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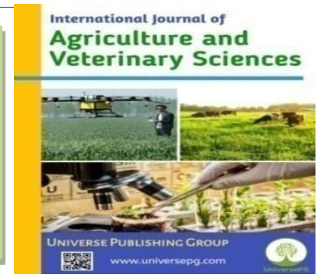

Herbage Yield Evaluation of *Pennisetum purpureum* Grass Genotypes

Diribi Mijena[1]*, Aman Getiso[1], Md. Raquibul Islam[2], and K. M. Shafi[3]

[1]Ethiopian Institute of Agricultural Research, Wondogenet Agricultural Research Center, Shashemene, Ethiopia; [2]Department of Microbiology, University of Chittagong, Bangladesh, and [3]Department of Microbiology, University of Dhaka, Bangladesh.

*Correspondence: hiliif@yahoo.com (Diribi Mijena, Ethiopian Institute of Agricultural Research, Wondogenet Agricultural Research Center, P. O. Box: 198, Shashemene, Ethiopia).

ABSTRACT

This trial was conducted to assess the agronomic traits and forage dry matter yield of six *Pennisetum purpureum* grass genotypes in the great rift valley of Ethiopia. The experiment was carried out for four consecutive years in a randomized complete block design with three replications. Diammonium phosphate (DAP) fertilizer at the rate of 100 kg/ha was uniformly applied at planting and additionally, urea at the rate of 50 kg/ha was top dressed after each forage harvesting. Data on plant height, tiller number, dry leaf stem ratio, and forage dry matter yield were analyzed using the general linear model procedures of SAS, and the least significant difference was used for mean comparisons. Combined analysis indicated that the tested genotypes varied significantly ($P<0.05$) for plant height at harvest, number of tillers per plant, dry leaf stem ratio, and forage dry matter yield. Genotype 16788 gave the longest mean plant height while standard check (Zehone-03) gave the shortest value. The highest mean number of tillers per plant was recorded for genotype 14983 followed by 16788, Zehone-03, 16808, and 14984 genotypes, respectively while the lowest was recorded for genotype 15743. The highest dry leaf stem ratio was measured from genotype 14983 and Zehone-03 followed by 14984, 15743, and 16808 genotypes, respectively while genotype 16788 gave the lowest value. Genotypes 14983 and 15743 gave the highest herbage yield while the lowest was from genotype 16808 and standard check (Zehone-03). In general, *P. purpureum* grass genotypes showed variations in terms of agronomic performance and herbage yield in the study area.

Keywords: Agronomic performances, Dry matter yield, Genotypes, Leaf stem ratio, and *Pennisetum purpureum*.

INTRODUCTION:

A shortage of livestock feeds both in terms of quantity and quality remains to be the major constraint to livestock production in the developing world (Sere *et al*., 2010; Shapiro *et al*., 2015), particularly during the dry season. Due to lack of grazing land and ineffective grazing management, fodder is insufficient to sustain animals even during years with a favorable rainy season. To boost livestock productivity in such a setting, better feed options that address both amount and quality of feed are necessary. This requires the introduction of high-quality grown forage crops that provide alternative high-quality and quantity feeds and is tolerant to the biotic and abiotic environmental challenges (Tessema and Halima, 1998; Zewdu *et al.,* 2002; Kahindi *et al.,* 2007; Mayberry *et al*., 2017).

Pennisetum purpureum grass is among the best yielding and most adaptable species of tropical grasses. It can be grown in a wide range of environments and agricultural systems, including dry or wet climates, smallholder, or industrial agriculture. (FAO, 2015) and has become one of Africa's most promising and productive fodder crops (Anindo and Petter, 1986). *Pennisetum purpureum* grows naturally in the tropics of African countries, especially in the eastern region. *Pennisetum purpureum* is a large, strong, and deeply rooted perennial bunch grass valued for its high yield and use as cattle feed (Woodard and Prine, 1991). In addition to that, its ease of establishment and regeneration, production of tasty green shoots, efficiency in the use of water, and the persistence of repeated cutting (Lowe *et al*., 2003; Elkana *et al.,* 2010) make it a primary fodder of choice. According to the above statement, *the grass* is advised for smallholder crop-livestock farming systems, particularly in dairy and feedlot production systems (Halim *et al*., 2013; Yirgu *et al*., 2023).

