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Performance of Elephant Grass cv. Odot (*Pennisetum purpureum* cv. Mott) and Sweet Potato (*Ipomoea batatas* L.) Cultivated as Mixed Cropping

Penampilan Kinerja Rumput Gajah Odot (*Pennisetum purpureum* cv. Mott) dan Ubi Jalar (*Ipomoea batatas* L.) Dibudidayakan sebagai Tanaman Campuran

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ABSTRACT

Elephant grass cv. Odot is one of the potential forage plants for livestock, especially ruminants. Meanwhile, sweet potato is an alternative food source. The two plants have different characteristics so that both may be cultivated in an intercropping system. The study was aimed to evaluate the effect of spacing of Odot elephant grass (Pennisetum purpureum cv. Mott) and variety of sweet potato (Ipomoea batatas L.) on the growth and yield of these two plants in a mixed cropping system. A randomized block design in a 2 × 4 factorial pattern with 3 replications was used in the study. The first factor was spacing of Odot elephant grass consisted of J1: 60 × 90 cm and J2: 45 x 90 cm. The second factor was several varieties of sweet potato, namely V1: Pating-1, V2: Beta-2, V3: Kidal and V4: Papua Solossa. Parameters observed were plant height, dry matter production, crude protein and crude fiber content of Odot elephant grass, as well as production of tubers, dry matter (DM) of leaves, crude protein (CP), crude fiber(CF) and brix content of sweet potato. The results showed that there was no significant effect of Odot elephant grass spacing on all parameters studied except plant height on the 5^{th} week of observation. Meanwhile, there was a significant effect on all parameters observed due to the treatment of sweet potato varieties. It was concluded that Odot elephant grass may be mixed with various sweet potato varieties such as Pating-1, Beta-2, Kidal and Papua Solossa, especially if there were no pests attacking the Odot elephant grass at the beginning of its growth. Further research with a more varied spacing of Odot elephant grass spacing is highly recommended.

***Keywords**: agricultural by-products; alternative feed; crude fiber (CF); crude protein (CP); forage crops*

ABSTRAK

Rumput gajah cv. Odot merupakan salah satu tanaman hijauan yang potensial bagi ternak khususnya ruminansia. Sedangkan, ubi jalar merupakan sumber pangan alternatif. Kedua tanaman memiliki karakteristik berbeda sehingga keduanya dapat dibudidayakan dalam sistem tumpangsari. Penelitian bertujuan untuk mengevaluasi pengaruh jarak tanam rumput gajah Odot (*Pennisetum purpureum* cv. Mott) dan varietas ubi jalar (*Ipomoea batatas* L.) terhadap pertumbuhan dan hasil kedua tanaman pada sistem tanam campuran. Rancangan acak kelompok pola faktorial 2 × 4 dengan 3 ulangan digunakan dalam penelitian. Faktor pertama adalah jarak tanam rumput gajah Odot terdiri dari J1:60 × 90 cm dan J2: 45 x 90 cm. Faktor kedua adalah beberapa varietas ubi jalar yaitu V1: Pating-1, V2: Beta-2, V3: Kidal dan V4: Papua Solossa. Parameter yang diamati adalah tinggi tanaman, produksi bahan kering, kandungan protein kasar (PK) dan serat kasar (SK) rumput gajah Odot, serta produksi umbi, bahan kering (BK) daun, protein kasar, serat kasar dan kadar brix ubi jalar. Hasil penelitian menunjukkan bahwa tidak terdapat pengaruh nyata jarak tanam rumput gajah Odot terhadap semua parameter yang diteliti

kecuali tinggi tanaman pada minggu ke-5 pengamatan. Terdapat pengaruh nyata pada semua parameter yang diamati akibat perlakuan varietas ubi jalar. Tidak ada pengaruh interaksi kedua perlakuan terhadap semua parameter yang diamati. Disimpulkan bahwa rumput gajah Odot dapat dicampur tanam dengan berbagai varietas ubi jalar seperti Pating-1, Beta-2, Kidal dan Papua Solossa, terutama jika tidak ada hama yang menyerang rumput gajah Odot pada awal pertumbuhannya. Penelitian lebih lanjut dengan jarak tanam rumput gajah Odot yang lebih bervariasi sangat disarankan.

