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GENETIC BEHAVIOR OF PANICUM(*PANICUM MAXIMUM* L.) UNDER DIFFERENT SOWING DATES IN IRAQ.

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Abstract

Two field experiments were conducted in the fields of the Department of Crop Science Engineering of the College of Engineering and Agricultural Sciences / Jadriya for the 2017-2018 season. The experiment aims at identifying the genetic behavior, yield and quality of fodder of two Panicum cultivars (Mambasi and Tanzanian) under different dates of cultivation (15/3, 30/3, 14/4 and 29/4). The experiment carried out according to the system of Split Plot Design in Randomized Complete Block three replicates (R.C.B.D). The main panels were allocated for planting dates while the secondary panels were allocated to the varieties. The results of the experiment were as follows: V1 in all studied traits exceeded the height of the number of branches (branch.plants^{-1}), wet feed crop (ton.h^{-1}), dry matter (ton.h^{-1}). The date of cultivation (15/3 D1) exceeded all studied traits the height of the number of branches (branch.plants^{-1}), dry matter (ton.h^{-1}), wet feed crop (ton.h^{-1}). The treatment of overlapping between cultivars and dates of cultivation V1D1 exceeded all studied traits.

Key words: sowing dates, Panicum, fodder yields.

Introduction

The development of the livestock sector is based on the development of plantations that are part of the food composition of the sector, where feed crops are the mainstay of animal breeders in providing green and dry fodder, as well as the provision of concentrated fodder. The diversity of feed crops gives a greater chance of feeding animals throughout the year and thus filling them within critical periods. Guinea grass *Punicum maximum* L. is from perennial fodder crops that are traced back to the Poaceae which is cultivated in the continent of Africa and South America and part of the continent of Asia, a tropical and subtropical plants (Nawaz *et al*., 2014). It is also characterized by the high yield of green and dry feed, both qualitatively and drought-tolerant and salinity of Lahoud outweighs many crops, but flourishes in fertile soil with good drainage (Jose *et al.*, 2001), (Aganaa and Tshwenyane, 2004), (Jank *et al*., 2011). Jose and others, (2000) showed that there were significant differences between the varieties in the number of broths for the bonicamus yield H-22 Giving the highest average reached (3.4) tiller.Plant^{-1}. Compared to the rest of the varieties. The H-64 gave the lowest average value of (1.2) tiller.Plant^{-1} has been attributed to genetic changes among the varieties. Ramakrishnan and others, (2013) showed the superiority of the eighth group of ponecam crop in the number of stakes, which gave the highest average of (21) tiller.Plant^{-1} compared to the other groups that gave the fourth group the lowest number of branches reached (12.17) tiller.Plant^{-1} This is due to genetic changes and this may be due to the concentration of genes for this trait in the group without other aggregates. Hoang *et al*., (2015) showed that the date of planting has a significant effect on the average number of tiller. The reason for this is that differences in temperature sometimes reduce the number of plagues. Nasser and Gizawy, (2009) noted that the delay in the date of cultivation led to an increase in the average number of participants. The date of November 15 gave the highest average number of 435 tiller.M^{-2}. Compared with the rest of the dates as the date of November 1 gave the lowest average rate of 415 tiller.M^{-2}. Al-Qaisi and others, (2010) showed that there was a significant effect in the number of the number of participants, as the third date gave the highest average number of participants 363.27 tiller.M^{-2}. Compared with the dates of the first, second and fourth, giving the fourth date the lowest average of the class (185.33) tiller.M$^{-2.}$ Respectively. Lokesh *et al.*, (2013) showed that the date of agriculture has a significant effect on the number of branches as the date of November 20 was significant,

Table 1: Effect of varieties and sowing dates and overlap between the four cultivars in the number of tillers (tiller.plant^{-1}).

