



EFFECT OF SOME AGRICULTURAL OPERATION IN THE NUTRITIONAL VALUE OF THE MIXTURE FORAGE

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Abstract

The experiment was conducted during winter seasons: 2016-2017 and 2017-2018 in the field of agriculture college – Al-Qasim Green University – Babylon –Iraq to study effect of sowing dates and seeding rate in the nutritional value of the mixture fodder. The randomized complete block design was used under split-plots arrangement in three replications, the main plots were included three sowing dates (D1: 1 Sep., D2: 15 Sep. and D3: 1 Oct.), while the sub-plots were included seven of the seed rates: (Q1: 150 kg.ha⁻¹ barley, Q2: 130 kg.ha⁻¹ barley, Q3: 110 kg.ha⁻¹ barley+ 27 kg.ha⁻¹ clover, Q4: 90 kg.ha⁻¹ barley+ 23 kg.ha⁻¹ clover, Q5: 27 kg.ha⁻¹ clover, Q6: 100 kg.ha⁻¹ barley+ 27 kg.ha⁻¹ clover, Q7: clover 35 kg.ha⁻¹). The results showed: D3 treatment was superior in percentage of crude protein and crude protein yield in all seasons respectively, while the D1 treatment was superior in the percentage of crude fiber (24.40 and 23.87%) in all seasons respectively, Q7 treatment was given higher percentage of crude protein and total yield of crude protein, Q2 treatment was superior in the percentage of crude fibers, Q6 treatment was given the higher yield of crude fibers in the both seasons.

Key words : barley, clover, mixed stand, sowing dates.

Introduction

The mixed fodder is one of important elements for agricultural system which limit income, the mixture forage is rich in nutrients more than single forage, so the mixture give integration in resources (Ates *et al.*, 2013). For many years, the mixture of grain and legume crops use for fodder benefit from production of green feed and dry matter, the improvement of forage quality increase animal production, financial stability of farmers and addition to the continuity system of agricultural (Helmy *et al.*, 2011, Anil *et al.*, 1998), the increase of forage associate with the use of the mixtures, but the agriculture management of mixture forage has more difficult from single forage because there are differences in agricultural practices among farmers with increase biotic and abiotic stress.

Differences in sowing dates, fertilizer requirements, lack of water, plant populations, plant appearance, and harvest dates create problems for control mixture forage, The range of competition on available resources become high among plants in mixtures with increase plant density and species, However in the system of feed production, it is necessary to a balance in the composition between

grain and legume contents in the final product to ensure high quantity and quality production, The seed ratio in the mixture limit from the agricultural practice, the perfect forage mixture limit from mix between grains and legume (Jabbar, 2010), if the grain plants in the mixture increased, the total dry matter in mixture increase but the nutritional value of forage has been lack, while increase of the legume plants in the mixture improve the quality with lack in dry matter, so it is very important to the study of balance between grain and legume plants in forage content Jabbar (2013).

The study of the timing of planting has very important due to changes in the environments, these changes affect on the germination of seeds, plant growth, the overall biological processes and qualities of forage, therefore the sowing dates affect on the harvest date, so it is very important for the feed production system because the purpose is to find the best time of harvesting with best mixture, Jabber (2014) indicated that a mixture of barley + clover has given improvement in forage value by increasing quality and quantity production,

Bali *et al.*, (2010) found high percentage of protein in late dates of planting and balance between crude

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protein and crude fiber, Malik *et al.*, (2010) found in study three sowing dates 10 Sep., 1 and 15 Oct., the seeds of barley and Egyptian clover have sowed either separate or mix that the clover grow individually or mix give increase in percentage of crude protein and the protein content, Atis *et al.*, (2012) found that the optimum density gave high percentage of chlorophyll and high total yield, Jabbar (2013) indicate that barley give high forage at intercropping with clover, so the aim of study to find best sowing date and perfect density by study many seed rates.

