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Response of Seed Yield and Its Components of Bread Wheat to Different Level of Combination Chemical and Biological Fertilizer and Several Type of Application Fertilizer

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ABSTRACT

BACKGROUND: Application of bio-fertilizers, especially the plant growth promoting bacteria, is most important strategy for the integrated management of the plant nutrition in the sustainable agriculture system with sufficient input.

OBJECTIVES: Current study was conducted to investigation the effect of different rate of combination fertilizer and biological fertilizer and type of application biofertilizer on crop production of Wheat.

METHODS: This research was carried out via factorial experiment based on randomized complete blocks design with three replications along 2020-2021 year. The treatments included different rate of combination Nitrogen fertilizer and Biofertilizer (Fla Wheat) (a_1: 100% nitrogen with nonuse of Fla Wheat as control or N_{100}/F_0, a_2: 70% Nitrogen with Fla Wheat or N_{70}/F_1, a_3: 40% Nitrogen with Fla Wheat or N_{40}/F_1) and several methods of applying biofertilizer (Fla Wheat) (b_1: 100% Seed treatment, b_2: 100% by irrigation, b_3: 50% seed treatment with 50% by irrigation).

RESULT: According result of analysis of variance effect of different level of fertilizer combination, method of application fertilizer (instead number of spikelet per spike) and interaction effect of treatments (instead number of spike per m^2 and number of spikelet per spike) on all measured traits was significant.

Mean comparison result of different level of fertilizer combination showed that maximum amount of seed yield (7032.1 $kg.ha^{-1}$), biologic yield (15315 $kg.ha^{-1}$), Harvest index (45.89%) number of spike per m^2 (384.84), number of spikelet per spike, number of seed per spikelet (18.02), number of seed per spike (2.23) and 1000-seed weight (40.26 gr) was noted for N_{100}/F_0 and minimum of those belonged to N_{40}/F_2 treatment.

As for Duncan classification made with respect to different level of Method of application fertilizer the highest and lowest amount of measured traits was for M_3 and M_2 treatment.

CONCLUSION: Generally result of this study revealed to save energy and produce economic yield application 70% Nitrogen with biofertilizer (Fla Wheat) at 50% seed treatment with 50% by irrigation recommended.

KEYWORDS: *Crop production, Harvest index, Microbacterium, Nutrition, Seed weight.*

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1. BACKGROUND

The most basic material need of humanity is the access to resources including air, food, and water in sufficient amounts. Although the use of chemical fertilizers adds large amounts of nutrients to the soil, plants are not able to absorb all these nutrients and materials so that the material accumulation over years has led to the current acute problems such as erosion, soil destruction, environmental pollutions, salt accumulation, and changes in pH of the soil and thus reduced fertility, creation of undesirable complexes, reduced levels of organic carbon, biodiversity loss, genetic erosion, and finally the disruption of the food chain (Dastmozd *et al*., 2015). Organic farming has emerged as an important priority area globally in view of the growing demand for safe and healthy food and long term sustainability and concerns on environmental pollution associated with indiscriminate use of agrochemicals. Though the use of chemical inputs in agriculture is inevitable to meet the growing demand for food in world, there are opportunities in selected crops and niche areas where organic production can be encouraged to tape the domestic export market (Venkatash-Warlu, 2008). Biofertilizers are more environmental friendly and in many cases, they have given the same or even better crop yields compared to mineral fertilizers (Saghir Khan *et al.,* 2007). So far considerable number of bacterial species, mostly associated with the plant rhizosphere, were tested and found to be beneficial for plant growth, yield and crop quality. They have been called 'plant growth promoting rhizobacteria (PGPR)' including the strains in the genera Azospirillium, Azotobacter, (Sudhakar *et al.,* 2000). PGPR participates in many key ecosystem processes, such as those involved in the biological control of plant pathogens, N fixation, solubilisation of nutrients and phytohormone synthesis (Vessey, 2003). Biological fertilizers release active precursors like gibberellin, auxin, cytokinine, vitamins, amino acids, polypeptides, anti-bacteria and anti-fungi especially exo polysaccharides to have a positive effect on yield of crops. Applied microorganisms as biological fertilizers have effects on growth of the plant to provide food elements by colonization in rhizosphere environment or in cooperation with symbiotic (Elanwar, 2010). On the other hand, these bacteria can produce fungi complexes that they can be used against plant diseases and improvement of germination and at last growth of the plant. These bacteria can reinforce performance of the plant by fixation of nitrogen and producing of materials causing growth stimulation, root growth and as a result water absorbent, reforming acidity of the soil and absorbing of food elements (Mahfouz and Sharaf-Eldin, 2007). Ahmad *et al.* (2010) showed that higher yield under the effects of biologic fertilizers might be because of the increase in metabolic activities of biologic fertilizers and production of growth stimulating hormones by bacteria. Also Bahamin *et al*. (2014) showed that when seeds were in inculcation by Nitroxin biologic fertilizer seed yield reached 3840 kg per hectare, showing

