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THE EFFECT OF MOWING DATES AND DIFFERENT NITROGEN LEVELS ON YIELD CHARACTERISTICS OF BARLEY (*HORDEUM VULGARE* L.)

Mohammed Salim Talib, Hasan Najim. Mansoor and Hayder Hilal abbas AL-Khafaji
Field crops department , Agriculture college , AL-Qasim Green University
Hasan.alsedy@agre.uoqasim.edu.iq haider079@agre.uoqasim.edu.iq

ABSTRACT

A field experiment was carried out during the winter season 2014/2015 in one of the fields of Abi Gharq district, located 10 km west of the Babylon governorate. The randomized complete block design was used under split-plots arrangement with three replications. The main plots were included levels of nitrogen fertilizer (without fertilizer, 50, 100, 150 N, 200, 250 kg). while the sub-plots were included (without a mower, a mower after 45 days, a mower after 65 days, a mower after 85 days) after planting, The data were taken and analyzed according to the used design and the averages were tested according to the LSD test, and the results were summarized as follows: The date of mowing C1 (mower after 45 days of planting) was significantly higher by giving the highest average for the degree of fallowness and the index of harvest, and the percentage of nitrogen in the green fodder was 3.647, 37.63% and 1.837%, respectively. Treatment C0 (without mower) outperformed significantly by giving it the highest average of biological yield, grain yield and nitrogen percentage in grains, as it gave 15,114 tons. H-1 and 5.73 tons. H-1 and 1.242%, respectively The fertilizer level N5 (250 kg N. H-1) gave the highest average of the degree of lying, biological yield, grain yield, nitrogen percentage in green fodder and nitrogen content in grains, as it gave 3.854% and 7.571 tons. H-1 and 6.20 tons. % And 1.397%, respectively, We conclude from the results of the study that lack of without cutting to a significant increase in the degree of resting, biological yield and grain yield, and we conclude that the high levels of nitrogen led to a significant increase in the degree of lying, biological yield, grain yield, and the proportion of nitrogen in green fodder and grains.

Keywords : Barley, mowing, Harvest index, Nitrogen%, Biological yield

Introduction

Barley is one of the most important cereal crops in the world after wheat and rice (Coarse, 1975). The world produces about 1.3 billion tons of barley per year from an area of 1.1 billion hectares (CSA, 2005). It is considered one of the main grains grown in Iraq and comes second after wheat in terms of importance, and the cultivated area of it represents about 36% of the total area planted with grain crops (Mahmoud, 2010). Barley is mainly used as animal feed either through the use of cereals in direct feeding or through the introduction of it in the preparation of diets or the production of green forage. Barley yields more tolerance to diseases and salinity than wheat, so its yields outweigh the wheat yield in inappropriate conditions (Younis *et al*., 1987). It is a field practice of barley crop because of its many benefits, including reducing the phenomenon of lying down experienced by local varieties and increasing the number of branches, that the barley yield during the season of 2-3 branches and this depends on the variety and its ability to regrow and the yield varies. Protein varies by mating date (Tikriti *et al*., 1981). Nitrogen fertilization is one of the important methods and treatments to address the shortage in the production of field crops. RNA and chlorophyll are included in the formation of carbohydrates and proteins (Gardner *et al*., 1990). Ramadan and Mohamed Ali (2010) indicated that increased nitrogen fertilizer and no mowing resulted in a significant increase in cereal yield of barley. Mohammed (2009) reported that grain yield and harvesting index increased significantly when nitrogen fertilizer was increased. Ehdai and Waines (2001) concluded that the nitrogen level increased from 105 to 170 kg N. h^{-1} led to an increase in the dry matter content of nitrogen for wheat crop (from 21.43 to 23.23 g). Kg. Kang (1989) found that the mower led to a decrease in the grain yield of the barley variety Doosan 22. Al-Haidari (2003) confirmed that there was an increase in the degree of lying down of plants by increasing the level of nitrogen fertilizer. N. h^{-1}Significant increase compared with levels (200 and 300) kg N. h^{-1}. This study was conducted for the purpose of determining the effect of mowing dates and its interaction with nitrogen on grain yield and some other traits.