Kata kunci: hasil samping pertanian; pakan alternatif; protein kasar (PK); serat kasar (SK) ; tanaman pakan

INTRODUCTION

Mixed cropping systems between food and feed crops have been widely practicing mostly in developing countries, although it has several problems such as competition for sunlight and nutrients by different types of crops that were cultivated on land simultaneously (Hairiah et al., 2003). However, most mixed crops yield resulted higher performance than monocultures. Gebru (2015) reviewed that the intercropping planting system has advantages over monoculture cropping systems such as stabilizing yields, efficient resources, reducing weeds, and efficient use of fertilizers. *Panicum maximum* showed the highest total dry matter (DM) yield in mixed crops of *P. maximum* and *S. grandiflora* cultivated on medium saline soil with the application of 20 tons/ha of manure (Kusmiyati et al., 2016). Food crops such as peanuts have been applied to a mixed cropping system with Odot elephant grass (Rahayu et al., 2021; Sarwanto and Tuswati 2017), but little information about sweet potato cultivation with Odot elephant grass as mixed cropping was found.

Elephant grass odot (*P. purpureum* cv. Mott) is a fodder plant that has advantages over its parent, elephant grass, such as growing not too tall, weak leaves, short strands, fine leaf hair, fast growth with high leaves/stem ratio and more palatable to livestock (Kusdiana et al., 2017). In good practice management with the application of organic fertilizer up to 20 tons/ha Odot elephant grass reached 125.4 cm in height, 3.1 cm in leaf width and 25.4 number of tillers, respectively (Marassing et al., 2013), produced 32.9-46.4 tons forage/ha/defoliation (Ressie et al., 2018; Kaca et al., 2017).

Odot elephant grass contains 10-15% crude protein (CP), 13.6% dry matter (DM), 85.6% organic matter (OM), and 3,957 kcal/g energy (Sirait, 2017). Under a monoculture cropping system using a spacing of 50×100 cm it provides good growth and development (Daru et al., 2019; Tshering dan Penjor, 2016). The spacing of Odot elephant grass respectively 60cm×60 cm, 70cm×70cm, 80cm×80cm, 90 cm×90cm and 100cm×100cm had no significant effect on fresh weight (FW) but was significant effect on plant height (Kusdiana et al., 2017). In addition, Odot elephant grass at mixed cropping with *Centrosema pubescent* and *Calopogonium muconoides* showed higher CP content than it was monoculture-cultivated (Kaca et al., 2017). In a mixed cropping system between Odot elephant grass and peanuts with various distance planting and planting times of Odot elephant grass the yield of Odot elephant grass was not significantly affected by both treatments (Rahayu et al., 2021).

Crude protein is an important component and therefore often used as an indicator in determining the quality of forage feeds (Pinkerton 2005). The quality of Odot elephant grass was also determined by the defoliation interval. Odot elephant grass that was defoliated at intervals of 45, 60 and 75 days had CP content of 25.5, 18.7 and 11.5%, consecutively, while CF content was 20.1, 22.6 and 25.6%, respectively (Kamaruddin et al., 2018).

Sweet potato is a plant source of high energy food, containing antioxidants and vitamins as vitamin A. The high energy content of sweet potato in the form of carbohydrates varies greatly depending on

the variety ranging from 27.9-40.0% with a water content of 68.5% (Nintani and Rusanti, 2012; Hardoko et al., 2010). Sweet potato leaves as a by-product may be used as alternative feeds, especially for ruminants (Indawan et al., 2020; Thiasari et al., 2020; Baba et al., 2018; Scott 1992). Thiasari et al. (2020) found that the increasing of the pruning intervals of sweet potato increased CF content of sweet potato leaves significantly, and vice versa, decreased the CP content.