28% increase compared to non-inculcation treatment. Seed yield of cereals is determined by two main components, seed number per unit area and mean seed weight. Seed yield is usually strongly associated with the number of seeds per unit area (Azimi *et al.,* 2013). While this association has been extensively reported for a relatively wide range of environments. The final seed number per unit area is set immediately after anthesis, while seed filling occurs during the remaining post anthesis period (Ugarte *et al.,* 2007). Considering to the environmental pollution caused by the indiscriminate use of nitrogen fertilizers, development of biological strategies for safe and cost-effective option for management of nitrogen in order to reduce the dangers of indiscriminate use of it, is one of the priority in the sustainable agriculture (Sahoo *et al*., 2013).

2. OBJECTIVES

Current study was conducted to investigation the effect of different rate of combination fertilizer and biological fertilizer and type of application biofertilizer on crop production of Wheat.

3. MATERIALS AND METHODS

3.1. Field and Treatments Information

This research was done to evaluate Nitrogen fertilizer and Biofertilizer (Fla Wheat) on growth indices of Wheat crop via factorial experiment based on randomized complete blocks design with three replications along 2020-2021 year. Place of research was located in Hamidiyeh city at longitude 48°40'E and latitude 36°31'N in Khuzestan province (Southwest of Iran). The treatments included different rate of combination Nitrogen fertilizer and Biofertilizer (Fla Wheat) (a_1: 100% nitrogen with nonuse of Fla Wheat as control or N_{100}/F_0, a_2: 70% Nitrogen with Fla Wheat or N_{70}/F_1, a_3: 40% Nitrogen with Fla Wheat or N_{40}/F_1) and several methods of applying biofertilizer (Fla Wheat) (b_1: 100% Seed treatment, b_2: 100% by irrigation, b_3: 50% seed treatment with 50% by irrigation). This experiment had 36 plots. Each plot consisted of 9 lines with a distance of 20 cm and 5 meters length. Physical and chemical properties of studied field was mentioned in table 1.

Table 1. Physical and chemical properties of studied field

Soil texture	Clay (%)	Silt (%)	Sand (%)	K (ppm)	P (ppm)	N (%)	OC (%)	pH	EC ($ds.m^{-1}$)	SP (%)
Clay loam	52	27	21	168	9.1	0.039	0.6	7.2	3.5	48

3.2. Farm Management

According to the fertilizer recommendation of the soil and water department of the Agricultural and Natural Resources Research Center of Khuzestan Province, the rate of application urea fertilizer was 300 $kg.ha^{-1}$ (equivalent to 138 $kg.ha^{-1}$ pure nitrogen). Phosphorus fertilizer from triple superphosphate source at the rate of 90 $kg.ha^{-1}$ and potash fertilizer from potassium sulfate source at the rate of 50 $kg.ha^{-1}$ were applied as a base before planting. 1/3 of nitrogen fertilizer was applied as a base and the remaining

2/3 at tillering and steam elongation stage. Distilled water was used instead of Fla Wheat in the control treatment. It should be noted that according to the manufacturer's recommendation, for every 100 kg of seeds, one liter of Fla Wheat biofertilizer was used as seed treatment. Place the seeds in the shade on nylon or a clean surface and sprinkle the bio-inoculum gradually on the seeds after shaking and mix well so that all of them are evenly impregnated with fertilizer. Then, in the shortest time after drying the seeds in the shade, planting was done. In the method of inoculation with irrigation in two shifts (each stage in the amount of one liter per hectare and at intervals of 40 days) Fla Wheat biofertilizer was applied with irrigation water. The first stage was at the beginning of the stem and the second stage was at the time of pollination. Fla Wheat biofertilizer contains *Microbacterium sp*. This biofertilizer increases wheat yield in dry and irrigated conditions due to its growth-promoting bacteria (10^7-10^8 CFU per gram) and production of natural growth hormones.