Materials and Methods

A field experiment was carried out during the winter season 2014/2015 in one of the fields of Abi Gharq district, located 10 km west of the Babylon governorate. In silt clay soil. The soil of the field plowed two orthogonal plows, were used RCBD distribution with (split-plot -design). The main plot included six levels of nitrogen fertilizer (no fertilizer, 50, 100, 150, 200, 250) kg N h^{-1} (N0, N1, N2, N3, N4, N5) while the sub-plots were included Four mowing dates (without mow, mow after 45 days, mow after 65 days, mow after 85 days) after planting (C0, C1, C2, C3), with three replicates and the experimental unit area was 6 m^2 with dimensions (2

× 3) , There was a distance between the repeaters 2 m and the experimental units 1 m to prevent the leakage of nitrogen fertilizer between the experimental units. The number of experimental units was (72) experimental units. Phosphate fertilizer was added in the form of (46% P2O5) at a rate of (40 kg P.h^{-1}) Prior to tillage, urea fertilizer (46% N) was used as a source of nitrogen. According to the studied dates and at the level of (5 - 6) cm from the soil surface Latif *et al.* (1996), harvested at the stage of full maturity and when the. Humidity reached the appropriate degree The following characteristics were studied.

Characteristics:

1. Lying down
2. Biological yield
3. Grain quotient ton. h^{-1}
4. Harvesting index
5. Nitrogen content in green fodder
6. Nitrogen content in grains

The data were statistically analyzed using the Genstat statistical program and averages were compared against the least significant difference test (L S D) at a probability level of 0.05 (Steel and Torrie, 1980).

Table 1 : Some Physical and Chemical Properties of Field Soil Before Planting

Unit of	Measurement	Adjective Value
ds. m	1.79	Electrical conductivity
	7.4	Soil reaction pH
g.Kg^{-1}	1.51	Organic matter
g.Kg^{-1}	0.27	Ready Nitrogen
mg. Kg^{-1}	5.04	Ready phosphorus
		Soil separators
g.Kg^{-1}	343.0	Sand
g.Kg^{-1}	510.0	Silt Silt
g.Kg^{-1}	147.0	Clay
	Silty Loam	Tissue

Results and Discussion

Lying down

The results of Table (2) indicate that the mowing dates significantly affected the quality of lying. The duration from mowing to maturity on the first date gave sufficient time to increase the height of the plant and therefore decreased resistance to lying down,The results showed significant differences between nitrogen fertilizer levels in lying down. The N5 level gave the highest average of 3.854 while the comparison treatment gave the lowest average of 1.912.This may be due to the role of nitrogen in increasing cell division and the activity of marstim tissues. It is essential in the formation of oxygen through the formation of the amino acid (Tryptophan) which leads to increased cell elongation and activity (Wareing, 1983). In addition, the expansion of cells increases the area of leaves, which shade between plants, which in turn encourages the work of both oxygen and gibberellin to increase the elongation of the phalanges, especially the lower ones, which is referred to as an apparent characteristic in the occurrence of lying (Al-Haidari, 2003). In addition, an increase in the level of nitrogen leads to an increase in the percentage of protein in plant cells and thus increase the amount of protoplasm in the cells of the plant and cells become modern, which does not allow the deposition of carbohydrates on the cell walls and makes them more delicate and thus be more susceptible to lying (Alrais, 1985).