Material and Methods

This Experiment was conducted during winter seasons 2016-2017 and 2017- in the field of Agriculture College, Al-qasim green University, Babylon, Iraq in silt clay loom table 1, the aim of study effect of sowing dates and seeding rate in the nutritional value of the mixture fodder, it was included the nutritional value of the mixture between barley and clover, the field was plowed once and tear down, it was divided in plot area 3x3m, the distances among lines were 20 cm, the randomized complete block design was used under split-plots arrangement in three replications, the main plots were

included three sowing dates (D1: 1 Sep., D2 : 15 Sep. and D3: 1 Oct.), while the sub-plots were included seven of the seed rates : (Q1: 150 kg.ha⁻¹ barley, Q2: 130 kg.ha⁻¹ barley, Q3: 110 kg.ha⁻¹ barley + 27 kg.ha⁻¹ clover, Q4: 90 kg.ha⁻¹ barley + 23 kg. ha⁻¹ clover, Q5: 27 kg.ha⁻¹ clover, Q6: 100 kg.ha⁻¹ barley + 27 kg.ha⁻¹ clover, Q7: clover 35 kg.ha⁻¹, Ibb 99 variety was used in experiment as barley cultivar while Muskawi variety was used as clover cultivar.

All experimental units were fertilized in 80 kg.h⁻¹ (Jehangir *et al.*, 2013), the irrigation was after sowing and given according to the need, the study traits were :

Percentage of crude protein (%)
– percentage of crude fiber (%) -
protein content (ton.h⁻¹) – fiber content (ton.h⁻¹).

The data analysis with L.S.D test in probability 5% (Steel and Torrie, 1997).

Results and Discussion

Percentage of crude protein

In the table 2 the results indicated a significant differences in sowing, the third date gave high crude protein in all seasons(15.90%), (15.48 %) while differ significantly from each other, the less than the first season was reached in the second season, which was reached(14. 36%) and the dates was not different between the second and first season. The third date may be due to

Table 1: Chemical and physical properties of soil.

Properties	Unit	First season	Second season
Sand	Gm.kg-1	174	177
Silt	Gm.kg-1	481	476
Clay	Gm.kg-1	345	347
Soil strength	-	Silt Clay loom	Silt Clay loom
pH	-	6.6	7.4
Ec	Ds.m ⁻¹	3	3.3
N	ppm	156.5	188.3
P	ppm	9.0	8.6
K	ppm	187	216

Table 2: Effect of planting date and seed rate in the percentage of crude protein.

Mean	Planting date			Seed rates k.h ⁻¹		Years	
	October 1	September 15	1 September	Berseem	Barley		
13.70	14.72	12.79	13.59	-	150	2017-2016	
13.18	14.30	12.09	13.14	-	130		
14.69	15.14	14.27	14.67	27	110		
15.86	16.77	15.45	15.36	23	90		
16.62	16.88	16.46	16.51	27	-		
14.82	15.36	14.52	14.60	27	100		
17.78	18.14	17.54	17.67	35	-		
15.23	15.90	14.73	15.07	Mean			
Mean	Planting date			Seed rates k.h ⁻¹			Years
	October 1	September 15	1 September	Berseem	Barley		
13.16	14.19	13.02	12.27	-	150	2018-2017	
12.83	13.87	12.75	11.86	-	130		
15.50	16.35	15.03	15.11	27	110		
14.34	14.77	14.36	13.91	23	90		
16.23	16.47	16.20	16.01	27	-		
14.49	14.97	14.32	14.18	27	100		
17.44	17.77	17.37	17.18	35	-		
14.85	15.48	14.72	14.36	Mean			
2017-2018		2016-2017		LSD 0.05			
0.72		0.66		Planting date			
1.41		1.64		Seed rates			
2.25		2.60		Interaction			

Table 3: Effect of planting date and seed rate in the percentage of raw fiber %.

Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
25.58	25.01	25.69	26.06	-	150	2017-2016
25.86	25.35	26.14	26.11	-	130	
24.20	23.57	23.79	25.24	27	110	
22.85	22.01	22.45	24.09	23	90	
22.49	22.53	22.34	22.59	27	-	
23.61	22.95	22.89	24.98	27	100	
21.42	21.49	20.99	21.78	35	-	
23.71	23.27	23.47	24.40		Mean	
Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
25.23	24.74	25.30	25.64	-	150	2018-2017
25.30	24.83	25.35	25.72	-	130	
22.46	21.75	21.94	23.68	27	110	
23.73	23.04	23.51	24.66	23	90	
21.88	21.83	21.88	21.93	27	-	
23.23	22.59	22.85	24.25	27	100	
21.13	21.15	21.01	21.24	35	-	
23.28	22.84	23.12	23.87		Mean	
2017-2018		2016-2017		LSD0.05		
0.84		0.83		Planting date		
2.14		2.10		Seed rates		
3.42		3.35		Interaction		

