Diagnosis of growth traits of Triticale genotypes (X Triticosecale wittmack) tolerant to nitrogen stress and estimation of some genetic parameters.

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Abstract :
A field experiment was carried out in the agricultural experiments of the College of Agriculture - Kirkuk University, which is located below 44 longitude and 35 latitude during the agricultural season (2023-2024) with the aim of studying growth traits which are the number of days to 50% flowering, number of total tillers plant-1, plant height, spike length, flag leaf area, and leaf area) for six genotypes of triticale (Frah, mohand, hui/tub-1, cmh80, liron-5, caal) under conditions of nitrogen stress (80 and 160) kg N ha-1 Based on estimation of genetic parameters. The results showed that Mohand genotype prevailed in all the studied traits, while the nitrogen fertilization level of 80 kg ha-1 prevailed in traits of number of days to 50% flowering, plant height, number of total tillers plant-1, and spike length, while the Mohand genotype prevailed in traits of the nitrogen fertilization level 80 kg ha-1 prevailed in the traits of number of days to 50% flowering, the number of total tillers plant-1, spike length, flag leaf area, and leaf area, which were 113, 10.00, 13.50, 37.05, and 1863.90, respectively. All traits studied were under the control of the genetic factor, and heritability broad sense ratio was high for traits of number of total tillers plant-1, spike length, and leaf area, reaching 76.12, 96.90, and 63.54%, respectively. The expected genetic advance was medium for traits of number of total tillers plant-1, spike length, flag leaf area, and leaf area were 21.72, 19.71, 10.44, and 26.57%, respectively. Therefore, selection can be made for these traits to improve them.
Key words: Triticale, growth traits, nitrogen stress, genetic parameters .

.1Introduction:

Triticale is one of the new grain crops in the plant kingdom. It is the first hybrid between wheat and rye. The aim of its production was to combine the productive and technological qualities of wheat and the qualities of rye in terms of tolerance and resistance to environmental conditions that are not suitable for the growth of wheat, as triticale is distinguished by its ability to withstand high temperatures and many diseases. Triticale is characterized by strong vegetative growth in terms of plant height, leaf area, increased number of total tillers, resistance to lodging, and its ability to resist repeated mowing of the vegetative system, as it has the ability [1.[

The productive capacity of any plant depends on the service operations that are applied in the field according to precise scientific principles, taking into account the environmental conditions suitable for growth. Among these operations is attention to fertilization operations, as they are among the important production factors to provide what the plant needs of these elements and increase agricultural production and improve Its quality, especially the major elements such as

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nitrogen, as it is one of the elements that have an important role in increasing cell division and expansion, which is reflected positively in increasing the height of the plant and the number of leaves and shoots, which leads to an increase in the root system and shoots, and then increases the plant's yield in quantity and quality [2], and it is also considered one of the essential nutrients, because it is an essential element for the formation of amino acids that make up proteins in plants. In addition, it is involved in the synthesis of chlorophyll and other organic compounds that contribute to increasing plant growth and production [3.[

The method of selection is considered the oldest and simplest method used to improve crops, but it depends on the phenotypic traits that differ in the resulting generation as a result of their influence on environmental factors. This means that the trait, whether quantitative or descriptive, interferes with the environment in expressing itself and thus being transmitted to the offspring in the next generation. Here the heritability rate for the trait is known. [4]. Therefore, estimating genetic variations and the degree of heritability of physiological and phenotypic genetic traits is one of the priorities of breeding programs to obtain genetic progress from selection because selection depends on the amount of variation present in the materials used. Heritability is a measure of genetic variation attributed to the quantitative variation of a trait, and this is called broad sense heritability [5]. Heritability represents the amount of variation that is transmitted from parents to subsequent generations and affects selection for the trait in such a way that it determines the effective method of selection to improve the trait. From it, it is possible to predict the amount of expected genetic advance in the trait and determine its relative importance and genetic effects, as estimating high heritability and genetic advance is appropriate for selection and the degree of heritability is not High population yield is sufficient to obtain a high plant yield unless the plant yield in the original population from selection is high [6 [

Found [7] in their study of the effect of nitrogen fertilization levels on the growth and yield of rye wheat, when three levels of nitrogen (80, 100, and 120) kg N ha-1 were used, the level of 120 kg N ha-1 was superior to the plant height trait, as it was given in the first and second seasons was 80.12 and 79.85 cm for the two seasons, respectively, and the spike length reached 9.53 and 8.45 cm for the two seasons, respectively, while the level of 80 kg N ha-1 recorded the lowest averages for both seasons, as the plant height reached 64.10 and 69.40 cm, and the spike length reached 7.50 and 7.72 cm for the two seasons, respectively.