Sweet potato production in Indonesia fluctuates between 2.3-2.4 million tons, where the decline in production was caused by a decrease in cultivated area (Research Institute for Nuts and Tubers, 2016). Recently, many high yielding varieties of sweet potato have been released including Pating-1, Beta-2, Kidal, and Papua Solosa. These varieties have an average growth period of 4-5 months with production ranged between 30-37 tons/ha, resistant to digging pests, disease, scabies, and somewhat drought tolerant (Research Institute for Nuts and Tubers, 2016).

This study was aimed to determine the effect of planting distance of Odot elephant grass, sweet potato varieties and interaction of both treatments on growth and yield of Odot elephant grass and sweet potatoes. Sweet potato planted with a spacing of 70×30 cm showed higher production than 70×20 cm (Iwan et al., 2013), a spacing of 70×40 cm showed better tuber diameter (Harti and Anugrah, 2013).

The research was conducted by cultivating Odot elephant grass and various varieties of sweet potatoes under a mixed cropping management.

MATERIALS AND METHODS

The study was conducted on the land conversion to organic agriculture in Kalongan village, East Ungaran sub-district (7°08'27"-7°15'72" S and 110°40'88"-110°48'14" E), Semarang district, Central Java Province, Indonesia from September 2020 to February 2021. The experimental sites is located at an altitude of about 339 meters above the sea level, rainfall of 3,454 mm/year with 181 rainy days, daily temperature is 25-30°C (Central Bureau of Statistics of Semarang District, 2017).

A randomized block design in a 2 × 4 factorial pattern with 3 replications was used in the study. The first factor was spacing of Odot elephant grass consisted of J1: 60 × 90 cm and J2: 45 x 90 cm. The second factor was several varieties of sweet potato, namely V1: Pating-1, V2: Beta-2, V3: Kidal and V4: Papua Solossa.

Odot elephant grass cuttings were obtained from a forage breeding center at Kadirejo village, Pabelan subdistrict, Semarang district, Central Java Province. Meanwhile, sweet potato cuttings were obtained from the Research Institute of Nuts and Tubers of Malang, East Java Province.

Soil samples were taken to analyze the macronutrient content of N, P, K and soil pH. A dose of 5 kg or equivalent to 8.3 tons/ha of goat manure then was applied at each bed and mixed evenly, and followed by making mounds for planting sweet potatoes. The bunds were made with height, width and distance between bunds of 30 cm, 60 cm, and 40 cm, respectively. The land were then left for 2 weeks before sweet potatoes were planted.

Cuttings of Odot elephant grass were planted two weeks later. Then the grass was allowed to grow until it was trimmed at the age of 30 days after planting (DAP). After pruning, the grass was allowed to grow and during the regrowth period, plant height and number of tillers were observed. Forty (40) days after pruning (DAT) Odot elephant grass was defoliated. Samples of grass were taken, some were oven-dried at 105°C for 24 hours to determine the DM of grass, and some were ovened at 60°C for 72 hours for analysis of crude protein (CP) and crude fiber (CF). Meanwhile, sweet potatoes were harvested at 20 weeks after planting (WAP), the leaves and tubers were separated. Sample of leaves and tubers were then weighed and air-dried, and ovened at 105°C for 24 hours to determine the DM content. Sample of fresh tubers were then taken for analysis of total dissolved sugar (brix).

Parameters observed were plant height, DM production, CP and CF content of Odot elephant grass, as well as production of tubers, DM of leaves, CP, CF and brix content of sweet potato. The data obtained

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were analyzed using analysis of vvariances and further tested with Duncan's test level 5%.

RESULT AND DISCUSSION

Chemical Properties of Soil And Manure

The chemical analysis of the soil and manure used were presented at Table 1. The chemical properties of the soil, especially the content of macro nutrients N, P, and K and the pH (Table 1) were suitable for the cultivation of Odot elephant grass (Kusdiana et al., 2017; Lasamadi et al., 2013), and varieties of sweet potato that were investigated (Research Institute for Nuts and Tubers, 2016).