Most smallholder livestock producers own small and split pieces of land due to the increase in human and livestock population and changing patterns of land use, which result in the decrement of grazing lands (Duguma, 2010). Due to its ability of producing high amount of herbage yields within little/limited input or space, *Pennisetum purpureum* can a best-fit alternative to other feed options in such areas. Different cultivars of *Pennisetum purpureum* produce higher dry matter yield as sixty tons per hectare per year (Rengsirikul *et al*., 2013) whereas the yield may be more dependent on the cultivar in use, the environment and management options. Therefore, this study was executed conducted to test the agronomic growth and the herbage yield performance of the six *Pennisetum purpureum* grass genotypes namely, 14983,14984,16808,16788, 15743 and Zehone-03 under the central rift valley agroecology of Ethiopia.

MATERIALS AND METHODS:

Study site

The study was executed at the Awada Agricultural Research sub-center experimental site at Dale district of Sidama region. Dale is located in the Great Rift Valley (https://en.wikipedia.org/wiki/Dale(woreda) at 320 km from Addis Ababa and 45km from Hawassa (the capital city of the region). It is located at 6°50’30” - 6°39’30” N and 38°17’0” - 38°32’0” E with an altitudinal range of 800 to 2600 masl (Adane *et al*., 2019) (**Fig. 1**). The annual rainfall received during the study period ranges 1223.44 to 1919.26mm with peaks in May 2018, October 2019, May 2020, November 2021 and the average annual minimum and maximum air were 10.66 and 28.06^{o}c, respectively (**Table 1**). *Nitosol and Chromotic Cambisols* are the dominant soil types of the study area (Kebede and Bellachew, 2008).