Raw fiber %

The results of table 3 show the significant effect of planting dates in percentage of fiber. The first season and the second and it is possible to note that the first date gave the highest percentage of the Raw fiber of the first season and the second (24.40%) (23.87%). Perhaps the reason for the superiority of the first date is that higher temperatures increase the plant content of raw fiber as there was a positive correlation between this class and the number of tillers. These results are consistent with Radwan, *et al.*, (1976), Jabbar M Kh (2010), who reported that the ratio of fiber increases with increasing temperatures. The results showed that there was a significant effect of seed quantities if barley was given 130 kg.h⁻¹, the highest percentage of raw fiber in the first season and the second was (25.86%) and (25.30%). This ratio did not differ with For single barley 150 kg h⁻¹ and Barley blend with clover 110 kg + 27 kg h⁻¹, While the Single Clover gave 35 kg h⁻¹ less than the first season of the first and second of the (21.42%)

the increase in the increase in the absorption of the nitrogen element is important to build protein with the reduce of the temperatures of this date (1). We note that there significant effect for if the single clover (35 h⁻¹) given (17.78%), (17.44%) in the first season and second season and has not been different from the clover is 27 kg.h⁻¹. the percentage of the protein reduce in barley 130 kg.h⁻¹ it rate (13.18%), (12.83%) for tow season. in the first and the second season It shows that there is a significant interaction. There is a significant overlap between the dates of agriculture and the quantities of seed, single clover (35 kg.h⁻¹) gave (18.14%) (17.77%) while the percentage of the protein reduce in barley 130 kg.h⁻¹ it rate (13.14%), (11.86%) for tow season. may be attributed to the superiority of clover alone in this grade. The presence of nitrogen-fixing bacteria nodes is important in building proteins. These results are consistent with EL- Karamany, *et al.*, (2009), EL- Karamany, *et al.*, (2012) and EL- Karamany, *et al.*, (2014) who found superiority of the single clover in the percentage of crude protein on the mixtures and single grains.

(21.13%) There was no significant about the clover 27-kg h⁻¹ and The blend of barley plus clover 90+ 23 kg.h⁻¹. show the results that there is an inevitable interference where he gives Barley 130 kg.h⁻¹ high percent. In the first and second season at the first date and (26.11%), (25.75%) in the respectively, there is no significant variation of barley 150 kg.h⁻¹ while the clover giving less than the first season and the second at the second date of 20.99% and 21.01% respectively. The cause of high raw rapidly or its decrease is due to this grade is linked to a significant mortality with the percentage of the crude protein. Where the more they have risen and other than the previously, the raw fibers in all malfunctions are ranging from raw fiber rabbits in the universal cultivated investigators and fibers in the single barley and this agency agreed with the reached by. Jabbar, *et al.*, (2011). found that the ratio of the Raw fiber in the mixtures of clover and grains were ranged between the ratio of raw fiber in clover and the percentage of raw fiber in single grains and that there is a negative correlation between the ratio of raw fiber and crude protein ratio.

Table 4: Effect of planting date and seed rate in total raw protein(ton.h⁻¹).

Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
1.34	1.48	1.30	1.25	-	150	2017-2016
1.27	1.41	1.18	1.22	-	130	
2.91	3.14	2.96	2.62	27	110	
3.42	3.85	3.40	3.02	23	90	
3.36	3.47	3.39	3.23	27	-	
2.91	3.33	2.20	3.20	27	100	
3.96	4.10	3.97	3.81	35	-	
2.74	2.97	2.63	2.62		Mean	
Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
1.23	1.35	1.24	1.09	-	150	2018-2017
1.18	1.30	1.19	1.05	-	130	
3.23	3.60	3.21	2.88	27	110	
2.77	2.97	2.90	2.44	23	90	
3.24	3.35	3.28	3.09	27	-	
3.09	3.15	3.09	3.03	27	100	
3.82	3.94	3.88	3.65	35	-	
2.65	2.81	2.68	2.46		Mean	
2017-2018		2016-2017		LSD 0.05		
0.19		0.27		Planting date		
0.30		0.41		Seed rates		
0.51		0.61		Interaction		