Plant Height of Odot Grass

There was no significant effect of plant spacing, sweet potato varieties, and the interaction of these two factors on plant height of Odot elephant grass at week 1 to 4 week after planting (WAP) (Table 2). This phenomenon indicates that the growth of sweet potato dominates the Odot elephant grass very strongly and consequently the effect of the distance of the Odot elephant grass did not show a significant difference on the plant height of Odot elephant grass. However, at 5 WAP of observation, height of Odot elephant grass that mixed with sweet potato Papua Solossa was significantly lower than the height of Odot elephant grass that mixed with either Pating-1, Beta-2 or Kidal. The plant height of Odot elephant grass at 5 WAP was presented at Figure 1.

Table 1. Chemical Properties of Soil and Manure Used

Sample	Nutrients/Soil pH		Status*)
Soil	pH	6.1	Slightly acid
	N (%)	0.75	High
	Available P_2O_5 (ppm)	11.9	High
	Available K_2O (ppm)	269	Very high
Organic fertilizaer	N (%)	1.97	Very high
	Available P_2O_5 (%)	0.14	Very high
	Available K_2O (%)	1.82	Very high

*) Eviati and Sulaeman (2009)

Table 2. Plant Height of Odot Elephant Grass at Week-1 to Week-4

Distance of Odot grass (cm)	Sweet potato varieties	Plant height (cm)			
		1 WAP	2 WAP	3 WAP	4 WAP
60 x 90	Pating-1	24.5±3.8	38.4±21.3	50.1±11.6	54.0±12.8
45 x 90		29.2±1.9	44.3±4.6	44.7±9.2	49.5±7.6
60 x 90	Beta-2	29.4±8.4	46.5±8.5	58.3±8.6	63.7±5.9
45 x 90		29.5±12.0	41.1±7.3	52.7±2.2	63.2±2.4
60 x 90	Kidal	24.8±9.5	35.7±11.2	46.4±17.4	54.5±15.1
45 x 90		25.8±4.9	45.9±15.5	56.4±8.3	58.5±6.9
60 x 90	Papua Solossa	21.6±7.0	34.9±8.3	41.7±4.8	48.5±6.6
45 x 90		28.2±7.1	37.6±8.1	49.5±4.3	54.6±5.5

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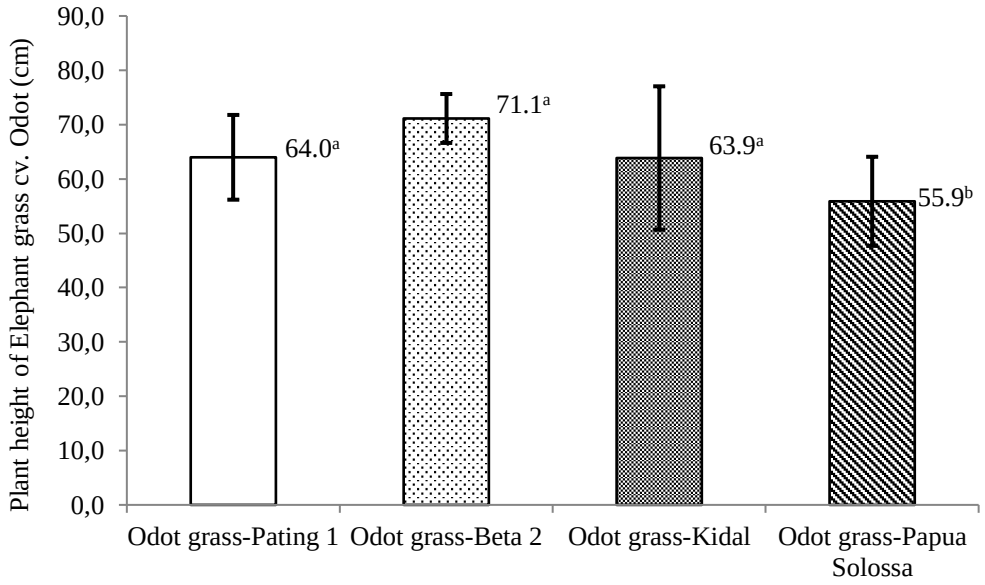