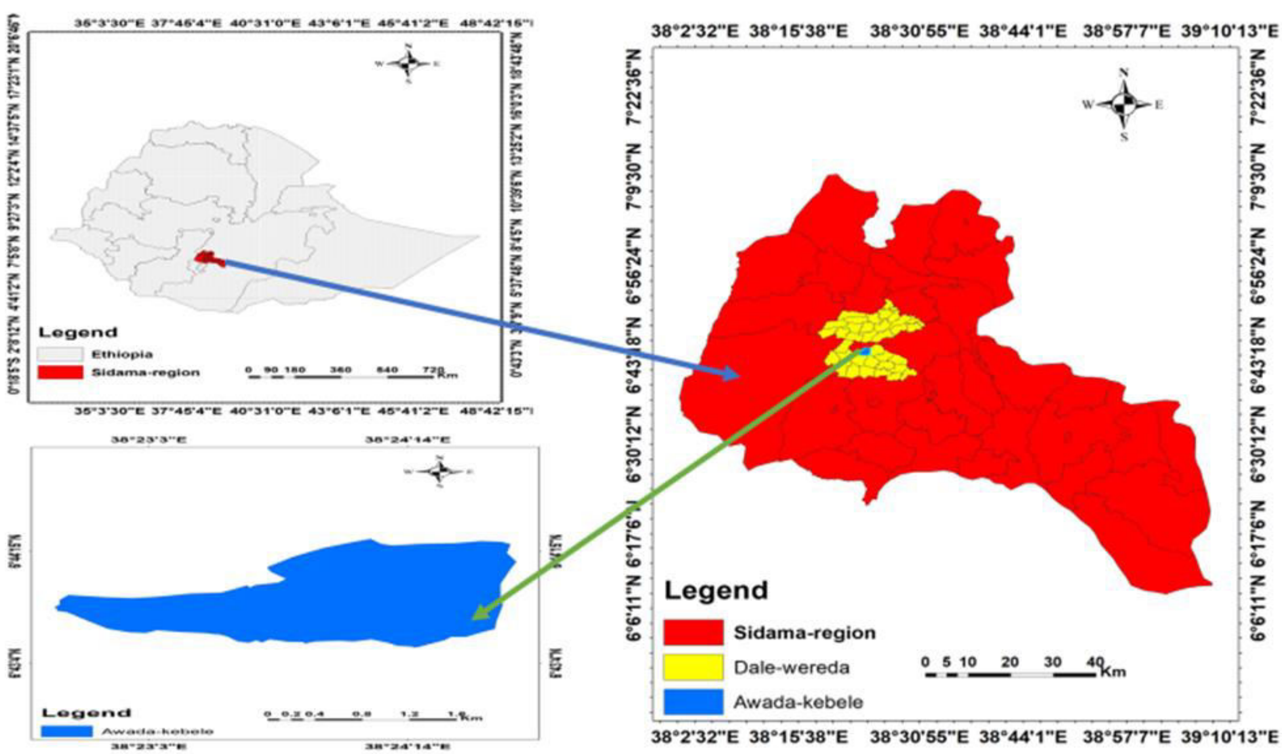

Fig. 1: Map of the study area.

Table 1: Monthly rainfall and average temperature during the study period.

Months	Rainfall (mm)				Temperature (^oc)							
					2018		2019		2020		2021	
	2018	2019	2020	2021	Max	Min	Max	Min	Max	Min	Max	Min
January	5.27	0.00	36.91	84.38	30.85	7.22	32.61	8.61	28.60	10.75	28.16	9.81
February	84.38	0.00	26.37	15.82	31.34	10.01	33.41	12.76	31.23	11.51	31.31	8.84
March	210.94	5.27	116.02	31.64	27.17	10.98	34.01	14.30	32.37	13.65	32.69	11.28
April	384.96	126.56	332.23	275.53	24.98	13.27	32.77	14.02	30.32	13.34	32.27	13.01
May	247.85	184.57	363.87	191.19	25.41	12.89	29.13	13.10	24.93	13.18	24.93	10.86
June	105.47	174.02	295.31	50.28	23.12	12.18	23.43	12.12	24.01	11.80	24.85	11.95
July	10.55	58.01	84.38	104.52	23.48	11.65	24.39	12.33	22.90	11.12	23.26	11.34
August	116.02	116.02	126.56	162.77	24.20	9.90	25.48	11.30	23.70	11.32	24.65	10.28
September	63.28	147.66	168.75	129.14	26.09	11.15	26.26	11.26	24.40	10.45	24.40	12.05
October	89.65	200.39	295.31	197.92	25.87	11.78	25.01	11.12	24.29	12.25	24.76	10.91
November	73.83	116.02	26.37	345.65	27.30	8.95	24.73	11.69	24.70	9.83	26.65	10.22
December	10.55	94.92	47.46	30.41	29.43	11.01	25.51	9.98	27.40	7.66	28.48	7.37
Total/Average	1402.73	1223.44	1919.53	1619.26	26.60	10.92	28.06	11.88	26.57	11.41	27.20	10.66

Source of planting materials

Five *Pennisetum purpureum* genotypes (14983, 14984, 16808, 16788, and 15743) selected as the study materials and released variety (Zehone-03) used as standard check are sourced from Bako and Wondogenet Agricultural Research Centers, respectively.

Land preparation and management

The experimental land was ploughed, harrowed, and smoothened to make sure that it was uniformly aerated and cleared from weeds. Then, the field was blocked into three and each block was split into six uniform experimental plots and slope gradient of the experimental plot was used as blocking element. Then, treatments are randomly assigned to the plots within a block. Phosphorus fertilizer in the form of di-ammonium phosphate (DAP) was uniformly applied to all plots at the rate of 100 kg/ha at planting. After each harvest, all plots were top dressed uniformly with 50 kg N/ha of which one-third at the first shower of rain and the remaining two-third applied during the active growth stage of the plant. During the experimental period, the plots were maintained with uniform management to make sure that the root system remained intact during the long dry spell. All other crop management practices were used uniformly for all plots as recommended.