The total raw protein (ton. h⁻¹)

The results in table 4 show that there is a significant effect of the planting dates if the third date gave the highest protein yield of the first and second season was (2.97 ton.h⁻¹) (2.81 ton.h⁻¹) and did not differ significantly from the second date, while the first date was given the lowest percentage of this grade of (2.62 and 2.46 ton.h⁻¹) in the first season and the second is shown that there is a significant effect of quantity seed if given single clover interval (35 kg.h⁻¹) The highest crude protein yield was (3.96 and 3.82 tons.h⁻¹) for the first and second season of the relay, and differed significantly from all other transactions. While the barley (130 kg for hectares) gave lowest grade (1.27 and 1.18 tons.h⁻¹) to the first season and the second to relay and has not been different from the extensive barley 150 kg per hectare. The results also showed that there was a significant interaction, clover 35kg.h⁻¹ gave in the first and second season highest protein in the third date, 4.10 and 3.94 tons.h⁻¹, and a more difference from most of the other treatment while the barley 130 kg.h⁻¹ gave less in first and the second season 1.18 and 1.05 ton.h⁻¹ in the second and first time, It has

not been different from the single barley 150 kg.h⁻¹. The reason for the superiority of clover is attributed to giving it a dry substances in raw protein ratio. These results agree with the results of Mezni, *et al.*, (2013) which indicated the superiority of single clover in the raw protein on the mixtures with the plus of grains + legume .

The total raw fiber (ton. h⁻¹)

The data in table 5 indicate in that there is no significant effect of planting data in raw fiber for tow season It is shown that there is a significant effect of the quantity seed in raw fiber product if the mixture is given 100 kg barley plus 27 g.h⁻¹, A total of 5.06 and 4.86 ton.h⁻¹ in the first and second seasons respectively, did not differ significantly from the single clover, 35 kg per hectare, and the barley mixture was 90 kg plus 23 kg.h⁻¹, the treatment of barley single 150 kg per hectare given less than 2.32 and 2.19 per hectare for the first and second seasons, and did not differ significantly from barley 130 kg.h⁻¹. It is shown that there is a significant effect of the quantity seed in the raw fiber product if the mixture 100 kg barley + 27 kg.h⁻¹ clover A total 5.06 and 4.86 ton.h⁻¹

Table 5: Effect of planting date and seed rate in the total of raw fiber(ton.h⁻¹).

Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
2.32	2.40	2.35	2.24	-	150	2017-2016
2.33	2.37	2.36	2.26	-	130	
4.68	4.80	4.83	4.42	27	110	
4.84	5.00	4.85	4.67	23	90	
4.51	4.57	4.56	4.41	27	-	
5.06	4.91	4.95	5.33	27	100	
4.75	4.84	4.74	4.68	35	-	
4.07	4.13	4.09	4.00		Mean	
Mean	Planting date			Seed rates k.h ⁻¹		Years
	October 1	September 15	1 September	Berseem	Barley	
2.19	2.20	2.27	2.11	-	150	2018-2017
2.20	2.24	2.23	2.12	-	130	
4.63	4.84	4.62	4.43	27	110	
4.47	4.57	4.66	4.20	23	90	
4.32	4.41	4.39	4.16	27	-	
4.86	4.61	4.86	5.11	27	100	
4.62	4.68	4.68	4.49	35	-	
3.90	3.93	3.95	3.80		Mean	
2017-2018		2016-2017		LSD 0.05		
ns		ns		Planting date		
0.41		0.54		Seed rates		
0.71		0.82		Interaction		

in the first and second seasons respectively, it did not differ significantly from the single clover, 35 kg per hectare, and the barley mixture was 90 kg plus 23 kg.h⁻¹ in the district, giving the barley single 150 kg per hectare less than 2.32 and 2.19 per hectare for the first and second seasons, and did not differ significantly from barley 130 kg.h⁻¹. Results showed significant overlap Where the mixture was given barley 110 +27 kg per hectare higher And a significant difference from the number of other treatments while giving the barley single 150 Less than 2.24 and 2.11ton.h⁻¹ The first and second season , and have not been different from the barley treatment of 130 kg.h⁻¹ in the first and second season. The reason for the above treatment is due to the high percentage of dry matter and percentage of raw fiber the effect superiority.

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