Figure 1. Plant Height of Elephant Grass cv. at Odot 5 WAP (cm)

The performance of Odot elephant grass in mixed cropping was very diverse depending on the variety of sweet potato. The height of Odot elephant grass mixed with Papua Solossa was lower than that mixed with other varieties. The first possibility occurs probably due to the fact that Papua Solossa was more dominant against Odot elephant grass compared to Pating-1, Beta-2 and Kidal. The second possibility may occur because Odot elephant grass excels in competing with the three varieties of sweet potato, Pating-1, Beta-2 and Kidal. This is in accordance with the description that each sweet potato variety has a different performance due to the genetic characteristics of the variety (Research Institute for Nuts and Tubers, 2016).

The distance of Odot elephant grass did not significantly affect the height of Odot elephant grass. These results were in line with the research previously (Daru et al., 2019; Kusdiana et al., 2017; Istikomah and Kunharjanti, 2017). the morphological characteristics of Odot elephant grass such as plant height, number of tillers, leaf length and production were not affected by the spacing of Odot elephant grass that grown in monoculture system. On the other hand, Rahayu et al. (2021) found that the height and yield of Odot elephant grass at mixed cropping with peanuts (*Arachis hypogea* L) was not affected by the spacing of Odot elephant grass and planting time of peanut.

Yield of Odot Elephant Grass and Sweet Potato Leaves

There was no significant difference in the effect of planting distance of Odot elephant grass on DM yield of the grass. In addition, there was no significant difference of interaction effect of spacing distance of the grass and sweet potato varieties on DM yield of the grass. Meanwhile, the treatment of sweet potato varieties significantly affected the DM yield of the grass.

The results showed that DM yield of Odot elephant grass mixed with Papua Solossa was not significantly different to DM yield of Odot elephant grass mixed with Beta-2 but both were significantly higher than DM yield of Odot elephant grass mixed with Pating-1 and Kidal. The DM yield of Odot elephant grass mixed with Kidal was significantly higher than that mixed with Pating-1.

There was no significant difference in the effect of planting distance of Odot elephant grass on DM yield of sweet potato leaves. In addition, there was no significant difference of interaction effect of spacing distance of the grass and sweet potato varieties on DM yield of sweet potato leaves. The treatment of sweet potato varieties significantly affected DM yield of

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sweet potato leaves. In contrast to grass DM yield, DM yield of sweet potato leaves at mixed cropping of Odot elephant grass-Kidal showed significantly higher than that DM yield of sweet potato leaves of other mixed cropping. The DM yield of the grass and sweet potato leaves at mixed cropping between Odot elephant grass-sweet potato varieties were presented at Figure 2.

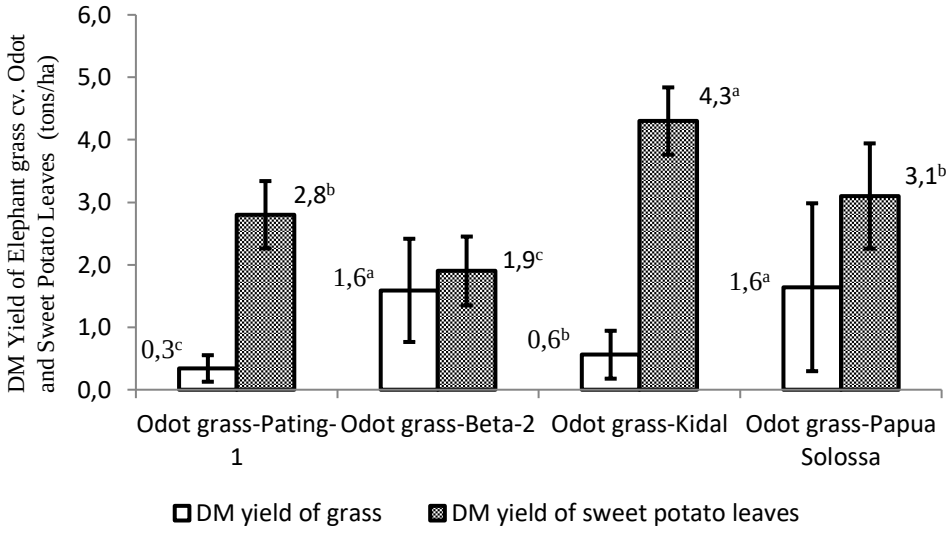

Figure 2. DM Yield of Elephant grass cv. Odot and Sweet Potato Leaves (tons/ha)