Experimental design and treatments

The trial was executed for four consecutive growing rainy seasons on the same experimental plots using a Randomized Complete Block Design with the three replications per each treatment. The treatment included six *Pennisetum purpureum* genotypes (14983, 14984, 16808, 16788, 15743 and Zehone-03). Three blocks, each containing six plots of $10.5m^2$ (3m*3.5m) were used for the treatment. A 1m and 1.5m space was maintained between the adjacent plots and blocks, respectively. Stem cuttings of the chosen study material with three nodes were planted at 1m between rows and 0.5m between plants with a depth of 15-20 cm at an angle of 45^0 E as recommended by Gemiyo *et al.* (2017) in May 2018 when continuous rain was assured for successful establishment.

Data collection

During the experimental periods, the trial plots were regularly monitored and data on agronomic growth including plant height at harvest, tiller number, leaf to stem ratio, and herbage yield were measured.

Morphological data collection

Morphological growth measurements were undertaken on plant survival rate, plant height at harvest, tillers number per plant before harvesting of the grass for the estimation of fresh biomass yield and forage dry matter yield in each harvest from randomly selected central net rows of the plot. The plant survival rate of each genotype was recorded and calculated as the ratio of the number of surviving plants per plot to the total number of plants planted per plot and then multiplied by one hundred. Tiller number per plant was counted from the three culms randomly selected in each plot. Plant height at each harvest was measured from three culms randomly selected in each plot using steel tape from the ground level to the highest leaf.

Estimation forage dry matter yield and dry leaf stem fraction

For the determination of biomass yield and leaf and stem ratio fraction, harvesting was done only once during the first and last years, but twice per year during the second and third years. Harvesting was done manually using sickle from the harvestable middle rows at 5cm above ground. Total fresh biomass yield was measured from each plot in the field and a 300g sample was taken from each plot to the laboratory to determine forage dry matter yield. The sample taken from each plot was weighed using a sensitive balance and the manually fractionated into leaf and stem. The morphological parts were separately weighed to know their sample fresh weight, oven-dried at 105^0c overnight and separately weighed to estimate the proportion of leaf and stem. Accordingly, leaves were separated from the stem, and fractions were estimated based on the dry weight of each component.

Statistical data analysis

The analysis of variance (ANOVA) procedure of the SAS general linear model (GLM) was used to compare the effect of genotypes and year of production on agronomic growth and yield performance. The least mean difference was used for mean separation when P<0.05. The data was analyzed using the following models:

$Y_{ijk} = \mu + G_i + Y_j + GY_{ij} + Bk + e_{ijk}$............ for the combined mean............. (1)

Where, Y_{ijk}=Dependent variables, μ= Overall mean, G_i=Effect of genotypes i, Y_j=Effect of year j, GY_{ij} = Interaction effect of genotypes and year ij, B_k= effect of block k; and e_{ijk}=Random error effect of genotype i, year j, interaction of genotype and year ij, and block k.

$Yij = \mu + G_i + B_k + e_{ij}$....................................for each year.............................(2)

Where, Y_{ij}=Dependent variables, μ= Overall mean, G_i = Effect of genotypes i, Effect of block k and e_{ij}=Random error effect of genotype i in block k.

RESULTS AND DISCUSSION:

Effect of genotypes, year, and their interaction on some agronomic traits and yield performance of the tested grass

The effects of genotypes, year, and their interaction on the plant height at forage harvesting, tiller number per plant, dry leaf to stem fraction, and forage dry matter yield of tested grass genotypes are presented in **Table 1**. The current result of the study showed that plant height at forage harvesting, tiller number per plant and forage dry matter yield were the significantly (P<0.001) influenced by genotype, year and the interaction of genotypes and year. Dry leaf to the stem fraction influenced by the genotype (P<0.01) and, year and interaction of genotype and year (P<0.001). This result might be brought because of environmental factors (rainfall, temperature, etc.) and genetic variations. The considerable variation in agronomic parameters and forage dry matter yield performance between the experimental years suggests that rainfall and temperature were distributed differently during those experimental years. The temperature and rainfall patterns slightly vary between the experimental years. Conditions in the soil, such as moisture content and soil quality, have a significant impact on plant development and output. The growth and development of crops are significantly impacted by agro-metrological factors such as rainfall, soil and air temperatures, wind, relative humidity or dew point temperature, and sun radiation, according to (Dapaah, 1997 and Hoogenboom, 2000).

