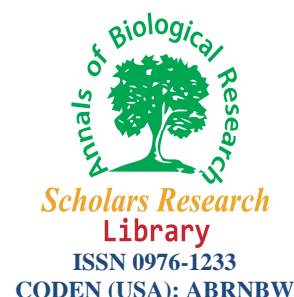




Scholars Research Library

Annals of Biological Research, 2014, 5 (2):96-98  
(<http://scholarsresearchlibrary.com/archive.html>)



## Studying the effect of nutrient fertilizers on agronomical and biological yield of wheat (CV Alvand)

Hooshang Faraji<sup>1</sup>, Ali Moradi<sup>1</sup>, Shahrokh Jahanbin<sup>1</sup> and Ali Rahimi<sup>2</sup>

<sup>1</sup>Department of Agronomy and crop breeding, Faculty of Agriculture, Yasouj University, Iran

<sup>2</sup>Young Researchers Club, Yasooj Branch, Islamic Azad University, Yasooj, Iran

### ABSTRACT

*In order to examine the effect of applying fertilizers containing iron, Zinc and copper on the quantitative characteristics of Alvand wheat, an experiment consisted of eight fertilizer treatments, including control, zinc, iron, copper, mixture of iron and copper, iron and zinc mixture, the mixture of copper and zinc and a mixture of all three, was done in a randomized completely block design with three replications was conducted, in Yasouj, Iran in 2011. Iron, zinc and copper from the solephate sources and each of them was added to the soil at planting time in the amount of 30 kg/ha and others with a concentration of one in thousand were sprayed in three stages of tillering, stem elongation and flowering. By applying Zn solephate, the number of spike per area increased as 110 spike and 1000 grain weight as 1.4 gr at the level of 1%. There was no significant differences between other treatments. By applying Zn- HI, the harvesting index increased by 1.7% at 5% probability level, however the difference between other treatments, compared to control were not significant compared to control. In terms of the number of grains per spike, a significant difference was obtained between the two treatments using mixtures of pure iron and iron and copper. This difference could be due to the antagonistic effect of iron and copper in absorption to the plant. The results indicated that Zn had a significant effect on grain yield. This means that by using it at 5% level, the yield was 1450 kg per hectare. Also, applying Zn had a significant effect at 5% level on the biological yield of wheat. This means that its application led to 2700 kg per hectare yield.*

**Keywords:** Fe, Zn, Performance, Wheat, Cu, Yasouj

### INTRODUCTION

About 40 percent of the world population suffer from the deficiency of low-consumed micronutrients such as zinc [5]. The use of fertilizers containing zinc, iron, manganese, copper, boron and molybdenum can lead to increasing of the grain [6]. Consuming 23 kg of fertilizer containing Zn significantly increased the grain yield in different parts of Turkey in the way that the relative yield was as a result of applying Zn fertilizer between 5 to 554 percent with the mean of 43% [3].

By applying zinc, iron Sekestryn and copper sulphate, besides 20% increase in yield, the concentration of Fe, Cu and Zn in wheat grain and straw increased [1]. The effect of micronutrient fertilizers on grain yield was also significant [2].

However This experiment was conducted in Yasouj in the growing season of 2011 to assess the effect of applying some micronutrient fertilizers containing Zn, Cu and Fe on the number of spike per area unit, seed weight, number of grains per spike, harvest index, straw yield, biological yield and grain yield of Chamran wheat.

## MATERIALS AND METHODS

To investigate the effect of fertilizers containing iron, zinc and copper on the quantitative characteristics of Alvand wheat, an experiment consisted of eight fertilizer treatments including control, Zn, Fe, Cu and mixtures of Fe and Cu, Fe and Zn mixture, the mixture of Cu and Zn and a mixture of all three, in a randomized completely block design with three replications was conducted in Yasouj in 2011.

The sulfate sources of Fe, Zn and Cu were used and the amounts of 30 kg.ha<sup>-1</sup> of each fertilizer were added to the soil at planting time and the others three with a concentration were sprayed in the stages of tillering, stem elongation and flowering was sprayed.

Before planting, a composite soil sample was provided from the depths of 0 to 30cm in each iteration and physico-chemical characteristics required for soil were analyzed and before absorption, the concentration of Fe, Zn and Cu were determined by the DTPA method. Table (1) shows the results of soil analysis.

**Table 1. Physical and chemical properties of the experimental soil**

Parameter	Value	Parameter	Value
Soil depth	0-30	Clay	26
SP (%)	36	Silt (%)	46
ECe (Ds m-1)	0.4	Sand (%)	28
pH	7.9	Soil texture	Loam
T.N.V (%)	47	Cu (ppm)	2
O.M (%)	0.9	Mn (ppm)	14.4
Total N (%)	0.09	Fe (ppm)	13
P (ppm)	10	Zn (ppm)	0.7
K (ppm)	206		

The length and the width of each plot were selected as 5m in 2.4m, respectively, so that in each plot, 20 lines were used and the distance between each line and each plot were 12 cm and 60 cm, respectively. To investigate the effects of Fe, Zn and Cu on wheat, 8 fertilizer treatments including; 1- control, 2- Zn, 3- Fe, 4- Cu, 5- Fe +Zn, 6- Cu +Zn, 7- Cu +Fe and 8- Cu +Fe +Zn was conducted in a randomized block designs with the 3 replications in the format of randomized block designs in 2011 year.