Used [8] six introduced genotypes of the triticale crop (Trapero, Panteon, Rotonda Fidelio, Dublat, and a local variety) to the superiority of the Dublat variety in plant height, flag leaf area, and spike length, as it gave the highest averages, reaching 112.99 cm and 35.61 cm2. and 15.08 cm, respectively, while the local variety recorded the lowest plant height and the smallest spike length, reaching 93.62 and 10.00 cm, respectively, and the Panteon variety recorded the lowest flag leaf area, reaching 19.07 cm2.

Concluded [1] that the genetic features represented by phenotypic and genetic variation, inheritance in the broad sense, and advanced genetic improvement were high in traits number of days to 50% flowering, plant height, number of total tillers, spike length, flag leaf area, and leaf area.

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It is usual, and within fertilizer recommendations, that large amounts of nitrogen fertilizers are used to increase crop yields, as doubling agricultural food production in all countries of the world has been linked to doubling the amounts of nitrogen fertilizers. Therefore, it has become necessary to develop new varieties that have distinct characteristics with low amounts of nitrogen. Therefore, the study aimed to identify varieties of Triticale with good growth characteristics under conditions of nitrogen stress by studying their genetic characteristics and knowing the growth characteristics that can be genetically improved and benefiting from their introduction into plant breeding programs in the future to produce hybrids that are distinct and highly productive in environments with low levels of nitrogen.

.2Materials and methods

A field experiment was carried out in the agricultural experiments of the College of Agriculture - Kirkuk University, which is located below 44 longitude and 35 latitude during the agricultural season (2023-2024) with the aim of studying growth traits (number of days to 50% flowering, plant height, number of total tillers, spike length, flag leaf area, and leaf area) for six compositions of triticale (Frah, mohand, hui/tub-1, cmh80, liron-5, and caal) under nitrogen stress conditions (80 and 160) kg N ha-1.

The experimental land was prepared, plowed, then smoothed, the land was leveled, and random samples were taken from it to conduct physical and chemical analyzes in the laboratories of the College of Agriculture/Hawija - University of Kirkuk, as shown in Table (1
(

Table 1. Analysis of the physical and chemical properties of field soil at a depth of 0.3 m.

No.	Type of analysis	Unit of measurement	Season 2023-2024
1	pH	---	7.1
2	E.C	ds.m^{-1}	2.21
3	Organic matter	%	0.85
4	N	ppm	0.42
5	P	ppm	7.5
6	K	ppm	43.68
Soil Texture			
7	Clay	%	4
8	Silt	%	52
9	Sand	%	44
10	Tissue	---	Silt loam

Triple superphosphate fertilizer (P2O5 46% + N 18%) was added as a source of phosphorus in one batch before planting, in an amount of 100 kg ha-1, and urea fertilizer with a concentration of (P2O5 18% + N 46%) was added as a source of nitrogen, in two batches, the first at the beginning of tillers stage and the second is in the elongation stage before heading of spike.

The genotypes were planted with an area of (1 x 1) m2 for each experimental unit, amounting to (36) experimental units, using a randomized

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complete block design (RCBD) according to factorial experiment. The first factor included genotypes, and the second factor included nitrogen fertilization levels in three replicates. Each replicate contained (12) experimental units, and 10 random plants were taken from the two middle lines of each experimental unit, and the peripheral plants were taken. They were excluded to account for the studied traits.

The computer program SAS 9.0 was used to conduct the statistical analysis, and the means between the genotypes and levels of nitrogen fertilization and the interaction between them were tested using Duncan's multiple range test to compare at a significance level of 0.05 [9.[

The components of phenotypic variance, which represent genetic variance, environmental variance, broad heritability, and expected genetic advance, were estimated according to the method [10.[

.3Results and discussion

It is noted from Table (2) related to the analysis of variance that the genotypes differed significantly among themselves in all the traits under study and at the probability level (0.01), while the levels of nitrogen fertilization differed from each other in traits of number of days to 50% flowering, and plant height at the probability level (0.01 .(

Nitrogen fertilization levels differed from each other in traits of flag leaf area at the probability level (0.05), and did not differ significantly from each other in traits of number of total tillers, spike length, and leaf area .