Table 2: Genotype and year effect on plant height, tiller number, dry leaf to stem fraction and forage dry matter yield of tested *Pennisetum purpureum* grass genotypes.

Parameters	Genotype (G)	Year (Y)	G*Y	Mean
Plant height (cm)	***	***	***	251.90
Tiller number per plant (count)	***	***	***	18.99
Dry leaf stem ratio	**	***	***	0.76
Forage dry matter yield (t/ha^{-1})	***	***	***	16.30

cm=centimeter; t/ha^{-1}=ton per hectare; G*Y=Interaction of genotype and year; CV= Coefficient variation; ***= P < 0.001.

Establishment performance

Establishment performance of genotype has considerable impact during forage crop cultivation due to its significant effect on forage productivity. The average survival rate of *Pennisetum purpureum* grass genotypes tested over years at the study area is indicated in Figure 2. The value of the current analysis revealed that statistically, there is no significant difference (P>0.05) between tested genotypes on the establishment performance. The highest plant survival rate (98%) was recorded for the genotypes 14983, 15743, and 16808 followed by 14984 genotype (94%). The lowest plant survival percentage (92%) was seen in genotype 16788 and Zehone-03 (which was used as standard check). Fayissa *et al.* (2004) reported that, the average Napier grass survival rate throughout the progression of the three-year trial period was 73.8% and because of the vigorous growth performance of the tillers produced by the remaining stands, the reduction in the plant number had no impact on its herbage production. High germination rate, rapid growth, and dense establishment are among preferred traits for forage crops (Fekede, 2004). Typically, Napier grass has a broad range of adaptations, robust growth, high biomass yield, and a deep root system to endure in dry circumstances. (Lowe *et al*., 2003; Anderson *et al*., 2008; Zewdu, 2008; Ray *et al*., 2022).

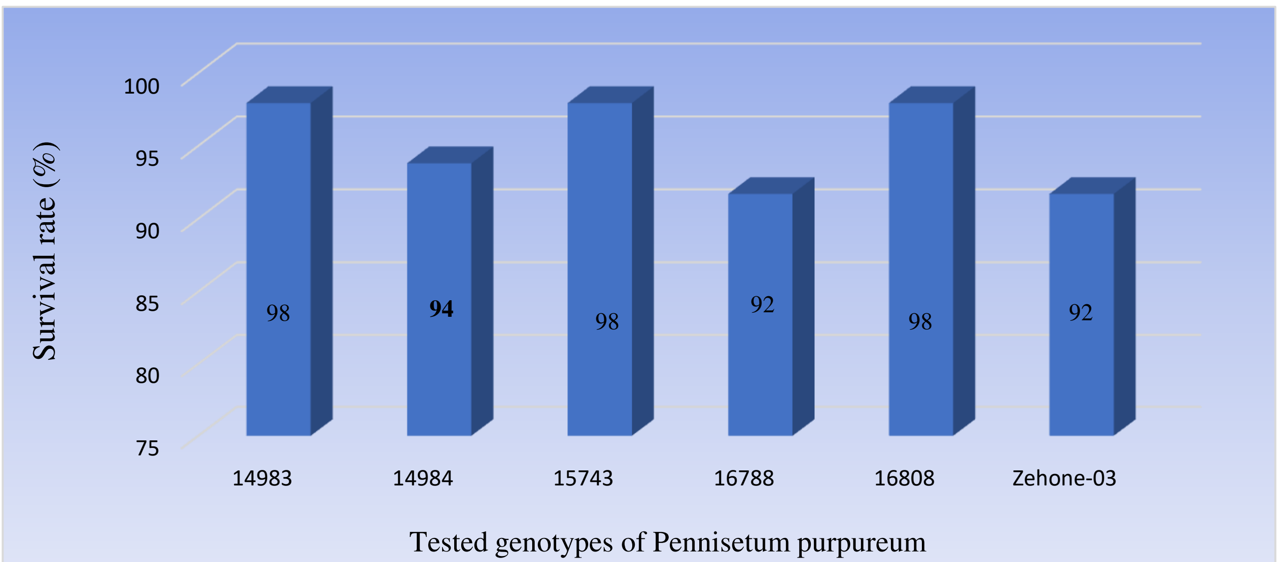

Fig. 2: Mean survival rate of tested *Pennisetum purpureum* genotypes during the experiment period.

