing Arsenic Phytoextraction Of Dwarf Napier Grass (*Pennisetum Purpureum* Cv. Mott) From Gold Mine Tailings By Electrokinetics Remediation With Phosphate And Edta. *Journal Of Hazardous, Toxic, And Radioactive Waste*. Vol. 25 No. 4 p. 153-161. 2021, Doi: 10.1061/(Asce)Hz.2153-5515.0000633.

[2] N. Zaini, N. Umami, C. Hanim, A. Astuti, And B. Suwignyo. Growth And Biomass Production Of Chicory (*Cichorium Intybus L*) Planted In Intercropping System With *Pennisetum Purpureum cv.* Mott And Cut At Different Ages. *Iop Conf. Ser. Earth Environ. Sci.*, Vol. 667, No. 1, P. 012012, Feb. 2021, Doi: 10.1088/1755-1315/667/1/012012.

[3] J. P. Keliat, N. N. C. Kusumawati, And A. A. A. S. Trisnadewi. Elephant Grass Growth And Yield (*Pennisetum Purpureum cv.* Taiwan) Who Is Given Kascing Fertilizer With Different Doses. *Pastura*, Vol. 10 No. 2 p. 91–96. 2021, Doi: 10.24843/Pastura.2021.V10.I02.P06.

[4] L. Noralita, N. M. Witariadi, And I. W. Wirawan. Mini Elephant Grass Growth And Yield (*Pennisetum Purpureum cv.* Mott) On Types And Doses of Manure. *Pastura*, Vol. 10 No. 1 p. 32–36. 2020, Doi: 10.24843/Pastura.2020.V10.I01.P08.

[5] A. Kowitwiwat And P. Sampanpanish. Phytostabilization Of Arsenic And Manganese In Mine Tailings Using *Pennisetum Purpureum cv.* Mott Supplemented With Cow Manure And Acacia Wood-Derived Biochar. *Heliyon*, Vol. 6 No. 7 p. 1–10, 2020, Doi: 10.1016/J.Heliyon.2020.E04552.

[6] S. Bahar, A. Saenab, And N. R. Sodular. Growth Of Odot Grass (*Pennisetum Purpureum cv.* Mott) On Sandy Marginal Land On Payung Island Kepulauan Seribu Jakarta. Vol. 2 No. 1 p. 1–5. 2020, Doi: 10.31605/Jstp.V2i1.837.

[7] F. Akhsan, Sukriandi, A. F. K. Amris, And M. Irmansyah. Effect of Liquid Organic Fertilizer With Different Urine And Mole Concentrations On Mini Elephant Grass Production (*Pennisetum Purpureum cv.* Mott). *Journal of Animal Husbandry Science and Technology*, Vol. 2 No. 1 p. 13–18. 2020, Doi: 10.31605/Jstp.V2i1.815.

[8] A. P. Wicaksono, J. T. Ibrahim, And A. Bakhtiar. Farming Analysis Of Grass Odot (*Pennisetum Purpureum cv.* Mott) In Village Of Medowo, Sub District Of Kandangan, Ditrict Of Kediri. *Jurnal Agribest*, Vol. 3 No. 2 Art. No. 2 p. 96-100. 2019, Doi: 10.32528/Agribest.V3i2.2322.

[9] D. Sarwanto And S. E. Tuswati. Introduction Of Dwarf Elephant Grass (*Pennisetum Purpureum cv.* Mott) And Annual Legumes In The Disused Limestone Mining In Karst Gombong Area, Central Java, Indonesia. *Buletin Peternakan*, Vol. 42 No. 1 p. 57-61. 2018, Doi: 10.21059/Buletinpeternak.V42i1.28734.

[10] V. P. Desy, N. D. Hanafi, T. H. Wahyuni, And A. Sadeli. Preservation Technique Of Dwarf Elephant Grass Cuttings (*Pennisetum Purpureum cv.* Mott). *Indonesian Journal Of Agricultural Research*, Vol. 1 No. 3 p. 211-217. 2018, Doi: 10.32734/Injar.V1i3.494.

[11] R. Mappanganro, K. Kiramang, And M. D. Kurniawan. Administration of Liquid Organic Fertilizer (Cow Urine) Against High *Pennisetum Purpureum cv.* Mott. *Journal of Animal Husbandry Science and Industry*, Vol. 4 No. 1 p. 23-31. 2019, Doi: 10.24252/Jiip.V4i1.9815.

[12] W. A. Sulaiman, D. Dwatmadji, And T. Suteky. Effect of Cow Feces Fertilizer With Different Doses On Growth And Production of Odot Grass (*Pennisetum Purpureum cv.* Mott) In Kepahiang Regency. *Journal Sain Peternakan Indonesia*, Vol. 13 No. 4 p. 365-376. 2018, Doi: 10.31186/Jspi.Id.13.4.365-376.

[13] J. S. Marassing, N. Bawole, F. Dompas, And W. B. Kaunang. Production And Quality of Dwarf Elephant Grass (*Pennisetum Purpureum cv.* Mott) Fermented Organic Fertilizer EM4. *ZOOTEC*, Vol. 32 No. 5 p. 23-31. 2017, Doi: 10.35792/Zot.32.5.2013.990.

[14] D. Sarwanto And S. E. Tuswati. Pertumbuhan Rumput Gajah Mini (*Pennisetum Purpureum cv. Mott*) Di Lahan Terbuka Bekas Penambangan Batu Kapur Kawasan Karst Gombong Jawa Tengah. *Majalah Ilmiah Biologi Biosfera: A Scientific Journal*, Vol. 34 No. 3 p. 131-137. 2017, Doi: 10.20884/1.Mib.2017.34.3.502.