3.3. Measured Traits

In order to determine the seed yield and its components, the two side rows and half a meter of the beginning and end of each plot were eliminated as the marginal effects and finally the ultimate samples were taken from an area of 1 m^2. In order to determine the number of spikes per area unit, the spikes were taken from an area of 1 m^2 of then three middle lines of each plot after considering half a meter of beginning and end of each line as the margin and after counting the spikes their mean was considered as the number of spikes per area unit. As many as 10 spikes were randomly selected from the middle lines of each plot and the number of seeds was counted carefully and their mean was recorded. Two 500-seed samples were randomly selected from the produced seeds by each plot and if the weight difference of the two samples was less than 5%, the total weight of the two samples was considered as weight of 1000-seed. After full maturity of the seeds, the spikes were taken from the 3 middle lines of each plot in an area of 1 m^2 and the seed yield of each plot with moisture of 14% was calculated per area unit and then was recorded. Harvest index (HI) was calculated according to formula of Gardner *et al*. (1985) as follows: **Equ.1.** HI= (Seed yield/Biologic yield) ×100.

3.4. Statistical Analysis

Analysis of variance and mean comparisons were done via SAS (Ver.8) software and Duncan multiple range test at 5% probability level.

4. RESULT AND DISCUSSION

4.1. Seed yield

According result of analysis of variance effect of fertilizer combination, method of application fertilize and interaction effect of treatments on seed yield was significant at 1% and 5% probability level, respectively (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum seed yield was noted for N_{100}/F_0 (7032.1 $kg.ha^{-1}$) and minimum of that belonged to N_{40}/F_2 treatment

(2791.4 kg.ha^{-1}) (Table 3). As for Duncan classification made with respect to different level of Method of application fertilizer maximum and minimum amount of seed yield belonged to M_3 (5462.1 kg.ha^{-1}) and M_2 treatment (4469.3 kg.ha^{-1}) (Table 4).

Table 2. Result of analysis of variance effect of treatment on measured traits

S.O.V	df	Seed yield	Biologic yield	Harvest index	No. spike per m^2
Replication	2	2421*	643^{ns}	11.57**	189.22**
Fertilizer combination (F)	2	404948**	631352**	760.86**	3782.87**
Method of application fertilize (M)	2	22273**	14899**	74.10**	93.30**
F×M	4	1644*	2075*	4.69*	17.67^{ns}
Error	16	435	477	0.46	8.56
CV (%)	-	7.04	17.72	21.67	4.87

$^{ns, *\text{ and }**}$: no significant, significant at 5% and 1% of probability level, respectively.

Continue table 2.

S.O.V	df	No. spikelet per spike	No. seed per spikelet	No. seed per spike	1000-seed weight
Replication	2	0.8686**	0.00174^{ns}	1.66^{ns}	5.303**
Fertilizer combination (F)	2	20.1142**	0.93774**	595.40**	300.457**
Method of application fertilize (M)	2	0.2417^{ns}	0.09508**	35.53**	15.282**
F×M	4	0.0365^{ns}	0.01172*	4.50*	1.805*
Error	16	0.0368	0.00306	1.04	0.531
CV (%)	-	7.69	15.11	21.85	12.64

$^{ns, *\text{ and }**}$: no significant, significant at 5% and 1% of probability level, respectively.

Evaluation mean comparison result of interaction effect of treatments indicated maximum seed yield was noted for N_{100}/F_0 and M_3 (7389.7 kg.ha^{-1}) and lowest one belonged to N_{40}/F_2 and M_2 treatment (2366.4 kg.ha^{-1}) (Table 5). Eydizadeh *et al*. (2010) stated that biological fertilizers increase the root contact with soil and ultimately increase the absorption of nutrients. Mentioned researchers also stated that the production of various acids by bacteria could lead to more organic solubility of the soil. It seems that the effect of bio-fertilizers provides up to 50% of the plant's nutritional requirements, and the rest of the plant's needs must be provided through the use of chemical fertilizers. Hojattipor *et al*. (2014) reported that the maximum total dry weight was obtained in wheat with increasing nitrogen fertilizer up to 225 kg.ha^{-1}, along with biological nitrogen fertilizer of nitrokara.