Plant height at harvest (PH)

In a combined analysis, the mean plant height of the *Pennisetum purpureum* grass genotypes differed substantially (P < 0.05) (**Table 3**) and it ranged from 218.6 to 284.6 cm with a mean plant height of 251.9 centimeters. In general, genotype 16788 provided the tallest mean plant height (284.6 cm) while standard check (Zehone-03) provided the shortest one (218.6 cm). This fluctuation might have occurred due to the variations in moisture content over time. Napier grass's growth and productivity are reportedly impacted by plant height variation caused by the stage of growth that corresponds with the cutting height of the plant (Arega *et al*., 2020). According to reports, *Pennisetum purpureum* grass' growth performance and productivity are affected by its cutting height, which has a big impact on how much of the grass is used as fodder (Mamaru, 2018). To increase the forage dry matter yield and nutritional quality of this plant, appropriate cutting management, including the right cutting height and frequency of defoliation, is crucial (Kebede *et al*., 2016; Tessema and Alemayehu, 2010). High cutting frequency stunts growth and development, while long harvest gaps cause fiber to build up and quality to decline (Tessema and Alemayehu, 2010). This is owing to Napier grass's high structural cell wall carbohydrates, which rise quickly with maturity and produce a fall in CP concentration and digestibility (Bayble *et al*., 2007). Moreover, studies show that cultivars, management techniques, and environmental factors influence how cutting interval affects yield and quality (Wangchuk *et al*., 2015).

Table 3: Mean plant height (cm) of six *Pennisetum purpureum* grass genotypes tested over the study period.

Genotypes	Harvesting years				Combined mean
	2018	2019	2020	2021	
14983	221.67[c]	255.40[c]	305.73[ab]	221.27[ab]	251.02[c]
14984	178.33[d]	239.07[d]	277.07[bc]	239.27[a]	233.43[d]
15743	267.00[b]	286.33[a]	303.20[ab]	214.00[b]	267.63[b]
16788	323.00[a]	270.93[b]	332.13[a]	212.47[b]	284.63[a]
16808	272.80[b]	251.07[c]	284.87[bc]	215.80[b]	256.13[c]
Zehone-03	220.67[c]	223.67[e]	251.60[c]	178.27[c]	218.55[e]
Mean	247.25	254.41	292.43	213.51	251.90
CV	1.75	2.10	8.86	5.05	5.47
SL	***	***	*	**	***

CV=Coefficient of variation; SL=Significant level; *=P<0.05; **= P < 0.01; ***= P < 0.001. Means with common letters in the column are not statistically significant.

Tiller number per plant (TNPP)

While choosing the best forage crops to increase production and productivity, tillering performance is a crucial morphological factor to consider (Kebede *et al*., 2016). The average tillering performance of the six tested *Pennisetum purpureum* genotypes are shown in **Table 4**. The combined analysis revealed that the genotypes showed considerable (P<0.05) variance. Genotype 14983 produced the most tillers (27.8) over years, while genotype 15743 produced the least tillers (13.5). The genetic differences among the *Pennisetum purpureum* grass genotypes and their interactions with the environment may be responsible for the variance in the tiller number generated per plant among the genotypes (Kebede *et al*., 2016). The current finding is consistent with those of Nyambati *et al*. (2010), who claimed that central Kenya likewise saw variations in tiller number between different kinds of Napier grass. Due to its perennial nature, *Pennisetum purpureum* produces multiple tillers and dense vegetative growth as the pasture consolidates and when it was cut (Tessema and Alemayehu, 2010; Zewdu *et al.,* 2003). Enhanced tillering restores lost photosynthetic area while retaining basal area, which is likely an adaptive characteristic to resist recurrent defoliation (Wangchuk *et al.,* 2015). Increased tiller output is correlated with both consistent productivity and greater tenacity in the face of adverse environmental circumstances (Poirier *et al*., 2012). In general, the generation of tillers plays a significant role in the ability of grasslands to withstand the effects of aging (Assuero and Tognetti, 2010).