		Sowing dates				
	Verities	D1	D2	D3	D4	Average
First cultivar	V1	41.73	33.20	35.67	26.13	34.18
	V2	36.33	31.47	28.20	25.73	30.43
	Average	39.03	32.33	31.93	25.93	32.31
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		2.08	4.75	3.61		
		D1	D2	D3	D4	Average
Second cultivar	V1	45.67	38.27	34.00	30.57	37.13
	V2	37.00	35.53	35.90	29.93	34.59
	Average	41.33	36.90	34.95	30.25	35.86
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		2.776	4.10	4.81		
		D1	D2	D3	D4	Average
Third cultivar	V1	45.67	38.27	34.00	30.57	37.13
	V2	37.00	35.53	35.90	29.93	34.59
	Average	41.33	36.90	34.95	30.25	35.86
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		1.14	4.10	1.97		
		D1	D2	D3	D4	Average
Fourth cultivar	V1	58.97	47.80	38.70	40.33	46.45
	V2	46.03	40.00	43.17	39.53	42.18
	Average	52.50	43.90	40.93	39.93	44.32
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		3.6014036	4.02	6.24		

giving the highest average number of shares reached 124 tiller.M^{-2}. Compared with the other dates as the date (December 23) gave the lowest average number of branches amounted to (108) tiller.M^{-2} respectively. Fatma and Bohedmah, (2015) pointed out that the delay in the date of cultivation led to an increase in the number of participants, which exceeded the date of November 12 in the number of participants if it gave the highest average of (5.3 tiller.M^{-2} Compared with the date of October 2, (3.03) tiller.M^{-2}. Ramakrishnan and others, (2014) showed significant differences in green fodder yield among varieties, giving category 5 the highest grade of the crop with an average of 5.3419 tons.h^{-1}. The comparison with the rest of the varieties gave class 9 a mean average of 3.2981 tons.h^{-1}. Jabbar, (2013) pointed out that the date of 20/10 in the capacity of the green fodder for the barley crop was higher than the average of 23.452 tons.h^{-1}, compared with the date 20/11 which gave an average of 18.205 tons.h^{-1}. Souza *et al*., (2005) showed that there were significant differences in the dry matter content between the varieties. Mambasi was an average of 6 tons.h^{-1}compared with the rest of the cultivars. AGO gave a mean average of 2 tons.h^{-1}. Fernandes *et al*., (2013) showed that there were significant differences in dry matter content, with PM34 exceeding 17.1 tons.h^{-1}. In comparison to the rest of the cultivars, PM42 had a mean average of tons.h^{-1}. The reason for this is that there are genetic changes between the varieties that resulted in eterogeneity in the response of varieties to the different growth factors, which led to an increase in dry matter in the class and decrease in another. Hare *et al.*, (2015) indicated that there were significant differences between dry and dry matter, with an average yield of 4.58 tons.h^{-1} Compared with the average dry yield of Tanzanian (2.43) tons.h^{-1}. As Muir *et al*., (2001) showed that the date of cultivation had a significant effect on dry matter content. The fourth date gave the highest average in dry matter (73.73 g) compared with the rest of the other dates. The first, second and third dates were given averages of 15.79 g Respectively, due to the fact that the environmental conditions at the fourth date were appropriate not to give the plant the best growth. Jabbar, (2013) pointed out that the date of agriculture has a significant effect on dry feed content, as the date of cultivation exceeded 20/10 in the capacity of dry feed yield, giving the highest average of (20.9) tons.h^{-1} compared to the date 20/11, which gave the lowest average of (16.8) tons.h^{-1}. Foster *et al.*, (2013) showed that there were significant differences between the varieties in the number of leaves, giving the varieties PM34 the highest average of (15 and 14.3) leaves.plant^{-1}

Table 2: Effect of varieties and sowing dates and overlap between the four cultivars in the Wet feed crop (ton.h^{-1}).

		Sowing dates				
	Verities	D1	D2	D3	D4	Average
First cultivar	V1	36.67	31.33	27.47	26.03	30.38
	V2	26.85	28.52	24.13	23.94	25.86
	Average	31.76	29.93	25.80	24.99	28.12
	LSD 5%	verities	Sowing dates	Sowing dates× verities		
		1.50	4.73	2.60		
		D1	D2	D3	D4	Average
Second cultivar	V1	38.21	33.32	23.98	34.48	32.50
	V2	27.53	23.02	23.57	22.12	24.06
	Average	32.87	28.17	23.78	28.30	28.28
	LSD 5%	verities	Sowing dates	Sowing dates× verities		
		3.320	2.96	5.75		
		D1	D2	D3	D4	Average
Third cultivar	V1	60.00	46.61	33.67	31.71	43.00
	V2	41.98	41.79	31.80	31.07	36.66
	Average	50.99	44.20	32.74	31.39	39.83
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		3.61	3.46	6.26		
		D1	D2	D3	D4	Average
Fourth cultivar	V1	46.91	35.10	26.75	28.70	34.36
	V2	32.90	31.97	26.17	31.16	30.55
	Average	39.91	33.54	26.46	29.93	32.46
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		4.3058223	7.46	7.46		

For the seasons 2003 and 2004 respectively, while PM43 gave the lowest average (7.4 and 8.3) leaves.plant^{-1} for the seasons 2003 and 2004, respectively.