Biological yield ton.h^{-1}

The results of Table (3) showed that there were significant differences between the dates of mowing in the characteristic of the biologic yield. h^{-1} and C3 gave the lowest average of 8.160 tons. h^{-1}. This may be due to the fact that the comparison treatment C0 was characterized by increased plant height and the number of activities (data not shown) as a result of non-exposure to the stubble in addition to the increase in grain yield (Table 4). During mowing) the duration from mowing to plant maturity was insufficient to produce a high grain yield in late mowing treatment. These results are consistent with Mansour (2018), who found that barley moth caused a significant decrease in the biological yield compared to treatments that were not exposed to the mollusk. The results of Table (3) showed that the fertilizer level was higher than N5 in this capacity, giving the highest average of 17.571 tons. h^{-1} while the comparative treatment gave the lowest average of 5.860 tons. h^{-1} may be due to the role of nitrogen in increasing vegetative growth in general by increasing the height of the plant and the number of plants and the number of leaves and leaf area and thus increase the number of spikes and the number of grain spike and grain yield (data did not appear) and these results are consistent with Al-Haidari's findings (2003). There was significant overlap between mowing dates and nitrogen fertilizer levels in the biologic yield as the interaction between N4C0 gave the highest mean of 20.690 tons. h^{-1} was not significantly different from interference N5C0 and N5C1, which gave averages of 20.673 and 20.613 tonnes. h^{-1} on the sequence while interference between N0C3 gave the lowest average of 3.963 tonnes. h^{-1}.

Grain yield ton.h^{-1}

The results of Table (4) showed that there was a significant effect of mowing dates on grain yield. C0 gave the highest average of 5.73 tons. h^{-1}, while treatment C3 gave the lowest average of 2.69 tons. h^{-1}. This may be due to the fact that the mower led to a shorter growth period for new growths, insufficient time for production of spikes and the formation of spikes. These results are consistent with Munsif *et al.* (2013), Alazmani (2014) and Singh *et al.* (2014) that the date of late mowing leads to a significant decrease in grain yield and its components compared to no mowing or early mowing. The results indicate that the nitrogen fertilizer levels significantly affected this characteristic. did not significantly differ from treatment N4 while the comparison treatment N0 gave the lowest average of 1.85 tons. h^{-1}. This may be due to the significant effect of high levels of nitrogen on both the number of spikes and the number of grains in the spike (data not shown), as high levels of nitrogen were considered important factors in increasing the number of spikes and the number of grains in the spike and then the grain yield (Oweis and Pala, 1998). Table showed significant overlap between mowing dates and nitrogen fertilizer levels. N5C0 gave the highest mean of 7.61 tons. h^{-1} did not significantly differ from the combinations N5C1 and N4C0 while the combination N0C3 gave the lowest average of 0.96 tons.h^{-1}.

Harvest index %:

The results of Table (5) showed that there were significant differences between mowing dates in harvesting trait as C1 gave the highest average of 37.63% and did not differ from the comparison treatment C0 (without mow) which gave an average of 37.56% while C3 gave the lowest average of 31.61. %. This may be due to an increase in the grain yield.Table due to the increase of its components in addition to the equilibrium state in the biological yield of treatment C1. The results of Table showed that the nitrogen fertilizer levels had a significant effect in this trait. N3 gave the highest average of 39.83% while the comparison treatment gave the lowest average of 30.49%. Cereal yield and vegetative growth traits (number of plants and plant height) which have a significant effect on the biological yield These findings are consistent with Sharma and Smith (1986). Results shows a significant overlap between mowing dates and nitrogen fertilizer levels. The interference between N0C3 gave the lowest average of 24.29%.

Nitrogen content in green fodder

The results of Table (6) indicate that mowing dates significantly affected the nitrogen content of green fodder. C1 gave the highest mean of 1.837% while C3 gave the lowest average of 1.477%. This is accompanied by a radical total activity during this stage that led to an increase in the absorption of nutrients, including nitrogen in addition to the aging of the plant led to an increase in carbohydrates and fibers offset by a decrease in the proportion of protein, which is the main source of nitrogen. The results showed that nitrogen fertilizer level exceeded N5 in this capacity, giving the highest average of 2.144% while the comparison treatment gave the lowest average of 0.895%. The reason may be due to the active and positive role of nitrogen in increasing the total root of the plant, which led to the efficiency of the root absorption of water and nutrients. This finding is consistent with what Saadi (2005)and Karkhi (2014) found. Table shows the presence of significant interference in the results of this trait.