Table 4: Mean Tiller number of six *Pennisetum purpureum* grass genotypes tested over the study period.

Genotypes	Harvesting years				Combined Mean
	2018	2019	2020	2021	
14983	29.93[a]	31.60[a]	18.27[a]	31.40[a]	27.80[a]
14984	13.07[bc]	21.33[bc]	17.80[ab]	18.80[c]	17.75[b]
15743	10.20[d]	16.47[c]	10.80[c]	16.67[c]	13.53[c]
16788	10.00[d]	21.33[bc]	14.53[abc]	25.47[b]	17.83[b]
16808	14.20[b]	20.00[bc]	14.20[bc]	24.93[b]	18.33[b]
Zehone-03	11.40[cd]	24.13[b]	14.87[ab]	24.27[b]	18.67[b]
Mean	14.80	22.48	15.08	23.59	18.99
CV	7.24	15.90	14.34	12.54	15.08
SL	***	*	*	**	**

CV=Coefficient of variation, SL=Significant level, *=P<0.05, **=P<0.01, ***=P<0.001. *Means with common letters in the column are not statistically significant.*

Dry leaf to stem fraction

Pennisetum purpureum grass genotypes have significantly different (P < 0.05) dry leaf to stem fractions (**Table 5**). The analysis revealed that dry LSR had a range of 0.60 to 0.86 with a mean of 0.76. Genotype 14983 (0.85) and standard check (Zehone-03) (0.86) yielded the highest dry LSR over the other genotypes while 16788 genotype produce the lowest (0.60) mean dry LSR ever observed. In comparison to the reports of Tudsri *et al*. (2002) and Mwendia *et al*. (2006), which ranged from 1.7 to 3.1 in Thailand and within the range of 1.65 to 6.1 in Kenya, respectively. The analysis result of the current findings shows that, the dry leaf to stem fraction of *Pennisetum purpureum* grass genotypes ranged between 0.6 and 0.85 are less favorable. According to Kebede *et al.* (2016) report, genetic variations react to leaf to stem fractions in different ways. As leaves contain more nutrients and less fiber than stems do, the leaf to stem ratio has a considerable impact on the grass's nutritional quality (Kebede *et al*., 2016). Due to the increased nutritional content of leaves in general (Tudsri *et al*., 2002) and the strong relationship between animal performance and the number of leaves in the diet, the leaf to stem ratio relates to high nutritional quality of the forage. The findings suggested that the leaf to stem ratio is a critical element influencing meal choice, quality, and forage consumption (Smart *et al*., 2004).

Table 5: Mean dry leaf to stem ratio of six *Pennisetum purpureum* grass genotypes tested over the study period.

Genotype	Harvesting years				Combined Mean
	2018	2019	2020	2021	
14983	1.57[a]	0.88[a]	0.41[e]	0.55[c]	0.85[a]
14984	1.00[b]	0.80[a]	0.62[d]	0.79[b]	0.80[b]
15743	0.81[c]	0.59[b]	0.62[d]	0.87[a]	0.72[c]
16788	0.63[d]	0.67[b]	0.68[c]	0.42[d]	0.60[d]
16808	0.62[d]	0.87[a]	0.86[b]	0.54[c]	0.72[c]
Zehone-03	0.83[c]	0.83[a]	1.03[a]	0.75[b]	0.86[a]
Mean	0.91	0.77	0.70	0.65	0.76
CV (%)	6.10	5.86	2.99	3.61	5.12
SL	***	***	***	***	***

CV=Coefficient of variation, SL=Significant level, ***=P<0.001. Means with common letters in the column are not statistically significant.

