

USING DIVISION OF CHEMICAL FERTILIZER (N) TECHNIQUE ON GROWTH AND YIELD TRITICALE AND REDUCTION OF ENVIRONMENTAL POLLUTION

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(Received 5 February, 2020; accepted 11 March, 2020)

ABSTRACT

The experiment was conducted in fields of field crops department-agriculture college / Al-qasim green university in winter season 2018-2019, the field ground was tilled, smoothed and modified, The field was divided according to Randomized Completely Block Design with three replications, the plots were included five treatments from division of the N fertilizer : N₀ : without addition, N₁ : 1/2 at planting- 1/2 at stem elongation, N₂ : 1/4 at planting -1/2 at stem elongation – 1/4 at booting, N₃ : 1/3 at planting - 1/3 at stem elongation -1/3 at booting and N₄ : 1/4 at planting - 1/4 at stem elongation - 1/2 at booting, 825 triticale cultivar was used with seedling rate 100 kg.h⁻¹ in lines planting at distance 20 cm among lines, the weeds were removed, the study traits were : plant height - No. of grains. spike⁻¹ - grain 1000 weight- grains yield – percentage of proteins. The results were appeared that the treatment N₄ gave high value while the treatment N₀ gave less value in plant height, the high mean in grain 1000 weight found in treatment N₄ comparison with treatment N₀ which gave value, the treatment N₄ also gave higher grain yield in plant while the treatment N₀ gave lower value in plant. The results appeared variation in percentage of protein, the treatment N₄ gave high value compared with the treatment N₀ which gave low value.

KEYWORDS : Division fertilizer, Growth stage, Nitrogen, Triticale

INTRODUCTION

Triticale is one of grain fields followed Poaceae family, it found from hybridization between Wheat and Rye, its grains use as animal feed or mix with grains of wheat to bake bread, because of grain contents include high of protein, so its grains used for food industry, flower and starch (Seguchi *et al.*, 2000).

Mineral nutrition is one of the culture keys in Triticale, many studies on distribution of nitrogen which need from plant in many different stages were conducted because of his role in accumulation of dry matter and increase grain yield. field experiment in china included three nitrogen levels with three nitrogen rates in three growth stages (two seasons) appeared different among the treatments in plant height and grain 1000 weight (Mingwei *et al.*, 2017). In Lithuania, six fertilizer treatments divided

to two additions make third treatment give high number of grains per spike (Daiva, 2013). In turkey, experiment included 80 kg nitrogen fertilizer divided to two quantity once and three quantity another to three cultivars of triticale appeared significant in second treatment of all cultivars in grain yield and protein content (Burhan and Nimet, 2009).

So this study was conducted to know application of nitrogen in three growth stages with its division.

MATERIALS AND METHODS

The experiment was conducted in fields of field crops department – agriculture college / Al-qasim green university in winter season 2018-2019, the field ground was tilled, smoothed and modified, then the soil properties were measured in Table 1, triple super phosphate (P₂O₅ 45%) was used as rate

150 kg N. h⁻¹ added at before planting.

The field was divided according to Randomized Completely Block Design with three replications, the plots were included five treatments from division of the N fertilizer :

N₀ : without addition

N₁ : 1/2 at planting – 1/2 at stem elongation

N₂ : 1/4 at planting – 1/2 at stem elongation – 1/4 at booting

N₃ : 1/3 at planting – 1/3 at stem elongation – 1/3 at booting

N₄ : 1/4 at planting – 1/4 at stem elongation – 1/2 at booting

825 triticale cultivar was used with seedling rate 100 kg.h⁻¹ in lines planting at distance 20 cm among lines, the weeds were removed, the study traits were : plant height – No. of grains. spike⁻¹ – grain 1000 weight – grains yield – percentage of proteins.

The data were analyzed by RCBD in Genstat program, the means were compared by LSD test at probability level 0.05.

Table 1. Some physical and chemical properties of soil

Trait	Value	Unit
Sand	655	g. kg ⁻¹
Clay	250	g. kg ⁻¹
Silt	95	g. kg ⁻¹
pH	6.7	
E.C.	5.78	ds. m ⁻¹
Organic material	1.379	%
NH ₄	7	mg. kg ⁻¹
NO ₃	13.44	mg. kg ⁻¹

RESULTS

The results in Table 2 appeared increase in plant height from variation among treatments, the treatment N₄ gave high value 74.1 cm while the treatment N₀ gave less value 68.5 cm, there are not significant effect to division nitrogen and its addition on number of grains in spike. In Table 2, the

high mean in grain 1000 weight found in treatment N₄ and its value was 52.69 g comparison with treatment N₀ which gave value 45.93 g, the treatment N₄ also gave higher grain yield with value 444.49 g in plant while the treatment N₀ gave lower value 244.12 g in plant. The results in Table 2 appeared variation in values of percentage of protein, the treatment N₄ gave high value 10.32% compared with the treatment N₀ which gave low value 9.27%.

DISCUSSION

The results showed variations among treatments in plant height also as foundy Waraich *et al.* (2007), the division of fertilizer and addition in different stages assisted in increase number of stem nodes in different growth stages and its role in internodes elongation from division and expansion cells, the nitrogen enter in composite of tryptophan amino acid is essential in indole acetic acid composite which is necessary for elongation (Taiz, 2002).

The reason of make non-significant addition nitrogen on number of grains in spike stage because there are not direct effect to nitrogen on Pollination and fertilization of flowers (Frederick and Camberato, 1995). The indirect effect of nitrogen from increase of leaf area and photo synthesis lead to increase food materials accumulation for transferring from source to the grains and addition nitrogen in different stages lead to increase grain 1000 weight (Alley, 2009).

The grains yield and protein content increase from role of nitrogen in form amino acid, cell division, increase growth roots, dry substance accumulation and absorption of elements from soil (Abedi *et al.*, 2011; Ellen, 1987).

Recommendation

The division of fertilizer give high space to more fertilization benefit from plants, so it is very

Table 2. Effect nitrogen addition on growth and yield traits

Treatments	Plant height (cm)	No. of grains spike ⁻¹	Grains 1000 weight (g)	Plant grains yield (g)	Percentage of protein (%)
N ₀	68.5	85.9	45.93	244.12	9.75
N ₁	71.6	87.9	47.43	302.18	9.99
N ₂	71.9	93.4	48.84	364.38	10.10
N ₃	72.0	93.8	49.98	418.71	10.19
N ₄	74.1	94.9	52.69	444.49	10.32
L.S.D. _{0.05}	2.52	N.S	2.58	29.93	0.008

important to division the nitrogen fertilizer and addition it.

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