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Research article

EFFECT OF PHOSPHORUS FERTILIZER AND MYCORRHIZA ON PROTEIN PERCENT, DRY WEIGHT, WEIGHT OF 1000 GRAIN IN WHEAT

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ABSTRACT: The mutualistic association between roots and mycorrhizal fungi can improve a plant's nutritional state since it facilitates the absorption of the main elements in the soil (N, P, K), increases the volume of soil explored by the root system, improves the plant's resistance to some diseases, and increases its production of dry matter. The mobility of this element is very slow in the soil physiological and biochemical plant activities like and cannot respond to its rapid uptake by plants. This study is a factorial experiment in a randomized complete block design with three replicates and all experiments were performed with different levels. In this experiment, a variety of wheat called clear that improved cultivars were used. According to the analysis of variance table mycorrhiza effect on grain yield, harvest index, Plant dry weight, Weight of 1000 grains was significant.
Key words: harvest index, grain yield, wheat

INTRODUCION

Wheat (*Tritium aestivum* L.) is the most important crop in the world and this plant is among the 'major three' cereal crops that provided 20 percent of the energy in human food [1, 20]. Phosphorus is one the most essential elements for unavailable to the plants after its application in the soil. Plant growth after nitrogen. However, the availability of They referred this to formation of strong bonds between this nutrients for plants is limited by different chemical phosphorous with calcium and magnesium in alkaline reactions especially in arid and semi-arid soils. pH and the same bonds with iron and aluminum in acidic Phosphorus play a significant role in several soils. The mobility of this element is very slow in the soil physiological and biochemical plant activities like and can not respond to its rapid uptake by plants. This photosynthesis, transformation of sugar to starch, and causes the creation and development of phosphorus transporting of the genetic traits. Sharma [20] reported depleted zones near the contact area of roots and soil that one of the advantages of feeding the plants with in rhizosphere. Therefore, the plants need assisting phosphorus is to create deeper and more abundant roots. System which could extend beyond the depletion zones Phosphorus causes early ripening in pants, decreasing and help to absorb the phosphorus from a wider area by grain moisture, improving crop quality and is the most developing an extended network around root system [19], sensitive nutrient to soil pH [14]. Revision is made necessary on ways to increase crops because of environmental problems resulting from the use of chemical fertilizers, their energy and production costs, and negative effects on their life cycle and ecological sustainability of farming ecosystems, and the good quality supply of enough food for a growing world population. Meanwhile, extensive farming operations with high performance justifies the extensive use of chemical fertilizers, which are costly and polluting the environment. So, recently, sustainable agriculture based on biological fertilizer has attracted a lot of interest [8]. The mutualistic association between roots and mycorrhizal fungi can improve a plant's nutritional state since it facilitates the absorption of the main elements in the soil (N, P, K), increases the volume of soil explored by the root system, improves the plant's resistance to some diseases, and increases its production of dry matter [4, 8]. Mycorrhizal roots due to their extramatrical hyphae that are capable of absorbing and translocating nutrients, can explore more soil volume than the non- mycorrhizal roots [10], and thus increase the supply of slowly disusing ions, such as phosphate to the plant [15].According to Sajedi and Madani [18] mycorrhizal fertilizer significantly increased grain number per row, number of grains per ear, ear weight and grain yield of corn.

Since few studies globally and especially in the field of mycorrhizal bio-fertilizers on the millet have been done, scientific information in this field is necessary. It has been reported that VAM in oculation enhanced the growth of barley signicantly in soils with low available P [6, 16], while such improvement in barley growth was not significant in an irradiated soil containing moderate amounts of available phosphorus [9]. The effects of mycorrhizas seem to increase in non-optimal nutritional conditions. In environments with scarce precipitation, the presence of these fungi can make the plants more resistant to water stress and strengthen their ability to use the nutrients naturally occurring in the soil [13, 19]. Al-Karaki [2] showed that mycorrhiza inoculated maize plants have more dry matter than non-inoculated plants due to salinity. Also inoculation of salt stressed tomatoes with mycorrhiza meaningfully increased their dry weight of root and shoots compared to non– mycorrhiza inoculated plants [2].

MATERIALS AND METHODS

In this study, research crops planted in 2011, and Khash mountain stage carried the gem industry. This study is a factorial experiment in a randomized complete block design with three replicates and all experiments were performed with different levels. In this experiment, a variety of wheat called clear that improved cultivars were used. Mycorrhiza arbuscular fungi (AM) in both the inoculated and non-inoculated with three levels of nitrogen and phosphorus fertilizer in three levels as other experimental treatments were used. Urea nitrogen is used by organizations of agricultural support services were provided. The farm has been in previous years under fallow land preparation including plowing, disk loader and fustigation is. The plowing by moldboard plow to a depth of 30 cm was used. The operation of the disc, the disc plow was perpendicular offset to a depth of 15 cm. To soil and plant nutrient land of the amount needed according to soil test results fustigation was done. To measure this trait after five plants were randomly selected and harvested from the middle two lines by removing the border took place clusters each of the plant to seed removed separately the for the plant out and counting were recorded. After data collection, by ANOVA statistical program SPSS, MASTATC took.