Forage dry matter yield

Forage dry matter of *Pennisetum purpureum* grass genotypes exhibited substantial (P<0.05) difference in combined and each year analysis (**Table 6**). Forage dry matter yield of combined analysis ranged from 12.7 to 20.03 t/ha with a mean of the 16.3 t/ha. Generally, genotypes 14983 (20.03 t/ha) and 15743 (20.03 t/ha) gave the highest mean dry matter yield over the other genotypes while genotype 16808 (12.71 t/ha) and standard check (Zehone-03) (12.62 t/ha) produced the lowest dry matter yield, respectively. This might be due to, variances in the tested genotypes, testing years, and genotype by years interaction effects resulted in discrepancies in dry matter yield (Kebede *et al*., 2016). Increased foliage height led to an increase in dry matter yield, and taller types produced more dry matter than shorter cultivars (Nyambati *et al*., 2010; Zewdu, 2005; Ishii *et al*., 2005). Napier grass' dry matter output increased as the time between cuttings increased, indicating that a long harvest interval is required to provide high amount dry matter yields (Tessema and Alemayehu, 2010). The genotype, edaphic, climate, and management factors all affect the grass's dry matter yields, which might vary (Wijitphan *et al*., 2009). Typically, as grass matures, the amount of herbage produced rises because of the plant's tissues expanding quickly (Ansah *et al*., 2010).

Table 6: Forage dry matter yield (t /ha^{-1}) of six *Pennisetum purpureum* grass genotypes tested during study period.

Genotypes	Harvesting years				Combined Mean
	2018	2019	2020	2021	
14983	6.54[f]	11.77[b]	45.10[a]	16.71[a]	20.03[a]
14984	8.89[e]	10.51[c]	26.13[b]	14.33[c]	14.97[c]
15743	20.60[a]	17.07[a]	25.45[b]	17.00[a]	20.03[a]
16788	17.93[b]	16.76[a]	19.88[c]	15.19[b]	17.44[b]

16808	15.70[c]	6.36[d]	14.99[d]	13.77[c]	12.71[d]
Zehone-03	10.39[d]	6.93[d]	21.70[c]	11.44[d]	12.62[d]
Mean	13.34	11.57	25.55	14.74	16.30
CV (%)	4.95	4.28	6.03	3.17	5.61
SL	***	***	***	***	***

CV=Coefficient of variation, SL=Significant level, ***= P < 0.001. Means with common letters in the column are not statistically significant.

Agro-morphological traits correlation

A simple linear bivariate correlation study of the morphological characteristics of *Pennisetum purpureum* grass genotypes is shown in **Table 7**. In contrast to the dry leaf to the stem ratio, which was adversely connected with the fodder dry matter production (P > 0.05), plant height at harvest and the tiller number per plant were positively correlated with fodder dry matter yield. The rise in dry matter as well as the cell wall elements may be responsible for the positive link between fodder dry matter output, plant height at harvest, and the tiller number per plant (Tilahun *et al*., 2017). Tiller number per plant and dry leaf to stem ratio were inversely connected with plant height, whereas dry leaf to stem ratio was positively correlated with tiller density. With more days till harvest, there may be increased competition for radiant energy, which would lead to a positive connection between fodder dry matter production and morphological characteristics (plant height at harvest and tiller number per plant) (Asmare *et al*., 2017).

Table 7: Correlation of the forage dry matter related traits.

	Forage dry matter yield	Plant height at harvest	Tiller number per plant
Plant height at harvest	.562		
Tiller number per plant	.205	-.181	
Dry leaf to stem ratio	-.164	-.876*	.492

CONCLUSION:

The current study revealed that, there is no substantial variations between *Pennisetum purpureum* grass genotypes on establishment performance. However, genotype 14983 were well adapted and being productive regarding tiller number per plant, dry leaf to stem ratio, and forage dry matter yield which is hopeful to fill the gap of small quantity livestock feed supply of the area. Therefore, based on the forage dry matter yield genotypes 14983 and 15743 are recommended for further promotion in the study area and similar agro-ecologies as alternative forage grass. The final remark is that further work should be done on chemical composition of the tested genotypes and animal performance fed with these grass genotypes.

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CONFLICTS OF INTEREST:

The authors don't have any competing interests.

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