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Effect of Nitrogen and Cultivars on Morphological traits of different Wheat Genotypes in Esfahan region

Farideh Samadiyan[1*], Ali soleymani[2], Farhood Yeganehpoor[3]

1. Student of MS in Agriculture, University of Azad Islamic Esfahan, Iran
2. Associate Prof Faculty of Agriculture, University of Azad Islamic Esfahan, Iran
3. PH.D. Student in Agronomy, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

Corresponding author: Farideh Samadiyan

ABSTRACT: In order to study effects of nitrogen and cultivars on morphological traits of different wheat genotypes an experiment was conducted at Agricultural Research Station of Islamic Azad University of Khorasgan (Esfahan) in 2011. The experimental was split plot in a randomized complete block design with three replications. In this experiment, different levels of nitrogen in the main plots included four levels (0, 50, 100 and 150 N) kg/ha urea and wheat varieties, including cultivars, Sepahan (between Clay) and SW (early) were placed in the subplots. Results showed that the effect of nitrogen on plant height, number of tillers, number of fertile tillers, number of fertile tillers, length and peduncle length were significant. Treatment fertilizer of 150 nitrogen kg/ha maximum number of tillers, number of fertile tillers per square meter, plant height, peduncle length and length compared to the other treatments. The total number of tillers was significant. Maximum number of fertile tillers and peduncle length was in Sepahan genotype.

***Keywords*:** Fertilizer, Height, Peduncle length and Sepahan

INTRODUCTION

Wheat among the oldest and most important crops in Iran and is considered a very long time and continues living life to the inhabitants of this planet has a significant role (Kazemi Arbt, 2004). The first wheat as food for humans and feed for livestock and poultry in the next phase as well as industrial applications is growing (Khodabandeh, 2005). Increase in wheat production through increased production efficiency; it is possible to successfully generate one aspect of the management of fertilizers and plant most of the light is. If enough water and nutrients to the plant if the light is the only factor that determines the amount of product per plant is. So here is the light extinction coefficient calculated absorption requirements for each area of climate modeling is important (Demotes-Mainarda and Jeuffroy, 2004). Light sources are necessary for plant growth. Light extinction coefficient K is a coefficient that represents the amount of light the plant is reduced. Light or radiation extinction coefficient decrease light penetration into the canopy is a concept that expresses the plants so that the leaves of the upper canopy should shoot angles less than K are greater than the horizontal leaves (Major and Otegu, 1996). The unique properties of light extinction coefficient crops, although in different varieties of the same species can also be changed (Sadeghzadeh, 1996). Evidence shows that the absorption of light in plant communities is more, the performance would be more. Biological and economic performance by increasing light absorption increases. However, the increasing shares of economic performance than is desired biological function of grain products (Saydgah, 1990; Yvnvsa, 1993). (Mi et al., 2000) concluded, nitrogen deficiency decreased spike and number of

grains per spike, but had no significant effect on grain yield. The effects of nitrogen fertilizer and the split were studied. Zero level of nitrogen fertilizer, 180, 120, and 90 kg N ha results showed that with increasing nitrogen up to 120 kg per hectare, number of stalks fertile area index and grain yield and number of Paws closely correlated with grain yield increased with increasing N up to 180 kg per hectare, but the difference was not significant (Samsvna and Pvrfysanvych, 1997).

MATERIALS AND METHODS

This experiment in year 2011-2012 Agricultural Research Farm Branch (Isfahan), located at latitude 32 degrees Khatoon Abad village 40 minutes north and longitude 51 degrees 48 minutes East, with an altitude of 1555 m. The sea level was implemented. The area under a very hot arid climate classification coupons and hot dry summers and cold winters are part.