RESULTS AND DISCUSSION

Protein (%)

According to the analysis of variance table mycorrhiza effect on Protein was significant (Table 1). According to the analysis of variance table Phosphorus effect on Protein was not significant (Table 1). The highest of the treated seed weight per 50 kilograms (15.22) and the lowest from the control treatment (14.27), respectively (Table 2).

Grain yield

According to the analysis of variance table mycorrhiza effect on grain yield was significant (Table 1). According to the analysis of variance table Phosphorus effect on grain yield was significant (Table 1). The highest of the treated seed weight per 100 kilograms (5102.2) and the lowest from the control treatment (4111), respectively (Table 2).

Table 1. ANOVA analysis of the wheat affected by interactions of mycorrhiza in phosphorus

S.O.V	df	Protein (%)	Grain yield	Harvest index	Plant dry weight	Weight of 1000 grains
R	2	0.59	44.6	49.16**	149.1	18.66
Mycorrhiza	2	5.22**	398.5*	64.6**	582.5*	1.50
P	2	0.3	582.5*	20.7*	231.9	34.56*
P*M	2	0.281	554.8*	33.8*	598.07*	18.2
C.V	-	0.221	112.9	7.9	185.4	10.5

*, **, ns :significant at $p<0.05$ and $p<0.01$ and non-significant, respectively.
P: Phosphorus, M: Mycorrhiza

According to Sajedi and Madani [18] mycorrhizal fertilizer significantly increased grain number per row, number of grains per ear, ear weight and grain yield. Therefore, in Future greatest efforts and emphasis to increase yield components should be devoted to grain weight [11]. Effect of Arbuscular mycorrhizal fungi on wheat looked at the results of this experiment showed that grain yield increased application of effect of arbuscular mycorrhiza fungi on wheat looked at the results of this experiment showed that grain yield increased application of mycorrhiza [12, 17].

Harvest index

According to the analysis of variance table mycorrhiza effect on harvest index was significant (Table 1). According to the analysis of variance table Phosphorus effect on harvest index was significant (Table 1). The highest of the treated seed weight per 100 kilograms (77.2) and the lowest from the control treatment (61.4), respectively (Table 2).

Table 2. Mean comparison of different characteristics influenced by mycorrhiza and phosphorus interactions.

Mean-square					
	Protein (%)	**Grain yield**	**Harvest index**	**Plant dry weight**	**Weight of 1000 grains**
Inoculated					
0 kg	15.18	4260.4e	66.2d	618.6d	46.2
50 kg	15.22	4563.3c	70.5bc	738.1b	47.22
100 kg	15.05	5102.2a	77.2a	780.4a	51.3
Non-inoculated					
0 kg	14.27	4111.4f	61.4e	596.6	46
50 kg	14.73	4550d	68cd	639.6c	47.11
100 kg	14.50	4958b	71.5b	768.00a	47.22
Any two means not sharing a common letter differ significantly from each other at 5% probability					

With increasing concentrations of nitrogen and phosphorus caused a significant effect on grain protein machine is such that with increasing levels of nitrogen and phosphorus, respectively, to 30 and 60 kg per hectare, seed protein can also enhance agricultural ties [3]. High levels of fertilizer (nitrogen and phosphorus) caused a significant effect on Harvest index in rice by high levels of nitrogen and phosphorus that are increased Harvest index [5].

Plant dry weight

According to the analysis of variance table mycorrhiza effect on plant dry weight was significant (Table 1). According to the analysis of variance table Phosphorus effect on plant dry weight was significant (Table 1). The highest of the treated seed weight per 100 kilograms (780.4) and the lowest from the control treatment (596.6), respectively (Table 2). Clover cultivation mycorrhiza reported that the significant increase in the uptake of phosphorus and this increase in nitrogen and dry weight increase [13].

Weight of 1000 grains

According to the analysis of variance table mycorrhiza effect on weight of 1000 grains was not significant (Table 1). According to the analysis of variance table Phosphorus effect on weight of 1000 grains was significant (Table 1). The highest of the treated seed weight per 100 kilograms (51.3) and the lowest from the control treatment (46), respectively (Table 2). The research showed that a root symbiosis with fungi mycorrhiza fennel seed weight increase was significantly [12].

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