Materials and Methods

Field of Field Crops / Faculty of Agriculture - University of Baghdad - Aljadria for the year (2017-2018) to study the effect of varieties and dates of agriculture in the yield and quality of fodder for the panicum crop. The experiment carried out according to the system of split plot design in Randomized Complete Blok three replicates (R.C.B.D). Soil was prepared from plowing, smoothing and settling. Give the a verity ombasa symbol V1,While the verity was given TanzanianV2. The phosphate fertilizer was added in the form of P_2O_5 and according to the recommended quantities of 40 kg.h^{-1}. As for the nitrogen fertilizer it was added in the form of batches in the forest and after the mowing and the plant needs 400 kg N.h^{-1} (Chen and Hutton, 1992). It was divided into experimental units with a total area of experimental unit 9 m 2 with dimensions (3 × 3) m. It was as follows: The main panels included the items while the secondary panels included the dates (15/3, 30/3, 14/4 and 29/4). The lines within the panels were the distance between the lines 50 cm and the distance between plants 60 cm Ramakrishnan, (2014).

Attributes studied

• Number of tillers (tiller.plant^{-1}): The number of shoots is calculated for ten plants and the average is taken.

• Wet Weight (Ton.h^{-1}): The weight of the green fodder was directly weighed after the mower to ensure that no part of the moisture was lost as a result of evaporation. On the basis of this, the fodder yield was calculated Green for all.

• Dry matter content (ton.h^{-1}): It is calculated by the following equation:

Dry matter content = green feed yield × dry matter %.

• Number of leaves.Plant $^{-1}$: As the average number of leaves of five plants (and the same plants for which the number of branches were measured) Jassem, (2014).

Results and Discussion

• Number of tillers (tiller.plant^{-1}): The results of table 1 indicate that the cultivars had a significant effect on the number of tiller. The V1 variety gave the highest average for the label (34.18, 37.13, 46.48, 46.54) tiller.plant^{-1}. For the four cultivars Sequentially while the variety V2 variety were given Less average (30.43, 34.59,

Table 3: Effect of varieties and sowing dates and overlap between the four cultivars in the Dry matter (ton.h^{-1}).

		Sowing dates				
	Verities	D1	D2	D3	D4	Average
First cultivar	V1	0.65	0.44	0.37	0.38	0.46
	V2	0.43	0.39	0.38	0.39	0.40
	Average	0.54	0.41	0.37	0.39	0.43
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		0.06	0.11	0.10		
		D1	D2	D3	D4	Average
Second cultivar	V1	0.75	0.54	0.42	0.42	0.53
	V2	0.45	0.56	0.41	0.40	0.46
	Average	0.60	0.55	0.41	0.41	0.49
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		0.056	0.10	0.10		
		D1	D2	D3	D4	Average
Third cultivar	V1	0.98	0.67	0.48	0.44	0.64
	V2	0.54	0.47	0.47	0.47	0.49
	Average	0.76	0.57	0.48	0.45	0.56
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		0.01	0.03	0.02		
		D1	D2	D3	D4	Average
Fourth cultivar	V1	0.90	0.65	0.43	0.41	0.60
	V2	0.54	0.47	0.44	0.46	0.48
	Average	0.72	0.56	0.44	0.44	0.54
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		0.0215135	0.03	0.04		

39.11 and 42.18) tiller.plant^{-1}. For the four cultivars Sequentially. This may be due to genetic differences. This is consistent with the results of Ramakrishnan *et al.*, (2013). Which pointed out that there are significant differences between the varieties in the number of branches in the plant, where the eighth group of the panicum crop in the number of straying has been attributed to the reason for the existence of genetic changes and this may be the reason for the concentration of genes for this attribute in a group without other groups. The results of table 3 showed that the date of agriculture has a significant effect on the number of tillers the date D1 gives the highest mean (39.03, 41.33, 52.52 and 52.5) tiller.plant^{-1}. For the four cultivars Sequentially while the D4 was given a lower average (25.93, 30.25, 37.73 and 39.93) tiller.plant^{-1}. For the four cultivars Sequentially. This is consistent with Jabbar, (2013), which showed that the date of agriculture has a significant effect in the number of branches, which was attributed to the fact that the first date led to an increase in the accumulation of dry matter.