Both the DM yield of Odot elephant grass in this study were significantly lower that the previous studies. This result was not in accordance with Ressie et al. (2018) and Glass et al. (2017). This was probably in mixed planting with sweet potato the growth of Odot elephant grass was depressed by sweet potato so that it cannot grow optimally. This may be due to the fact that at first the Odot elephant grass was attacked by pests so it had to be replaced with new cuttings. At the that time the growth of sweet potato was established, so the Odot elephant grass was unable to compete with sweet potatoes for sunlight and nutrients. This was in accordance with Hairiah et al. (2003).

The phenomenon of differences in DM yields of both Odot elephant grass and sweet potato leaves was strongly influenced by differences in genetic properties between the four varieties of sweet potato tested. This is in line with the description about the superior varieties of nut and tuber crops (Research Institute for Nuts and Tubers, 2016).

This is in line with the description of superior varieties of legumes and tubers, where each sweet potato variety used in the study has genetic characteristics that may determine the differences in the growth of each variety (Balai Research on Nuts and Tubers, 2016). (Research Institute for Nuts and Tubers, 2016).

Crude Protein and Fiber Content

The results showed that there was no significant effect of planting distance of Odot elephant grass on the CP and CF content of the grass and CP and CF of sweet potato leaves. The treatment of sweet potato varieties had no effect on CP and CF content of the grass but had a significant effect on CP and CF content of sweet potato leaves. There was no significant effect of interaction of the two treatments on the CP and CF content of the grass and sweet potato leaves. The CP and CF content of Odot elephant grass and sweet potato leaves were presented at Table 3.

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Table 3. Crude Protein (CP) and Crude fiber (CF) Content of Odot Elephant Grass and Sweet Potato Leaves

Distance of Odot grass (cm)	Pating-1	Beta-2	Kidal	Papua Solossa	Mean of value
	CP content of Odot elephant grass (%)				
60 x 90	13.2±1.8	13.6±0.2	13,1±0.3	12.8±2.7	13.2±1.3
45 x 90	11.2±2.8	13.0±1.1	13.3±1.0	11,4±1.3	12.2±1.5
Mean of value	12.2±1.4	13.3±0.4	13.2±0.1	12.1±1.0	
	CP content of sweet potato leaves (%)				
60 x 90	17.6±0.6	16.5±0.9	18.6±0.5	16.9±1.8	17.4±1.0
45 x 90	15.8±0.9	14.8±1.1	19.2±1.2	15.9±1.5	16.4±1.1
Mean of value	16.7±1.2^{b}	15.7±1.2^{b}	18.9±0.4^{a}	16.4±0.7^{b}	
	CF content of Odot elephant grass (%)				
60 x 90	22.3±1.2	27.7±6.2	26.1±2.5	24.1±0.9	25.1±2.7
45 x 90	27.6±7.2	22.9±0.9	19.9±5.8	17.1±1.9	23.5±3.9
Mean of value	25.0±3.7	25.3±3.4	23.0±4.4	20.6±4.9	
	CF content of sweet potato leaves (%)				
60 x 90	13.3±2.6	16.3±2.2	13.1±1.5	14.5±1.0	14.3±1.8
45 x 90	16.0±1.0	18.0±1.4	14.5±1.2	12.6±0.2	15.3±0.9
Mean of value	14.6±1.9^{b}	17.1±1.2^{a}	13.8±1.0^{b}	13.6±1.3^{b}	