4.2. Biologic yield

Result of analysis of variance revealed effect of fertilizer combination, method of application fertilize and interaction effect of treatments on biologic yield was significant at 1% and 5% probability level, respectively (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum biologic yield was noted for N_{100}/F_0 (15315 kg.ha^{-1}) and minimum of that belonged to N_{40}/F_2 (10018 kg.ha^{-1}) treatment (Table 3). As for Duncan classification made with respect to different level of Method of application fertilizer maximum and minimum amount of biologic yield belonged to M_3 (13107 kg.ha^{-1}) and M_2 treatment (12304 kg.ha^{-1}) (Table 4).

Table 3. Effect of different method of Fertilizer combination on measured traits

Fertilizer combination	Seed yield (kg.ha^{-1})	Biologic yield (kg.ha^{-1})	Harvest index (%)	No. spike per m^2
N_{100}/F_0	7032.1a	15315a	45.89a	384.84a
N_{70}/F_1	5016.5b	12669b	39.46b	372.99b
N_{40}/F_2	2791.4c	10018c	27.75c	344.92c

*Mean which have at least once common letter are nit significant different at the 5% level using (DMRT)
N_{100}/F_0: 100% nitrogen with nonuse of Fla Wheat as control or, N_{70}/F_1: 70% Nitrogen with Fla Wheat or, N_{40}/F_1: 40% Nitrogen with Fla Wheat.

Continue table 3.

Fertilizer combination	No. spikelet per spike	No. seed per spikelet	No. seed per spike	1000-seed weight (gr)
N_{100}/F_0	18.02a	2.23a	40.26a	44.95a
N_{70}/F_1	17.17b	1.91b	32.76b	40.86b
N_{40}/F_2	15.11c	1.58c	24.01c	33.55c

*Mean which have at least once common letter are nit significant different at the 5% level using (DMRT)
N_{100}/F_0: 100% nitrogen with nonuse of Fla Wheat as control or, N_{70}/F_1: 70% Nitrogen with Fla Wheat or, N_{40}/F_1: 40% Nitrogen with Fla Wheat.

Evaluation mean comparison result of interaction effect of treatments indicated maximum biologic yield was noted for N_{100}/F_0 and M_3 (15468 kg.ha^{-1}) and lowest one belonged to N_{40}/F_2 and M_2 treatment (9555 kg.ha^{-1}) (Table 5). Shabankareh (2018) stated increasing nitrogen use efficiency is important and strategies such as cultivars with higher nitrogen uptake efficiency change in fertilizer type, management time of fertilizer application and more split fertilizer need to be recommended. Moosavi *et al*. (2013) recommended to apply 225 kg.ha^{-1} nitrogen with the minimum density of 50 plants m^{-2} to obtain economical yield of grain sorghum had the positive effect to increase grain yield. Increase protein percentage with using bio-fertilizers is due to the effect of bacterial inoculation that increased the effective regulation of the growth, physio-

logical and metabolic activity of the plant (Eidy Zadeh *et al*., 2012).

4.3. Harvest index

According result of analysis of variance showed effect of fertilizer combination, method of application fertilize and interaction effect of treatments on harvest index was significant at 1% and 5% probability level, respectively (Table 2). Result of mean comparison of the fertilizer combination showed the maximum of harvest index was obtained for N_{100}/F_0 (45.89%) and minimum of that (27.75%) was for N_{40}/F_2 treatment (Table 3).

Table 4. Effect of different method of application Fertilizer on measured traits

Method of application fertilizer	Seed yield ($kg.ha^{-1}$)	Biologic yield ($kg.ha^{-1}$)	Harvest index (%)	No. spike per m^2
M_1	4908.8b	12591ab	37.76b	367.53ab
M_2	4469.3c	12304b	34.80c	364.39b
M_3	5462.01a	13107a	40.54a	370.83a

*Mean which have at least once common letter are nit significant different at the 5% level using (DMRT)

Continue table 4.