The results of table 3 showed that there were significant differences between the varieties and dates of cultivation Interference V1D1 gave the highest mean of the number of tillers (41.73, 45.67, 56.33 and 58.97) tiller.plant^{-1}. For the four cultivars Sequentially, while the V2D4 overlap gave a lower average (25.73 and 29.93) tiller.plant^{-1}. For the tow cultivars 1 and 2 Sequentially. The overlap also gave V2D3 a mean average of (34.93) tiller.plant^{-1} for cultivar 3. The overlap also gave V1D3 a mean average of 38.7 tiller.plant^{-1} for cultivar 4. This may be due to the fact that environmental genetic interference works to distinguish one category from another.

• Wet Feed Holder (Ton.h^{-1}): The results of table 2 indicate that the cultivars had a significant effect on wet feed yield, with V1 variety giving the highest mean of (30.38, 32.5, 43 and 34.36) Ton.h^{-1}. For the four cultivars Sequentially, while V2 variety gave an average grade of (25.86, 24.06, 36.66 and 20.55) Ton.h^{-1}. For the four cultivars Sequentially. This is consistent with the results of Fernandes *et al.*, (2013), which pointed out that there are significant differences between the varieties has been attributed the reason for the existence of genetic changes between the varieties, which led to the efficiency of some varieties to benefit from the requirements of growth than other varieties. The results of table 2 showed that the date of planting had a significant effect on the wet feed yield, with D1 giving the highest mean of (31.76, 32.87,

50.99 and 39.91) Ton.h^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while D4 gave the lowest mean of 24.99 and 31.39 tons.h^{-1} for tow cultivars 1 and 3 Sequentially, D3 also gave the lowest average (23.78 and 26.46) tons.h^{-1} for cultivars 2 and 4 sequentially. This is consistent with the results of Fahdawi and Dulaimi, (2011), who pointed out that the date of agriculture has a significant effect in the yield of wet feed has been attributed to the researcher because the high temperature works to reduce the effectiveness of the enzyme Nitrate Reductases which controls the process of nitrogen representation within the plant and this cycle leads to a lack of chlorophyll content in the plant, which works to reduce the process of photosynthesis, which leads to the reduction of the product of wet feed. The results of table 2 showed that there was a significant effect of the interaction between the cultivars and the date of cultivation in the wet feed content. V1D1 gave the highest mean (36.67, 38.21, 60 and 46.91) Ton.h^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while the mean overlap of V2D4 was the lowest mean of(23.94, 22.12, 31.07 and 26.17) tons.h^{-1} for the 1, 2, 3 and 4 cultivars Sequentially. This is consistent with Yunus and Aziz, (2013), which indicated that there is a significant effect of the interaction between the varieties and date of cultivation. This was due to environmental genetic interaction.

• Dry matter (ton.h^{-1}): The results of table 3 indicate that the cultivars had a significant effect on dry feed yield, with V1 variety giving the highest mean of (0.46, 0.53, 0.64 and 0.6) tons.h^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while V2 gave the highest mean (0.4, 0.46, 0.49 and 0.48) for cultivars 1, 2, 3 and 4 Sequentially. This is consistent with the results of Hare *et al.*, (2015), which indicated that the varieties have a significant effect on the dry matter content. The reason for this was attributed to the fact that there were genetic changes between the varieties which resulted in heterogeneity in the response of varieties to different growth factors. The substance of dry matter in a class and its reduction in another.