[15] D. Lestari, N. Opi Ari Kustanti, And E. M. Moeis. Perbedaan Jarak Tanam Terhadap Produktivitas Ratoon Rumput Gajah (*Pennisetum Purpureum cv.* Mott). *Aves: Jurnal Ilmu Peternakan*, Vol. 12 No. 2 p. 1-9. 2018, Doi: 10.35457/Aves.V12i2.1504.

[16] M. L. Ressie, M. L. Mullik, And T. D. Dato. Effect of Fertilization And Watering Interval on Growth And Production of Odot Elephant Grass (*Pennisetum Purpereum cv.* Mott). *Jspi.Id*, Vol. 13 No. 2 p. 182–188. 2018, Doi: 10.31186/Jspi.Id.13.2.182-188.

[17] Y. Yahya, T. Tamrin, And S. Triyono. Biogas Production From a Mixture of Chicken Manure, Cow Manure, And Mini Elephant Grass (*Pennisetum Purpureum cv.* Mott) With Batch System. *Journal Of Agricultural Engineering*, Vol. 6 No. 3 p. 151-160. 2018, Doi: 10.23960/Jtep-L.V6i3.151-160.

[18] C. D. Araujo, M. Y. Un, B. B. Koten, M. D. S. Randu, And R. Wea. Odot Grass Growth And Production (*Pennisetum Purpureum cv.* Mott) Pada Tanah Entisol Di Lahan Kering Akibat Pemberian Pupuk Organik Cair Berbahan Feses Babi Dengan Volume Air Berbeda. *Jurnal Ilmu Peternakan Terapan*, Vol. 3 No. 1 p. 6-13. 2019, Doi: 10.25047/Jipt.V3i1.1902.

[19] T. P. Daru, O. F. Kurniadinata, And Y. N. Patandean. Effect of Manure Dosage And Planting Distance on Mini Elephant Grass Production (*Pennisetum Purpureum cv.* Mott). *Journal of Integrated Agriculture*, Vol. 7 No. 1 p. 38-46, 2019, Doi: 10.36084/Jpt..V7i1.181.

[20] N. I. Kaca, I. G. Sutapa, L. Suariani, Y. Tonga, N. M. Yudiastari, And N. K. E. Suwitari. Production And Quality of Mini Elephant Grass (*Pennisetum Purpureum cv.* Mott) Planted In Mixed Grass And Legume Crops At First Cutting. *Pastura*, Vol. 6 No. 2 p. 78–84. 2019, Doi: 10.24843/Pastura.2017.V06.I02.P08.

[21] E. H. Dumadi, L. Abdullah, And H. Sukria. Quality of Elephant Grass Forage (*Pennisetum Purpureum*) Different Types of Growth: Quantitative Review. *Journal of Nutrition Science and Feed Technology*, Vol. 19 No. 1 p. 6-13. 2021, Doi: 10.29244/Jintp.19.1.6-13.

[22] P. W. A. A. Putra, A. P. I. G. B. Parwata, W. I. Wirawan, N. L. G. Sumardani, And I. W. Suberata. Elephant Grass Response (*Pennisetum Purpureum* Schumach) Against The Application of Urea Fertilizer, Chicken Manure, And Cow Manure as a Source of Nitrogen (N). *Scientific Magazine Of Animal Husbandry*, Vol. 17 No. 2 p. 41-45. 2014, Doi: 10.24843/Mip.2014.V17.I02.P01.

[23] S. M. Sada, B. B. Koten, B. Ndoen, A. Paga, P. Toe, R. Wea, And Ariyanto. Effect of Time Interval of Liquid Organic Fertilizer Made from Keong Mas Raw On Growth and Production of Forage *Pennisetum Purpureum cv.* Mott. *Journal of Scientific Innovation*, Vol. 18 No. 1 p. 42-47. 2018, Doi: 10.25047/Jii.V18i1.846.

[24] J. Daryatmo, W. W. Mubarokah, And B. Budiyanto. Effect of Urea Fertilizer on Odot Grass Production and Growth (*Pennisetum Purpureum cv*. Mott). *Journal Of Tropical Animal And Veterinary Science*, Vol. 9 No. 2 p. 62-66. 2019, Doi: 10.30862/Jipvet.V9i2.63.

[25] A. P. Prayogo, N. D. Hanafi, And Hamdan. Elephant Grass Production (*Pennisetum Purpureum*) By Giving Liquid Organic Fertilizer Fermented Cow Rumen Waste. *Jurnal Pertanian Tropik*, Vol. 5 No. 2 p. 199-206. 2018, Doi: 10.32734/Jpt.V5i2.2992.

[26] N. V. F. Sigar, D. A. Kaligis, W. B. Kaunang, And S. S. Malalantang. Effect of N-P-K Fertilizer On Dry Materials And Grass Coarse Protein Brachiaria Humidicola Cv. Tully and *Pennisetum Purpureum cv.* Mott. *ZOOTEC*, Vol.

34 No. 2 p. 109-113. 2014, Doi: 10.35792/Zot.34.2.2014.5533.

[27] R. Lal. Soil Carbon Sequestration Impacts On Global Climate Change And Food Security. *Science*, Vol. 304 No. 5677 p. 1623–1627. 2004, Doi: 10.1126/Science.1097396.

[28] C. N. N. Kusumawati, A. A. A. S Trisnawati, And N. W. Siti. Growth And Results Stylosanthes Guyanensis Cv Ciat 184 On Entisol And Inceptisol Soil Given Organic Fertilizer Kascing. *Scientific Magazine Of Animal Husbandry*, Vol. 17 No. 2 p. 91-96. 2014, Doi: 10.24843/Mip.2014.V17.I02.P02.

[29] Steel, R. G. dan Torrie, J. H. 1993. Principles and Procedur of Statistic. Mc. Graw. Hill Book Company, New York.