The CP content of Odot elephant grass ranged between 12.1-13.3%, while the CP content of sweet potato leaves reached 15.7-18.9%. The CP content Odot elephant grass was not significantly affected by either the spacing of the grass or the different varieties of sweet potato. The content of CP of sweet potato leaves Kidal was significlantly higher than the CP of the other three varieties. Meanwhile, the CP content of sweet potato leaves among the three varieties, Pating-1, Beta-2 and Papua Solossa were not significantly different. The CF content of Odot elephant grass ranged between 20.6-25.1%, while the CF content of sweet potato leaves reached 13.6-17.1%. The CF content of Odot elephant grass was not significantly affected by either the spacing of the grass or the different varieties of sweet potato. The CF content of sweet potato leaves Beta-2 was significlantly higher than the CF content of the other three varieties. Meanwhile, the content of CF of sweet potato leaves among the three varieties, Pating-1, Kidal and Papua Solossa were not significantly different.

The CP content of Dwarf Napier (*P. purpureum* cv. Mott) that defoliated at the age of 40, 60 and 75 days respectively were 25.51, 18.70 and 17.50%, while the CF content reached 20.12, 22.59 and 25.62%, respectively (Kamaruddin et al., 2018). The content of CP *P. purpureum* cv. Mott in this study was much lower than the findings of Kamaruddin et al. (2018). The difference was due to the different cropping patterns used in the two studies, monoculture and mixed cropping patterns. However, the difference in cropping patterns did not affect to the CF content of Odot elephant grass, where the CF content in both studies was relatively the same. On the other hand, Kaca et al. (2017) found that Odot elephant grass mixed either with *Centrosema pubescens* or *Calopogonium mucunoides* showed higher CP content than the CP content of Odot elephant grass that monoculture-cultivated. This may be because of those two leguminous crops, *C. pubescens* and *C. mucunoides*, provided more atmospheric nitrogen to themselves and Odot elephant grass through nitrogen fixation. However, the CP content of Odot elephant grass mixed either with *C. pubescens* (8.92%) or *C. mucunoides* (9.12%) was lower than that found in this study and the study conducted by Kamaruddin et al. (2018). This may be because the two legumes, *C. pubescent* and *C. muconoides*, provided less atmospheric nitrogen to the system through nitrogen fixation.

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Yield of sweet potato tubers

There was no significant effect of Odot elephant grass spacing, but there was a significant effect of sweet potato varieties on the yield of sweet potato tubers. There was no significant interaction effect between the two treatments on the yield of sweet potato tubers. The yield of sweet potato tubers from various varieties of sweet potato is presented in Figure 3.

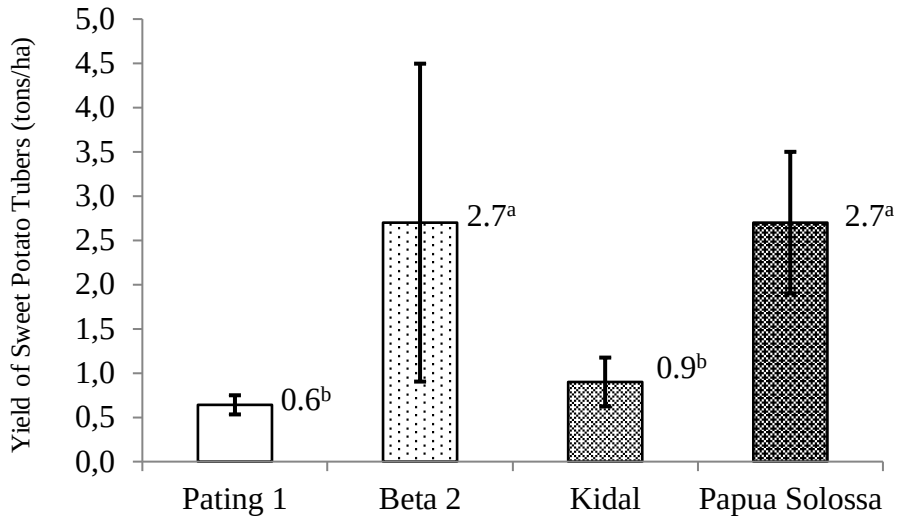

Figure 3. Yield of Sweet Potato Tubers (tons/ha)