The results of table 3, showed that the date of cultivation had a significant effect on dry feed content, with D1 giving the highest mean of (0.54, 0.6, 0.76 and 0.72) tons.h^{-1} for cultivars 1, 2, 3 and 4 Sequentially, while D4 gave the lowest mean of 0.39 and 0.45 tons.h^{-1} for cultivars 1 and 2 Sequentially, D3 also gave the lowest mean (0.41 and 0.44) tons.h^{-1} for cultivars 3 and 4 Sequentially. This is consistent with the results of Maury *et al.*, (2016), which pointed out that the date of agriculture has a significant effect in the status of the product of dry fodder has been attributed to the reason that the appropriate date works to increase the dry matter

Table 4: Effect of varieties and sowing dates and overlap between the four cultivars in the Number of leaves per plant (leaf.plant^{-1}).

		Sowing dates				
	Verities	D1	D2	D3	D4	Average
First cultivar	V1	365.67	355.00	311.33	291.67	330.92
	V2	350.67	322.00	304.00	270.00	311.67
	Average	358.17	338.50	307.67	280.83	321.29
	LSD 5%	verities	Sowing dates	Sowing dates× verities		
		4.69	4.77	8.12		
		D1	D2	D3	D4	Average
Second cultivar	V1	393.33	379.33	327.67	302.00	350.58
	V2	377.67	334.33	323.67	287.00	330.67
	Average	385.50	356.83	325.67	294.50	340.63
	LSD 5%	verities	Sowing dates	Sowing dates× verities		
		4.681	6.64	8.11		
		D1	D2	D3	D4	Average
Third cultivar	V1	409.00	388.67	345.33	307.67	362.67
	V2	398.33	359.33	335.67	291.33	346.17
	Average	403.67	374.00	340.50	299.50	354.42
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		5.34	12.41	9.26		
		D1	D2	D3	D4	Average
Fourth cultivar	V1	58.97	47.80	38.70	40.33	46.45
	V2	46.03	40.00	43.17	39.53	42.18
	Average	52.50	43.90	40.93	39.93	44.32
	LSD 5%	verities	Sowing dates	Sowing dates × verities		
		3.2384502	3.76	5.61		

due to the appropriate environmental conditions of the crop. The results of table 3, showed that the interaction between the cultivars and the date of planting had a significant effect on the dry weight, with V1D1 giving the highest mean of (0.65, 0.75, 0.98 and 0.9) tons.h^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while V1D4 gave the lowest mean (0.4, 0.44 and 0.41) tons.h^{-1} for the 2, 3 and 4 cultivars Sequentially, while V1D3 gave the lowest mean of 0.37 tons.h^{-1} for 1cultivar.

• Number of leaves per Plant (leaves.Plant^{-1}): The results of table 4, indicate that the cultivars had a significant effect on the number of leaves in the plant, with V1 verity giving the highest average (330.92, 350.58, 362.67 and 371.08) leaves.Plant^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while V2 verity gave the lowest average grade (311.67, 330.67, 346.17 and 350.25) leaves.Plant^{-1} for the 1, 2, 3 and 4 cultivars respectively. This may be due to the genetic nature of the cultivars. This is consistent with the results of Foster *et al.*, (2013), which indicated that there were significant differences between the varieties. The difference was attributed to the effect of certain genes or genes in producing on the other. The results of table 4, showed that the date of cultivation has a significant effect on the number of leaves in the plant, as the date D1 gave the highest average (358.17, 385.5, 403.67 and 405.67) leaves.Plant^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, while D4 gave the lowest mean of (280.83, 294.5, 294.5 and 309) leaves.Plant^{-1} for the 1, 2, 3 and 4 cultivars Sequentially. This is in line with the results of Jassem, (2014), which found that delayed agriculture reduced the time of vegetative growth due to the decrease in the number of hours of the day, which makes plants accelerate to reach the stage of ejaculation, which reduces their chances of continuing to produce number of leaves in the plant. The results of table 5, showed that there was a significant difference between the overlap between the cultivars and the date of cultivation in the number of leaves in the plant. V1D1 gave the highest mean value of (365.67, 393.33, 409 and 413.33) leaves.Plant^{-1} for the 1, 2, 3 and 4 cultivars Sequentially, Sequentially, while V2D4 gave the lowest mean (270, 287, 291.33 and 298.33) leaves.Plant^{-1} for cultivars 1, 2, 3 and 4 sequentially may be due to environmental genetic interference.

Conclusions

The cultivation of *Panicum maximum* is widely practiced in Iraq because of the important characteristics of the crop. Cultivation of the crop on the date 15/3 as an ideal date for planting because the temperature at this time is the most suitable for the conditions of germination.

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