Through di-interaction, the genotypes and nitrogen fertilization levels differed significantly from each other in traits of number of days to 50% flowering, plant height, and leaf area at the probability level (0.01), while the genotypes and nitrogen fertilization levels differed. They differed significantly from each other in trait of leaf area at the probability level (0.05), and they did not differ significantly from each other in traits of the number of total tillers and spike length. This result agreed with [1, 8, 11 .[

Table 2. Analysis of variance for Genotypes, Nitrogen fertilization levels, and their interactions in the studied traits.

S. o. V.	D.F	No. of days to 50% flowers	Plant height	No. of total tillers	Spike length	Flag leaf area	Leaf area
Replicates	2	0.08	2.99	1.00	0.26	1.61	86272.31
Genotypes	5	8.32^{**}	288.84^{**}	11.20^{**}	11.86^{**}	92.82^{**}	663194.29^{**}
Nitrogen	1	14.69^{**}	337.64^{**}	$1.00^{n.s}$	$1.56^{n.s}$	116.78^{*}	$116747.50^{n.s}$
Geno*Nitro	5	4.09^{**}	457.91^{**}	$1.60^{n.s}$	$0.18^{n.s}$	65.65^{*}	164632.74^{**}
Error	22	0.27	4.55	1.00	0.67	18.84	89414.70

ns, * and **: non-significant, significant at 0.05 and 0.01 probability level, respectively.

No. of days to 50% flowers (day:(

The results of Table (3) show that the genotypes differed significantly among themselves in terms of number of days to reach 50% flowering, as the genotypes mohand and liron-5 were significantly

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superior and needed fewer days to reach this stage, taking 113.00 and 113.00 days, respectively. It was followed by the genotypes hui/tub-1 and cmh80, which recorded a number of days of 114.50 and 114.83 days, respectively, and the genotypes Frah and Caal needed a longer number of days to reach this stage, taking 115.67 and 115.50 days, respectively. The difference between the genotypes in number of days to reach 50% flowering may be due to the difference in the genetic makeup of these genotypes in their response to temperature and the length of the photoperiod.

Nitrogen fertilization levels differed significantly from each other, as the nitrogen fertilizer level of 80 kg ha-1 was superior, giving it the lowest average for the trait, amounting to 113.78 days, compared to the nitrogen fertilization level of 160 kg ha-1, which required a longer number of days to reach this stage, amounting to 115.06 days. Perhaps the reason is that the increase in nitrogen, which is part of the chlorophyll molecule, may increase the growth of leaves, which in turn will become outlets for metabolic products that are larger and stronger than the sexual organs, which leads to a delay in the plants reaching the flowering stage.

Regarding di-interactions, genotypes with nitrogen fertilization levels, the hui/tub-1 and cmh80 genotypes were affected by the nitrogen stress of 80 kg ha-1 and reached 113.00 days for each, while the mohand and liron-5 genotypes were not affected by the nitrogen fertilization levels of 80 and 160. kg ha-1 and amounted to 113.00 days for each of them, and therefore the genotypes mohand, hui/tub-1, cmh80, and liron-5 can be used to improve the trait of the number of days to reach 50% flowering through breeding programs. This result agreed with [12, 13 .[

Table 3. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the trait No. of days to 50% flowers (day).

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	115.67 bc	115.67 bc	115.67 a
mohand	113.00 d	113.00 d	113.00 c
hui/tub-1	113.00 d	116.00 ab	114.50 b
cmh80	113.00 d	116.67 a	114.83 b
liron-5	113.00 d	113.00 d	113.00 c
caal	115.00 c	116.00 ab	115.50 a
Means Nitrogen levels	113.78 b	115.06 a	

Means with the same letter are not significantly different at 0.05

Plant height (cm:(

It is noted from the results of Table (4) for plant height traits that the genotypes differed significantly from each other, as mohand, cmh80, and liron-5 genotypes excelled in producing the tallest plants, reaching 118.50, 119.17, and 119.25 cm, respectively. This may be due to their difference in Genetic composition and how it responds to the environment and benefits from it. It is also noted that the nitrogen fertilization level of 80 kg ha-1 showed a significant superiority of

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115.82 cm compared to the nitrogen fertilization level of 160 kg ha-1.