Nitrogen% in grains

The results of Table (7) showed that there was a significant effect of mowing dates on the nitrogen percentage in the grains. The comparison treatment gave C0 (no mow) the highest mean of this characteristic at 1.242%, while the date of mowing C3 gave the lowest average of 0.952%. It was not exposed to the stubble that had enough time to absorb the nutrients and stored in the vegetative total and then transferred to the grain during the period of their fullness, while the transactions that were exposed to the stubble lost most of the amount stored in the vegetative total as a result of the lawn and then benefited from the rest to compensate the exposed part To the beast. The results showed that the nitrogen fertilizer levels had a significant effect in this trait. N5 gave the highest mean for this trait at 1.397%. The reason for the increase of nitrogen available in the periphery of the roots is offset by the role of nitrogen in increasing the total root and improving the efficiency of absorption, which led to the increase of nitrogen stored in the vegetative total, which moved to the grain during the period of fullness. This finding is consistent with what Karkhi found (2014). Table shows that there was a significant overlap between mowing dates and nitrogen fertilizer levels.

Table 2: Effect of mowing and nitrogen fertilization dates and their interaction on average lying point.

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	2.450	2.117	1.783	1.300	1.912
N1	2.867	2.850	2.150	1.450	2.329
N2	3.083	3.500	2.717	1.633	2.733
N3	3.783	3.983	2.933	1.850	3.137
N4	3.950	4.533	3.250	1.917	3.412
N5	4.217	4.900	3.717	2.583	3.854
Average	3.392	3.647	2.758	1.789	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	0.338		0.293	0.559	

Table 3: Effect of mowing and nitrogen fertilization schedules and their interaction on the mean biogenic yield. h^{-1}

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	8.383	6.267	4.827	3.963	5.860
N1	10.560	8.737	7.747	5.613	8.164
N2	13.873	11.917	9.110	7.680	10.645
N3	16.687	15.143	12.873	9.120	13.456
N4	20.690	18.893	16.890	9.960	16.608
N5	20.673	20.613	16.373	12.623	17.571
Average	15.144	13.595	11.303	8.160	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	0.940		0.444	1.275	

Table 4: Effect of mowing and nitrogen fertilization dates and their interaction on average grain yield per ton. h^{-1}

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	2.85	2.23	1.36	0.96	1.85
N1	3.73	3.17	2.45	1.38	2.68
N2	5.84	4.72	2.58	2.35	3.87
N3	6.99	6.34	4.84	3.45	5.41
N4	7.36	6.83	5.62	3.93	5.93
N5	7.61	7.41	5.67	4.09	6.20
Average	5.73	5.12	3.75	2.69	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	0.421		0.144	0.499	

Table 5: Effect of mowing and nitrogen fertilization dates and their interaction on average harvesting index.

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	33.55	35.87	28.26	24.29	30.49
N1	35.33	36.30	32.17	24.62	32.10
N2	42.24	39.61	29.42	30.74	35.50
N3	41.89	41.92	37.62	37.88	39.83
N4	35.56	36.16	33.29	39.49	36.12
N5	36.78	35.89	33.77	32.62	34.77
Average	37.56	37.63	32.42	31.61	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	2.11		1.01	2.87	

Table 6: Effect of mowing dates and nitrogen fertilization and their interaction on average nitrogen content in green fodder.

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	——	1.160	0.851	0.674	0.895
N1	——	1.379	1.123	0.923	1.142
N2	——	1.990	1.613	1.542	1.715
N3	——	2.088	1.957	1.861	1.969
N4	——	2.134	1.990	1.885	2.003
N5	——	2.270	2.184	1.979	2.144
Average	——	1.837	1.620	1.477	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	0.036		0.023	0.057	

Table 7: Effect of mowing and nitrogen fertilization dates and their interaction on average nitrogen content in grains.

Nitrogen levels. kg h^{-1}	Cutting dates. day				Average
	C0	C1	C2	C3	
N0	0.705	0.634	0.472	0.393	0.551
N1	1.020	0.985	0.887	0.769	0.915
N2	1.225	1.226	1.129	1.009	1.147
N3	1.399	1.395	1.226	1.130	1.288
N4	1.540	1.421	1.293	1.193	1.362
N5	1.562	1.460	1.345	1.220	1.397
Average	1.242	1.187	1.059	0.952	
LSD	Nitrogen levels		Cutting dates	Interaction	
0.05	0.040		0.016	0.050	

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