Method of application fertilizer	No. spikelet per spike	No. seed per spikelet	No. seed per spike	1000-seed weight (gr)
M_1	16.79a	1.91ab	32.39b	39.73ab
M_2	16.59a	1.82b	30.34c	38.51b
M_3	16.92a	2.01a	34.31a	41.12a

*Mean which have at least once common letter are nit significant different at the 5% level using (DMRT)

Evaluation mean comparison result indicated in different level of method of application fertilizer the maximum amount of harvest index was noted for M_3 (40.54%) and minimum of that belonged to M_2 (34.80%) treatment (Table 4). Evaluation mean comparison result of interaction effect of treatments indicated maximum harvest index was noted for N_{100}/F_0 and M_3 (47.75%) and lowest one belonged to N_{40}/F_2 and M_2 treatment (24.74%) (Table 5). Hosseini *et al*. (2013) reported the maximum and the minimum amount of nitrogen harvest index belonged to control (66.41%) and 270 $kg.ha^{-1}$ (58.52%) treatments, respectively. Application of high levels of nitrogen fertilizer than to lower levels resulted in a significant decrease in this index. The reason for this trend can be stated that with increasing nitrogen application, a certain range of nitrogen transfer to the seed will be stopped, similar to the absorption of more nitrogen from the soil, although application of 270 $kg.ha^{-1}$ nitrogen did not lead to further increase in seed yield. Delogu *et al*. (1998) in their study of wheat and barley cultivars founded that increasing nitrogen application led to significant decrease in nitrogen harvest index, and there was a significant difference for all studied levels in their experiments.

4.4. Number of spike per m²

Result of analysis of variance showed effect of fertilizer combination and method of application fertilize on number of spike per m^2 was significant at 1% probability level, but interaction effect of treatments was not significant (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum number of spike per m^2 was noted for N_{100}/F_0 (384.84) and minimum of that belonged to N_{40}/F_2 (344.92) treatment (Table 3).

Table 5. Mean comparison interaction effects of treatments on measured traits

Fertilizer combination	Method of application fertilizer	Seed yield (kg.ha^{-1})	Biologic yield (kg.ha^{-1})	Harvest index (%)	No. seed per spikelet	No. seed per spike	1000-seed weight (gr)
N_{100}/F_0	M_1	6947.1b	15275ab	45.47ab	2.23ab	40.27ab	44.83ab
	M_2	6759.4b	15203ab	44.45b	2.21ab	39.51ab	44.60ab
	M_3	7389.7a	15468a	47.75a	2.27a	41.02a	45.43a
N_{70}/F_1	M_1	4974.9d	12470c	39.88c	1.91c	32.71c	40.72c
	M_2	4281.9e	12154c	35.21d	1.75d	29.60d	39.21c
	M_3	5792.8c	13381b	43.28b	2.06b	35.99b	42.66b
N_{40}/F_2	M_1	2804.4fg	10028e	27.94e	1.62e	24.19e	33.65d
	M_2	2366.4g	9555f	24.74f	1.46f	21.92f	31.74e
	M_3	3203.6f	10472d	30.58e	1.72d	25.94e	35.26d

*Mean which have at least once common letter are nit significant different at the 5% level using (DMRT)

N_{100}/F_0: 100% nitrogen with nonuse of Fla Wheat as control or, N_{70}/F_1: 70% Nitrogen with Fla Wheat or, N_{40}/F_1: 40% Nitrogen with Fla Wheat.

As for Duncan classification made with respect to different level of Method of application fertilizer maximum and minimum amount of number of spike per m^2 belonged to M_3 (370.83) and M_2 treatment (364.39) (Table 4). The correct and proportional nitrogen application rate of fertilizers increases wheat grain yield by increasing the number of spikes per unit area, and increasing the number of seeds per spike has a lower role in raising the yield (Fowler and Brydon, 2001). Researchers reported that the increase in nitrogen consumption increases the number of spikes per unit area, which can increase vegetative growth and, consequently, increase the amount of tillering due to nitrogen consumption. In such a situation, the number of fertilized tillers per unit area increases and the number of spikes per unit area also increases (Mosanaei *et al*., 2017).

4.5. Number of spikelet per spike

Result of analysis of variance revealed effect of fertilizer combination on number of spikelet per spike was significant at 1% probability level but effect of method of application fertilize and interaction effect of treatments was not significant (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum number of spikelet per spike was noted for N_{100}/F_0 (18.02) and minimum of that belonged to N_{40}/F_2 (15.11) treatment (Table 3). Some researchers reported the increase of nitrogen causes a significant increase of the number of tillers per

plant and fertilized tillers, leaves surface and durability of flag leaf, biological yield, number of spike per square meter and number of seeds per spike and the positive and significant effects of these traits on the seed yield, also a positive correlation between the number of seeds per spikelet and the number of spikelet per spike with the seed yield (Ehdaie and Waines, 2001; Kumar *et al*., 2001).