The results of the double interaction of the genotypes with nitrogen fertilization levels showed that the cmh80 and liron-5 genotypes responded to the nitrogen stress of 80 kg ha-1 and gave the highest rate of 125.00 and 124.00 cm, respectively. This means that the cmh80 and liron-5 genotypes can Utilizing it and introducing it into plant breeding programs to improve plant height. This result

Table 4. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the trait Plant height (cm).

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	97.08 d	120.67 b	108.88 b
mohand	116.33 c	120.67 b	118.50 a
hui/tub-1	116.00 c	95.67 d	105.83 c
cmh80	125.00 a	113.33 c	119.17 a
liron-5	124.00 ab	114.50 c	119.25 a
caal	116.50 c	93.33 d	104.92 c
Means Nitrogen levels	115.82 a	109.69 b	

Means with the same letter are not significantly different at 0.05

agreed with [7, 14, 15.[

cm compared to the nitrogen fertilization

No. of total tillers Plant-1 (tiller plant-1:(

The results of Table (5) showed that the genotypes differed significantly among themselves, as the genotypes Farah, Mohand, hui/tub-1, cmh80, and Caal did not show a significant superiority among them, and they reached 10.00, 10.00, 9.50, 9.00, and 10.00 tiller plant-1, respectively, but it differed significantly from the liron-5 genotype, which gave the lowest number of tillers, amounting to 6.50 tiller plants-1. The reason for the difference between genotypes in the number of tillers is due to the genetic factor, which is the basic factor for the plant's ability to produce tillers, and this leads to variation in genetic makeup for this trait.

The trait of the number of tillers Plant-1 was not affected by nitrogen fertilization, as the levels of nitrogen fertilization did not differ from each other significantly. This may be due to the fact that trait of the number of tillers is affected by the genetic factor more than it is by the environmental factor, so this trait was not affected by nitrogen fertilization. This was explained by [16] in their study that included fifteen genotypes of wheat, that 65% of this trait is under the influence of the genetic factor.

As for the di-interaction between genotypes with nitrogen fertilization levels, it is noted that the Farah, Mohand, and Caal genotypes gave a response to stress with nitrogen fertilization of 80 kg ha-1 and did not differ significantly from nitrogen fertilization of 160 kg ha-1 and gave the highest averages of 10.00, 10.00 and 11.00 tiller plant-1, respectively. Even the nitrogen fertilization level of 80 kg ha-1 was significantly higher than the nitrogen fertilization level of 160 kg ha-1 for the caal genotype, reaching 11.00 and 9.00 tiller plants-1, respectively. This result agreed with [12, 13, 15.[

We conclude from the above that the genotypes Farah, Mohand, and Caal showed a response to nitrogen stress of 80 kg ha-1, and therefore they can be used to improve the trait of the number of tillers plant-1, by introducing them into a plant breeding program

Table 5. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the trait No. of total tillers Plant^{-1} (tiller plant^{-1})

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	10.00 ab	10.00 ab	10.00 a
mohand	10.00 ab	10.00 ab	10.00 a
hui/tub-1	9.00 b	10.00 ab	9.50 a
cmh80	9.00 b	9.00 b	9.00 a
liron-5	7.00 c	6.00 c	6.50 b
caal	11.00 a	9.00 b	10.00 a
Means Nitrogen levels	9.33 a	9.00 a	

Means with the same letter are not significantly different at 0.05

Spike length (cm:(

It is clear from the results of Table (6) that the genotypes showed significant differences between them in the trait of spike length, as the genotypes Farah, Mohand, and hui/tub-1 excelled and gave the highest average for the trait, amounting to 13.33, 13.08, and 12.92 cm, respectively, and this may be This is due to their difference in genetic makeup and the extent of their response to the environment and benefiting from it.

The spike length was not affected by the levels of nitrogen fertilization, as the levels of nitrogen fertilization did not differ significantly from each other.

