Agriways 9 (2) : 129-130, December 2021

ISSN: 2321-8614 (Print)
ISSN: 2454-2318 (Online)

Research Article

Effect of Varying Varieties and Different Levels of Zinc on Yield and Economics of Wheat (*Triticum aestivum* L.)

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Received: 24 November 2021/Accepted: 10 November 2021

Abstract: The field experiment was conducted during Rabi season of 2019-20 at Student's Instructional Farm (SIF) of Chandra Sekhar Azad University of Agriculture and Technology, Kanpur (UP) India to find out the impact of varying varieties and different levels of zinc on yield and economics of wheat. The treatment included four wheat varieties viz, K 607, K 307, HD 2967, and K 1006 and three levels of zinc viz, 0 kg ha-1, 5 kg ha-1, 7.5 kg ha-1, laid out in Factorial Randomized Block Design with three replications. The inputs provided at right time and at recommended rates. The results showed that the performance of of HD 2967 and K 1006 was found significantly superior over the rest of varieties in terms of yield and economics. The variety HD 2967 recorded highest grain yield (42.57q ha-1), net income (Rs. 58696.33), and B:C ratio (2.34) followed by K 1006 recorded grain yield (41.15 q ha-1), net return (Rs. 55639.66) and B:C ratio (2.26) and significantly superior over the ret of varieties. Application of zinc @7.5 kg ha-1 produced maximum grain yield (40.84 q ha-1), net return (Rs. 54215) and B:C ratio (2.22) followed by application of zinc @ 5 kg ha-1 produced grain yield (39.81 q ha-), net return (Rs. 52336.5) and B:C ratio (2.18) and significantly superior over no application of zinc. Therefore, the variety of HD 2967 better performance in terms of yield and economics with the zinc applied at 7.5 kg ha-1 in present trial.

Keyword: Different varieties, zinc level?

Introduction

Wheat is the most important winter crop grown in India during Rabi season (November to April). This golden grain winter cereal is a major contributor to the food security system and provides more than 50 percent calories to the people who are mostly dependent on this staple food. The area under wheat was increased since the start of green revolution in 1967 and the production and productivity were also increased. India is major wheat producing country in the world. It ranks second after china and at present produce more wheat than the United States of America. India occupied area under wheat 43.78 million ha with the production of 107.59 million tones and productivity of 32.16 qha-1 grain (Anonymous, 2020). In Uttar Pradesh, the productivity of wheat is low which need improvement. One of the main causes of low productivity of wheat in U.P. is its delayed sowing of sizeable area after harvesting of potato. Some timely sown varieties like PBW-343, PBW-435 and Raj-3077 give high production and can be grown anywhere in U.P. for obtaining maximum yield.

Wheat is a staple food of world, especially of developing nation, which lacks mechanism of zinc absorption, compared to pulses, more intention is therefore necessary to be given for the same. Micronutrient, zinc deficiency affects one third population of world. Although it is not integral part like nitrogen, phosphorus and potash but recent arose deficiencies in soil, plants and of course in human beings ranged a bell of danger. Zinc has diverse physiological functions in biological systems. It interacts with a large number of enzymes and other proteins in the body and performs critical structural, functional and regulatory roles.

Material and Methods

The field experiment was conducted during Rabi season of 2019-20 at Student's Instructional Farm of Chandra Sekhar Azad University of Agriculture and Technology, Kanpur (UP) India. Treatments involved four wheat varieties viz, K 607, K 307, HD 2967 and K 1006

and three levels of zinc viz, 7.5 kg ha-1, 5 kg ha-1 and 0 kg ha-1. The twelve tratment were laidout in Factorial Randomized Block Design replicated three times. The soil of experimental field was sandy loam with 52.38% sand, 27.86% silt and 19.76% clay with pH of 7.8. It was moderately fertile being low in organic matter (26%), available N (145 kg ha-1), phosphorus (18 kg ha -1), potash (182.0 kg ha-1) and zinc (0.41 ppm). Zinc sulphate (ZnSO4) used as a sourse of zinc. The sowing was done on 26/11/2019 and crop was harvested on 26/04/2020.

Results and Discussion

Yield

The critical appraisal of the data presented in Table:1 revealed that maximum grain yield (42.55 q ha-1) under HD 2967 which is significantly followed by K 1006 recorded 41.15 q ha-1 and minimum grain yield (37.25 q ha-1) was recorded under K 607 variety. The zinc application recorded highest straw yield (60.28 q ha-1) recorded with 7.5 kg ha-1 of zinc which is statistically at par with 5 kg ha-1 of zinc and significanly superior over no application of zinc. Similar results were obtained by Jan et al. (2013) and Shaheen et al. (2007).

The maximum grain yield (40.84 q ha-1) recorded with application of 7.5 kg ha-1 of zinc which is statistically at par with 5 kg ha-1 of zinc superior over no application of zinc. Similar results were obtained by Chaudhary et al. (2018), Tao et al. (2018) and Zou et al. (2012). The highest straw yield (62.56 q ha-1) was recorded under HD 2967 which is statistically at par with K 1006 (60.19 q ha-1) and minimum straw yield (55.62 q ha-1) was recorded under K 607.

Economics

The economics of different varieties and different levels of zinc in terms of gross return, net return and B:C ratio revealed that maximum gross return (Rs. 102821.33) was recorded under HD 2967 significantly followed by K 1006 (Rs. 99552.33) minimum gross return (Rs. 90260.66) was recorded under K 607 variety. The maximum net return (Rs. 58696.33) recorded under HD 2967 which is significantly followed by K 1006 (Rs. 55639.66) and minimum (Rs. 46166) under K 607. The highest B:C ratio (2.34) was recorded under HD 2967 which is significantly followed by K 1006 (2.26) and minimum B:C ratio (2.04) was recorded under K 607.

The zinc application maximum net return (Rs. 54215) recorded with 7.5 kg ha-1 of zinc significantly followed by 5 kg ha-1 of zinc (Rs. 52336.50). The zinc application recorded the maximum gross return (Rs. 98747.50) which is recorded with 7.5 kg ha-1 which is significantly followed by 5 kg ha-1. The zinc application recorded highest B:C ratio (2.22) was recorded with application of 7.5 kg ha-1 of zinc significantly followed by 5 kg ha-1 of zinc (2.18) and minimum B:C ratio (2.15) was recorded with no application of zinc. Similar results were found by Prasad et al. (2014).

Table: - 1 Effect of varieties and different varieties on yield and economics

Treatment	Grain yield (q ha-1)	Straw yield (q ha-1)	Goss return (Rs. ha-1)	Net return (Rs. ha-1)	B:C ratio
(A) Varieties					
K 607	37.25	55.62	90260.66	46166.00	2.04
K 307	38.16	56.85	92414.00	48411.66	2.10
HD 2967	42.55	62.56	102821.33	58696.33	2.34
in0K 1006	41.15	60.91	99552.33	55639.66	2.26
SE(d)±	0.58	1.09	277.10	146.11	0.02
CD (P=0.05)	1.21	2.27	574.83	126.53	0.04
(B) Levels of zinc					
0 kg ha-1	38.68	57.46	93632.75	50133.75	2.15
5 kg ha-1	39.81	59.22	96406.00	52.336.50	2.18
7.5 kg ha-1	40.84	60.28	98747.50	54215.00	2.22
SE(d)±	0.50	0.95	239.98	126.53	0.01
CD (P=0.05)	1.05	1.97	497.82	262.48	0.03

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