4.6. Number of seed per spikelet

According result of analysis of variance showed effect of fertilizer combination, method of application fertilize and interaction effect of treatments on number of seed per spikelet was significant at 1% and 5% probability level, respectively (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum number of seed per spikelet was noted for N_{100}/F_0 (2.23) and minimum of that belonged to N_{40}/F_2 treatment (1.58) (Table 3). Evaluation mean comparison result indicated in different level of method of application fertilizer the maximum amount of number of seed per spikelet was noted for M_3 (2.01) and minimum of that belonged to M_2 (1.82) treatment (Table 4). Assessment mean comparison result of interaction effect of treatments indicated maximum number of seed per spikelet was noted for N_{100}/F_0 and M_3 (2.27) and lowest one belonged to N_{40}/F_2 and M_2 treatment (1.46) (Table 5). Mohajeri and Ghadiri (2003) reported that increasing the amount of nitrogen had a significant effect on increasing the seed number per wheat spike and this increase was clear at nitrogen levels from 0 to 100 $Kg.ha^{-1}$ but higher than this range, increasing the seed number per spike was not significant.

4.7. Number of seed per spike

Result of analysis of variance revealed effect of fertilizer combination, method of application fertilize and interaction effect of treatments on number of seed per spike was significant at 1% and 5% probability level, respectively (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum number of seed per spike was noted for N_{100}/F_0 (40.26) and minimum of that belonged to N_{40}/F_2 treatment (24.01) (Table 3). As for Duncan classification made with respect to different level of Method of application fertilizer maximum and minimum amount of number of seed per spike belonged to M_3 (34.31) and M_2 treatment (30.34) (Table 4). Evaluation mean comparison result of interaction effect of treatments indicated maximum number of seed per spike was noted for N_{100}/F_0 and M_3 (41.02) and lowest one belonged to N_{40}/F_2 and M_2 treatment (21.92) (Table 5). According to the research of Mosanaei *et al*. (2017), the effect of nitrogen fertilizer on the number of wheat spikes was significant, which was consistent with the results of the present study. Nitrogen increases the biomass production and increases the possibility of retransmission of photosynthetic materials, producing more seeds per spike and better filling them after flowering, which will increase seed yield (Shanggan *et al*., 2000).

4.8. 1000-seed weight

According result of analysis of variance showed effect of fertilizer combination, method of application fertilize and interaction effect of treatments on 1000-seed weight was significant at 1% and 5% probability level, respectively (Table 2). Mean comparison result of different level of Fertilizer combination indicated that maximum 1000-seed weight was noted for N_{100}/F_0 (44.95 gr) and minimum of that belonged to N_{40}/F_2 treatment (33.55 gr) (Table 3). Sadeghi and Kazemeini (2011) reported increasing the amount of nitrogen application increased the weight of 1000-seed in barley varieties. Since nitrogen fertilizer increases dry matter production and leaf area, barley seed also became heavier with increasing nitrogen application. Evaluation mean comparison result indicated in different level of method of application fertilizer the maximum amount of 1000-seed weight was noted for M_3 (41.12 gr) and minimum of that belonged to M_2 (38.51 gr) treatment (Table 4). Assessment mean comparison result of interaction effect of treatments indicated maximum 1000-seed weight was noted for N_{100}/F_0 and M_3 (45.43 gr) and lowest one belonged to N_{40}/F_2 and M_2 treatment (31.74 gr) (Table 5). Asghari *et al*. (2006) reported that the increase in fertilization rate from 0 to 150 kg ha^{-1} led to increase grain yield (8.56 $kg.ha^{-1}$) significantly. Almodares *et al*. (2009) suggested applying 200 $kg.ha^{-1}$ urea because the highest biomass and protein content and the lowest fiber content will be achieved with at this amount of nitrogen fertilizer.

5. CONCLUSION

Generally result of this study revealed to save energy and produce economic yield application 70% Nitrogen with biofertilizer (Fla Wheat) at 50% seed treatment with 50% by irrigation recommended.

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FOOTNOTES

AUTHORS' CONTRIBUTION: All authors are equally involved.

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