As for the di-interaction between genotypes and nitrogen fertilization, the trait was not affected either, which allows the possibility of exploiting genotypes with a nitrogen fertilization level of 80 kg ha-1 to improve the spike length characteristic, especially since all genotypes have responded to the stress of reducing the amount of nitrogen required, especially the combinations the genotypes, Farah, Mohand, and hui/tub-1, did not differ significantly from the other combinations, but they gave the highest averages with the nitrogen fertilization level of 80 kg ha-1, amounting to 13.67, 13.50, and 13.17 cm, respectively. This result agreed with [14, 17

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Table 6. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the trait spike length (cm)

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	13.67 a	13.00 a	13.33 a
mohand	13.50 a	12.67 a	13.08 a
hui/tub-1	13.17 a	12.67 a	12.92 a
cmh80	11.67 a	11.67 a	11.67 b
liron-5	10.00 a	10.00 a	10.00 c
caal	10.83 a	10.33 a	10.58 c
Means Nitrogen levels	12.14 a	11.72 a	

Means with the same letter are not significantly different at 0.05

Flag leaf area (cm2:(

It is noted from the results of Table (7) for the flag leaf area trait that the genotypes showed significant differences among themselves, as the Frah, hui/tub-1, and cmh80 genotypes excelled and gave the highest average for the trait, amounting to 36.37, 37.26, and 41.44 cm2, respectively. The reason for this may be due to their difference in genetic makeup, which leads to differences in the nature of growth, the ability to photosynthesize, and the preparation of nutrients needed for growth, and the expansion of the flag leaf as a result of the genetic difference between genotypes, as the flag leaf is one of the important indicators in the photosynthesis system. The plant has a major and influential role on yield, as it contributes up to 83% of the products of the photosynthesis process that reach the spike.

It is also noted that the level of nitrogen fertilization differed significantly among them in relation to the flag leaf area, as the level of nitrogen fertilization exceeded 160 kg ha-1 and gave the largest flag leaf area of 37.12 cm2 compared to the level of nitrogen fertilization 80 kg ha-1, and the reason for this may be due to Increasing the levels of nitrogen fertilizer increases the chlorophyll pigment in the leaves, which in turn leads to an increase in the efficiency of the photosynthesis process, and this in turn is reflected positively in the leaf area of the plant.

Regarding the di-interaction, it is noted that the genotypes hui/tub-1 and cmh80 with a nitrogen fertilization level of 160 kg ha-1 significantly outperformed the rest of the treatments and gave the highest average for the trait, amounting to 40.47 and 46.77 cm2, respectively. Although the genotypes above showed superiority in the trait, they cannot be selected to improve the trait of flag leaf area because they did not show the ability to tolerate a lack of nitrogen fertilization, unlike the Farah and Mohand genotypes, which showed their ability to tolerate the stress of a lack of nitrogen and gave greater averages with the nitrogen fertilization level of 80 kg ha-1 reached 37.68 and 37.05 cm2, respectively, compared to the nitrogen fertilization level of 160 kg ha-1, which gave averages of 35.06 and 31.33 cm2, respectively, through which the flag leaf area

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can be improved. This result agreed with [8, 12.[

Table 7. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the Flag leaf area (cm^2)

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	37.68 bc	35.06 bcde	36.37 ab
mohand	37.05 bc	31.33 cde	34.19 bc
hui/tub-1	34.04 bcde	40.47 ab	37.26 ab
cmh80	36.10 bcd	46.77 a	41.44 a
liron-5	28.66 de	31.98 cde	30.32 c
caal	27.58 e	37.11 bc	32.35 bc
Means Nitrogen levels	33.52 b	37.12 a	

Means with the same letter are not significantly different at 0.05

Leaf area (cm2 plant-1:(

The results of Table (8) for the leaf area trait show that the genotypes showed significant differences among themselves, as the Frah, Mohand, hui/tub-1, and cmh80 genotypes outperformed the rest of the genotypes and gave the highest average for the trait, reaching 1818.06, 1718.95, 1779.98, and 1861.68. cm2 plant-1, respectively, and the reason for this may be due to their difference in their genetic makeup, which leads to a difference in the nature of growth and the ability to photosynthesize and prepare the nutrients needed for growth.

Leaf area was not affected by nitrogen fertilization levels, as nitrogen levels did not differ significantly from each other.