Table 1. Physical and chemical properties of experimental field soil

Clay (%)	Soil (%)	Silt (%)	K (%)	P (%)	N (%)	OC (%)	pH	EC (ds)	Depth of soil (cm)
39	22	39	415	36	0.12	1.71	7.9	3.6	0-30
41	24	35	428	36	0.10	1	7.9	3.48	30-60

The experimental split plot in a randomized complete block design with three replications. In this experiment, different levels of nitrogen in the main plots included four levels (0, 50, 100 150 N) kg/ha and wheat varieties including cultivars, Sepahan (between Clay) and SW (early) were placed in the subplots. Elements needed to strengthen land and plant fertilizer according to soil test results of 100 kg /ha fertilizer urea (46% N) was on the ground before planting. 300 kg of nitrogen per hectare as well as the transition from vegetative to reproductive roads were down. November 14, 2012 and the planting density of 400 plants (m^2). Each sub-plot consisted of 10 lines with a planting distance of 15 cm and a length of 5 meters and implants lines in order to prevent any water mixing between the main plots 1.5 m in distance, was considered significant. The first irrigation was done immediately after planting other plants need watering by rainfall during the growing season was time. During the growing season to control weeds and herbicides in early spring due to rain outbreaks were sporadic. Planting the beginning and end of each line, half a meter as marginal effects was removed. of 10 lines in each plot planting, plot 3 lines along both sides can be removed and 4 formed the center line of the test population. To determine the plant height in physiological maturity stage, 10 plants randomly selected edge of the ground (the crown) to the top of the main spike regardless awn per cm were measured. Peduncle length, flag leaf node to the head from a distance of 10 randomly selected plants in compliance with the terms of the cm of the margin was measured by the ruler. Infertile and fertile tillers and the tillers counted in 10 randomly observing the periphery of the plant was determined at maturity. Data of the measured traits were analyzed using SAS and MSTATC software. Mean comparisons were performed using Duncan.

RESULTS AND DISCUSSION

Peduncle length

Effect of nitrogen on peduncle length was significant at 5% level (Table 2). Lowest peduncle length was obtained by treatment of 50 N kg/ha-treatment differences were not significant alone. Although there was a significant difference with other treatments. Peduncle length and the specific genotype effect was not significant (Table 2). However the highest and lowest peduncle length, peduncle length was obtained by Pishtaz was obtained by line-SW (Table 3).Grain is transferred. Other genotypic differences between cultivars peduncle length they will concerned. Interaction of nitrogen and variety on peduncle probability 5% level was significant (Table 2). The treatment of 50 N kg/ha Line SW peduncle length had the greatest difference was significant only with Sepahan genotype. lowest peduncle length were obtained by a number of leading digits Sepahan were not significantly different. The treatment of 150 N kg/ha peduncle length was pioneered by figures showed no significant difference with the lowest peduncle length were obtained by line-SW (Table 4).

Spike length

Effect of nitrogen on spike length was significant at 5% level (Table 2). Maximum length was obtained by treatment of 150 N kg/ha just different from the 100 N kg/ha treatment had no significant difference with other treatments significantly. Minimum length was obtained by treatment of 50 N kg/ha fertilizer treatments simply the difference was not significant, but showed a significant difference with other treatments. Our results indicate that nitrogen deficiency causes slow growth, decreased cell division and ultimately the length is short. The effect of cultivar on the length of the five was significant (Table 2). The maximum length was obtained by a number of other leading figures were significantly different. Sw minimum line length was obtained by the difference vs. Sepahan simply were not significant (Table 3). Significantly reduced due to compression of the number of spike length and decreasing the distance between them. Genotypic differences between cultivars in terms of their length are concerned. (Zare, 2006) in their study on barley, differences observed between varieties in terms of length.

Fertile tillers

Effect of nitrogen on No fertile tillers m^2 was significant at 5% level (Table 2). The minimum number of No fertile tillers was obtained by treatment of 150 N kg/ha different from merely 50 N kg/ha treatments were not significant (Table 3). The results show that increasing the intake of 100 to 150 N kg/ha of No fertile tillers was significantly decreased. Reducing the number of No fertile tillers plant affected by competition within and outside the plant struggling to access resources such as water, air, food, and especially light. The number of No fertile tillers m^2 was not significant and no trend was observed (Table 2). However most no fertile tillers by the leading other genotypes, the differences were not significant. The minimum number of No fertile tillers per square meter was obtained by Sepahan varieties (Table 3)

