



Research Article

Enhancing Yield and Economic of Wheat (*Triticum aestivum* L.) through Foliar Application of Nutrients

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Abstract: An experiment was carried out at the Student's Institutional Farm (S.I.F.) of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur during Rabi season of 2019-2020 to find out "The foliar application of nutrients on yield and economics of wheat crop. The experiment comprises of eight treatments i.e. control (RDF), RDF + FYM @0.96 q/h, RDF + Urea @2.0%, RDF + ZnSO₄ @0.5%, RDF + Borex @0.2%, RDF + Urea @2.0% + ZnSO₄ @0.5%, %, RDF + ZnSO₄ @0.5% + Borex @0.2% and RDF + Urea @2.0% + ZnSO₄ @0.5% + Borex @0.2% and laid out in a Randomized Block Design with four replication. The soil of experimental plot was sandy loam in texture with pH 7.8, E.C. of 0.22 mm/ha/cm at 25°C. It contained 0.24% organic carbon, 170 kg/ha available nitrogen, 16 kg/ha available phosphorous and 180 kg/ha available potassium. The trial was conducted in 2 December, 2019 and the variety of wheat was used K-9423 (Unnat Halna) and the crop was harvested on 03 April, 2020. Result showed that the treatment of RDF + Urea @2.0% + ZnSO₄ @0.5% + Borex @0.2% was found superior in terms of higher yield and economics compared to other treatments, respectively. The maximum grain and straw yield (42.21 q/ha and 129.38 q/ha) recorded under RDF + Urea @2.0% + ZnSO₄ @0.5%, %, RDF + ZnSO₄ @0.5% + Borex @0.2% treatment, respectively. The maximum gross income (Rs 140412/ha), net income (Rs 71244/ha) and B:C ratio (2.029) were superior found in RDF + Urea @2.0% + ZnSO₄ @0.5% + Borex @0.2% treatment, respectively in present trial. The increment evaluated in the grain yield (21.31%), gross income (15.49) and net return (22.99%) under treatment of RDF + Urea @2.0% + ZnSO₄ @0.5%, %, RDF + ZnSO₄ @0.5% + Borex @0.2% compared to control treatments, respectively.

Key word: Foliar application, Urea, ZnSO₄, Borex and wheat crop.

Introduction

Wheat is a grass widely cultivated for its seed, a cereal grain which is worldwide staple food. The many species of wheat together make up genus *Triticum*; the most widely grown is common wheat (*T. aestivum*). Botanically, the wheat kernel is a type of fruit called a caryopsis. Wheat is the most important staple food of about two billion people (36% of the world population). Wheat provides nearly 55% of the carbohydrates and 20% of the food calories consumed globally (Breiman and Graur, 2008). It is known as common bread wheat and valued for bread making. Although most of wheat is grown for human food and about 10 per cent is retained for seed and industry (for production of starch, paste, malt, dextrose and gluten). Wheat grain contains all essential nutrients and about 12% water, 60-80% carbohydrates, proteins (8-15%), contain adequate amount of all essential amino acid (except lysine, tryptophan and methionine), fat

(1.5-2%), minerals (1.5-2%), vitamins such as B complex, vitamin E and 2.2% crude fiber keeping this view enhancing foliar applied nutrients on growth and yield of wheat (*Triticum aestivum* L.) in central Uttar Pradesh.