As for the di-interaction, the genotypes hui/tub-1 and cmh80 excelled with the nitrogen fertilization level of 160 kg ha-1 and gave an average of 2029 and 2111.53 cm2 plants-1, respectively, and the genotypes Farah and mohand with the nitrogen fertilization level of 80 kg ha-1, which gave an average of 1884.17 and 1863.90 cm2 plant-1, respectively. Although the hui/tub-1 and cmh80 genotypes showed superiority in the trait, they cannot be selected to improve the leaf area trait because they did not show the ability to withstand the lack of nitrogen fertilization, unlike the Farah and Mohand genotypes, which showed the ability to withstand stress due to the lack of nitrogen fertilization. Nitrogen gave greater averages with the nitrogen fertilization level of 80 kg ha-1 compared to the nitrogen fertilization level of 160 kg ha-1, through which the leaf area trait can be improved. This result agreed with [8, 12 .[

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Table 8. Effect of Genotypes, Nitrogen fertilization levels, and their interactions in the leaf area (cm^2 $plant^{-1}$)

Genotypes	Nitrogen 80 Kg ha^{-1}	Nitrogen 160 Kg ha^{-1}	Means Genotypes
Frah	1884.17 abc	1751.96 bcd	1818.06 ab
mohand	1863.90 abcd	1573.99 cd	1718.95 ab
hui/tub-1	1530.77 cd	2029.20 ab	1779.98 ab
cmh80	1611.83 cd	2111.53 a	1861.68 a
liron-5	997.50 e	948.26 e	972.88 c
caal	1510.98 d	1667.57 cd	1589.27 b
Means Nitrogen levels	1566.52 a	1680.42 a	

Means with the same letter are not significantly different at 0.05

Genetic Parameters:

The results of Table (9) for estimating genetic parameters show that the genetic variance was greater than the environmental variance in all the traits studied. This is due to the control of genetic factors over these traits and the possibility of improving them genetically.

The heritability broad-sense ratio was high for the traits number of total tillers plant-1, spike length, and leaf area, reaching 76.12, 96.90, and 63.54%, respectively. This is due to the high value of genetic variation compared to phenotypic variation, and a medium for the trait number of days to reach 50% flowering reached 49.58%, and low plant height and flag leaf area reached 23.69 and 36.04%, respectively.

The expected genetic advance was medium for the traits number of total tillers plant-1, spike length, flag leaf area, and leaf area, reaching 21.72, 19.71, 10.44, and 26.57%, respectively. Therefore, selection can be made for these traits to improve them, and low traits of the number of days to reach 50% flowering and the plant height reached 1.25 and 5.20%. Therefore, selection is not useful, and these traits can be improved through hybridization methods used in plant breeding programs. This result agreed with [18, 19, 20 .[

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Table 9. Estimates of genetic parameters for all studied traits.

Traits / Genetic Parameters	No. of days to 50% flowers	Plant height	No. of total tillers Plant^{-1}	Spike length	Flag leaf area	Leaf area
σ^2 Genotypes	1.34	47.38	1.70	1.86	12.33	95629.93
σ^2 Error	0.09	1.52	0.33	0.22	6.28	29804.90
σ^2 Phenotypes	2.71	200.02	2.23	1.92	34.21	150507.51
$H_{B.S}$%	49.58	23.69	76.12	96.90	36.04	63.54
AG	1.43	5.86	1.99	2.35	3.69	431.37
AG%	1.25	5.20	21.72	19.71	10.44	26.57

σ^2= variance. $H_{B.S}$= Heritability broad sense. AG= Advance Genetic. AG%= Advance Genetic, as mean trait

Conclusion :

From the above, it is clear that mohand genotype has shown tolerance to nitrogen stress in the traits of the number of days to 50% flowering, number of total tillers plant-1, spike length, flag leaf area, and leaf area, while the frah genotype has shown tolerance to nitrogen stress in the traits of the number of total tillers plant-1, length spike, flag leaf area, leaf area, for the nitrogen fertilization level of 80 kg ha-1. Therefore, it is possible to benefit from the mohand and frah genotypes in improving the utilization of most of the studied traits, and this is confirmed by the genetic parameters, as all the traits were under the control of the genetic factor more than the environmental factor, and thus These traits can be improved either by selection or introduced into plant breeding programs to produce hybrids that carry genes capable of tolerating nitrogen stress for all the traits studied.

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