Yields of tubers of sweet potato Beta-2 and Papua Solossa were not significantly different but both were significantly higher than the yields of sweet potato tubers Pating-1 and Kidal. Meanwhile, the yield of sweet potato tubers Pating-1 was not significantly different from Kidal (Figure 3). The yield of sweet potato tubers was in accordance with that published by the Research Institute for Nuts and Tubers (2016) that the order of the highest to lowest yield potential was achieved by Beta-2, Papua Solossa, Kidal and Pating-1. However, the yield of sweet potato tubers achieved in this study was different from the yield potential produced by the Research Institute for Nuts and Tubers (2016). This may be due to research conducted on the conversion of land into organic agricultural land where the availability of nutrients was only sourced from organic fertilizers so that was not sufficient to support plant growth. In addition, different varieties of sweet potato have different growing periods so that each variety may use different growth resources and this may affect the yield of sweet potato tubers differently. The difference in yield of sweet potato tubers in this study was supported by Willey (1979a) in Gebru (2015) who concluded that the greater the difference in ripe age and growth factors of plant components, either due to genetic differences or manipulation of planting date, the greater the opportunity for exploitation of total growth factors which was larger, so the results were different.

Total Dissolved Solids of Sweet Potato Tubers

The distance spacing of Odot elephant grass did not significantly affect the total dissolved solids (TDS) of sweet potato tubers, while sweet potato varieties had a significant effect on the TDS of sweet potato tubers. The interaction between the two treatments did not significantly affect the TDS of sweet potato tubers. The TDS of sweet potato tubers showed sugar content contained in. The TDS content of sweet potato tubers from low to high was achieved by Beta-2, Pating-1, Papua Solossa and Kidal were 7.8%, 10.3%, 10.7%, and 12.4%, respectively. The sugar content in the treatment of various sweet potato varieties was presented at Figure 4.

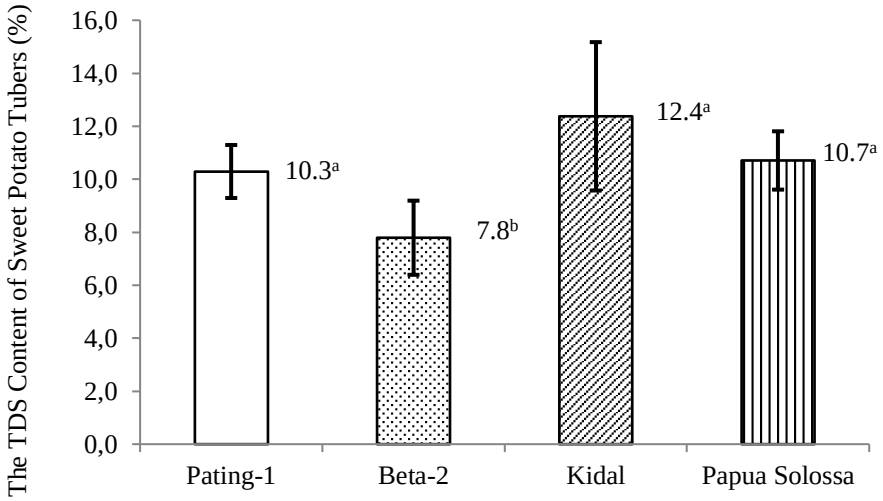

Figure 4. The TDS Content of Sweet Potato Tubers (%)

The TDS of Pating-1, Kidal, and Papua Solossa was not significantly different, but all three were much higher than the TDS of Beta-2. This was in accordance with Nintani and Rusanti (2012), Hardoko et al. (2010). They found that the carbohydrate content of sweet potato tubers varied greatly depending on the variety, ranged of 27.9-40.0% with a moisture content of 68.5%.

CONCLUSION

Based on the experimental results, it can be concluded that Odot elephant grass may be mixed with various sweet potato varieties such as Pating-1, Beta-2, Kidal and Papua Solossa, especially if there were no pests attacking the Odot elephant grass at the beginning of its growth. Further research with a more varied spacing of Odot elephant grass spacing is highly recommended.

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