Number of total tillers

Effect of nitrogen on Number of total tillers m^2 was significant at 1% level (Table 2). Maximum number of tillers obtained by treatment of 150 N kg/ha was 100 kg/ha treatment differences were not significant, but no significant difference was observed. The lowest total tillers m^2 were obtained by treatment (Table 3). (Shahsavari and Saffari ,2005) observed experimentally that increasing N fertilizer increased wheat tillers. Increasing nitrogen levels increased to a certain extent of fertile and non-fertile tillers respectively. The total number of tillers m^2 was significant at the five percent level (Table 2). Maximum number of tillers per square meter was obtained by Pishtaz there was no significant difference with other treatments. The lowest number of tillers per square meter was obtained by line SW and Sepahan only difference was not significant (Table 3).

Height

Effect of nitrogen on plant height 1% probability level was significant (Table 2). Highest plant height was obtained by treatment of 150 N kg/ha significant difference with other treatments was the lowest plant height was achieved by treatment with other treatments, the difference was significant 50 and 100 N kg/ha treatments had no significant difference (Table 3). The results show that the consumption of 150 N kg/ha maximum height is achieved. There was no significant genotype effect on plant height were observed (Table 2). The minimum height of the line was genotype SW (Table 3). In the present study, genotypic differences between cultivars in height so that they will concerned, more precocious varieties produce less height. (Ataie Kachoei ,1998) and also (Demotes-Mainarda and Jeuffroy, 2004) stated that an agronomic traits plant height was affected by genotype and condition were significant differences between different varieties of the plant exist.

Table 2. Analysis of variance of morphological characteristics of different wheat cultivars under different levels of nitrogen fertilizer

		Mean square					
SOV	df	Peduncle length	Spike length	Number of No-fertile tillers	Number of fertile tillers	Number of total tillers	Height
Replication	2	2.28	5.01	0.05	0.007	0.04	1.36
Nitrogen	3	9.57*	14.16*	0.59*	3.755**	2.13*	53.32**
Ea	6	0.64	1.25	0.10	0.138	0.07	13.10
Genotype	2	0.98	12.70*	0.23	0.318	0.94*	14.52
Nitrogen×Genotype	6	1.54*	1.78	0.43	0.131	0.21	10.49
Eb	16	0.39	2.54	0.25	0.125	0.09	4.70

**,* are Non-significant and significant respectively at level 1 and 5 percent

Table 3. mean morphological characteristics of different wheat cultivars under different levels of nitrogen fertilizer

SOV	Peduncle length (cm)	Spike length (cm)	Number of No-fertile tillers (m^2)	Number of fertile tillers (m^2)	Number of total tillers (m^2)	Height (cm)
Nitrogen						
0	12.9b	12.05c	3.25a	2.80c	6.05b	98c
50	12.9b	12.99bc	3.13ab	3.23b	6.36b	102.7b
100	14.1a	13.98ab	3.38a	3.51b	6.90a	106.2b
150	15 a	14.96a	2.78b	4.33a	7.12a	116.2a
Genotype						
SW	13.4a	12.76b	3.08a	3.30b	6.38b	104.8b
Sepahan	13.8a	13.06b	3.04a	3.48ab	6.52b	105.5ab
Pishtaz	14 a	14.67a	3.30a	3.62a	6.92a	107a

Means in each column ,followed by at least one similar letter are not significantly different level-using Duncan's Multiple Range Test

Table 4. Comparison mean of morphological treat of the interaction of different wheat cultivars under different levels of nitrogen fertilizer

SOV		Peduncle length (cm)
Nitrogen	Genotype	
0	SW	12.47cd
0	Sepahan	13.10cd
0	Pishtaz	13.20cd
50	SW	13.53bc
50	Sepahan	13.10cd
50	Pishtaz	12.17d
100	SW	12.93cd
100	Sepahan	14.93a
100	Pishtaz	14.60ab
150	SW	14.87a
150	Sepahan	14.90a
150	Pishtaz	15.37a

Means in each column, followed by at least one similar letter are not significantly different level-using Duncan's Multiple Range Test

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