Tested land had left fallow in the previous season. Amounts of nitrogen, phosphorous and potassium required for the field were determined based on soil test and were supplied by the sources of urea, triple superphosphate and potassium sulfate, respectively. Phosphorus and potassium fertilizers and a third nitrogen fertilizer before planting, were applied and the rest of nitrogen was used at the stages of tillering and stem elongation, the rest of nitrogen fertilizer were evenly used as the seed for all plots.

Low-consumed elements have also been used in 4 methods (mixed with soil, applying at stages of tillering, stem elongation and flowering). The applied resources of Fe -, Zn - and Cu were sulfate and each fertilizer was added to land in an amount of 30 kg/ha at planting time.

In foliar application treatments, the fertilizers, were sprayed at 3 stages of tillering, stem elongation and flowering with the sulfate of desired elements with the density of 1/1000.

The selected seed of Chamran cultivars was used in the rate of 200 kg/ha. During the growing period, irrigation was done in 7 steps (once in the fall and 6 times in the spring). Harvesting was done from 4m<sup>2</sup> and grain yield was determined based on Kg/ha. After harvesting, grain was isolated from straw and grain and straw yield was determined based on Kg/ha. To determine the number of grains per spike, 20 spikes were selected and the number of grains/spike and the number of spike/m<sup>2</sup> was also counted. Finally the harvest index, also, was measured based on dividing the grain to the biologic yield.

data was analyzed using MSTAT-C software and the difference between the means was compared using Duncan's multiple range tests at probability level of 5%.

## RESULTS AND DISCUSSION

on the basis of the variance analysis table (table 2), results showed that fertilizer treatments had significant effect on the biologic yield, straw yield and harvest index, 1000 grains weight, and grain yield, the number of spike/m<sup>2</sup> at probability level of 5%, but the treatments had no significant effect on grains/spike.

Table 2: Variance analysis of measured traits

Traits Source of variation	Degree of freedom	Grain performance	Biologic performance	Straw performance	Number of grain/spike	Number of spike/m <sup>2</sup>	1000 grain weight	Harvest index
Replication	2	0.605	2.84	0.982	3.01	4294.8	0.347	1.64
Treatment	7	0.903*	*3.61	*0.956	5.48 <sup>ns</sup>	**3811.3	**1.208	2.96*
Error	14	0.275	1.03	0.261	2.95	641.2	0.278	0.807
Total	13	11.38	45.43	12.13	85.80	44245.8	13.04	35.28
CV		9.71	8.50	7.82	4.40	4.49	1.39	1.99

\*\*, \* and ns Significant level, refer to %0.5, %0.1 and no significant, respectively

In terms of the grain number per spike, significant difference observed between the treatments of pure Fe and the mixture of Fe and Cu. The Zn sulfate treatment, Fe sulfate and the mixture of Zn-Cu sulfate caused an significant increase in the 1000 grains weight and these increases were statistically significant at 1% level compared with control.

Zinc treatments had a significant effect on the biological yield. Other treatments did not show any significant difference with the control. Also the effect of zinc treatments was significant on grain yield in the way that the maximum grain yield maximum yield of grain was obtained from zinc fertilizer treatments with 6667Kg was obtained from using 6667 Kg/ha by 1450 kg/ha more than that in the control group. however other fertilizer treatments did not show any significant differences with control treatment.

Similar results were obtained on consuming Zn on wheat grain [4]. It seems that lack of an increase in the yield of Npk + Fe + Zn + Cu treatment compared with Npk + Zn treatment is due to the interaction and antagonism between Cu - Zn and Fe - Zn. Zinc element had had the highest effect on the application of wheat and its components. To increase the yield of Chamran cultivar grain in the same conditions, it is generally recommended that before planting, 30kg Zn Fertilizer per hectare be applied and one in a thousand foliar application in 3 stages of tillering, stem elongation and flowering.

## REFERENCES

- [1] M.J. Sedri, M.J. Malakouti, *Journal of Soil and Water Sciences*, **1998**, 12(5): 19-31.
- [2] S.A. Siyadat, S.A. Hashemi Dezfouli, M. Radmehr, Gh. A. Adine, *Mashhad University of Iran*, **1999**, P.P. 220-235.
- [3] Chakmak, *Cukurova University, Turkey*, **1997**, P.P. 175-180.
- [4] U. R. Khandkar, N. K. Jain, D. A. Shine, *J. Indian Soc. Soi. Sci.* **1992**, 40: 399-400.
- [5] J. T. Morghan, H. J. Mascagni, *Enriromnental and soil factors affecting micronutrient deficiencies and toxicities*, **1991**, P.P. 371-411
- [6] H. Tandon, *Micronutrients in soil crops and fertilizers. Fertilizer Development and consulation Organization, New Dehli, India*, **1995**, P.P. 180-195.