Materials and Methods

The present investigation was conducted in Students Instructional Farm (SIF) at C.S. Azad University of Agriculture and Technology, Kanpur (U.P.) during Rabi season of 2019-20. The experimental farm falls under the Indo-genetic alluvial tract of Central Uttar Pradesh. Geographically, Kanpur is situated in the central part of U.P. and subtropical tract of North India between latitude ranging from 25° 56' to 28° 58' North and longitude 79° 31' to 80° 34' East and located on an elevation of about 125.9 meter above mean sea level in gangetic plain. The seasonal rainfall of about 816 mm received mostly from IInd Fortnight of June or first Fortnight of July to mid October with a few showers

in winter season. The maximum and minimum temperature in the Rabi season usually occurs 350 C and 150 C, respectively. The soil of experimental field was well leveled, sandy loam in texture with pH of 7.8 and E.C. of 0.22 mm/ha/cm at 25oC. It contains 0.24% organic carbon, 170 kg available N/ha, 16 kg/ha available phosphorous and 180 kg/ha available potassium. Crop was fertilized uniformly at a rate of 120 kg N+60 kg P₂O₅+40 kg K₂O. The experiment was laid out in a "Randomized Block Design" with four replications. The eight treatments were tested viz. T1-RDF (120:60:40 NPK), T2-RDF +FYM (@0.96q/h), T3-RDF + Urea (@2.0%), T4-RDF +ZnSO₄ (@0.5%), T5-RDF + Borex (@0.2%), T6-RDF + Urea (@2.0%) + ZnSO₄ (@0.5%), T7-RDF + ZnSO₄ (@0.5%) + Borex (@0.2%), T8-RDF + Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%). The trial was conducted in 2 December and the variety was K-9423 (Unnat Halna). Sowing was done by hand behind the country plough with uniform seed rate of 100 kg/ha. Seed of wheat variety was sown at row spacing of 20 cm. The crop was harvested at field maturity at 120 DAS on 3, April 2020. The observations were recorded on growth characters, yield attributes and yields of crop. Economics of treatments was also worked out on the basis of market process of different inputs and crop produce.

Result and Discussion

Yields

It is clear from Table-3 that biological yield was highest in treatment T8 RDF+ Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%) is 168.330 q/ha, it is recorded maximum 14.59% when compared to lowest treatment i.e. RDF control treatment. The significantly highest grain yield was recorded under T8 RDF+ Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%) is 41.210 q/ha and recorded maximum 21.31% when compared to control treatment. The maximum harvesting index 24.48% is recorded under treatment T8 RDF+ Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%). Similar findings were reported Moghadam, M. J. et al. (2012), Amiya Biswas et al. (2018) that foliar spray of zinc and boron help in increasing the grain yield.

Economics

The gross income of various treatments was influenced significantly. The highest gross income calculated Rs 140412.00 under treatment T8 RDF+ Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%). The gross income increased to the tune of Rs 5976 and 4.91% to Rs 18835 and 15.49% compared to RDF control treatment. The highest net income calculated Rs 71244.00 under treatment T8 RDF+ Urea (@2.0%) + ZnSO₄ (@0.5%) + Borex (@0.2%). The net profit varies to the tune of 1.56%

to 22.99% under different treatment. Similar findings were reported from Prakash Chand Ghasal et al. (2017).

Table-1: Effect of different treatments on yields of wheat and their economics

Treatment	Grain yield (q/ha)	Straw yield (q/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C ratio
Control (RDF)	33.970	111.590	121577.00	57924.00	1.910
RDF+FYM(0.96q)	34.720	112.970	127553.00	58831.00	1.947
RDF+Urea(2.0%)	35.170	118.960	127654.00	59343.00	1.937
RDF+ZnSO ₄ (0.5%)	35.380	123.340	128044.00	61512.00	1.936
RDF+Borex(0.2%)	37.140	125.600	129865.00	63944.00	1.904
RDF+Urea(2.0%) + ZnSO ₄ (0.5%)	37.740	127.110	130395.00	64856.00	1.909
RDF+ZnSO ₄ (0.5%) + Borex(0.2%)	40.000	127.720	133126.00	64870.00	1.925
RDF+Urea(2.0%) + ZnSO ₄ (0.5%) + Borex(0.2%)	41.210	129.380	140412.00	71244.00	2.029
S.E. (d)	1.0434	4.0507	614.4088	407.8313	0.0387
C.D.	2.1707	8.4272	1278.2365	848.4633	0.0840

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