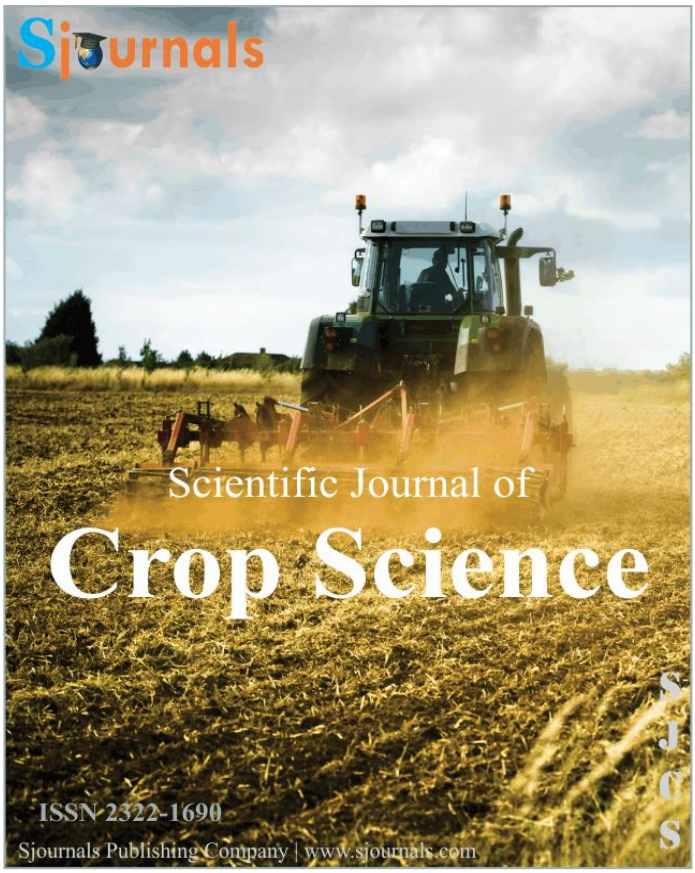

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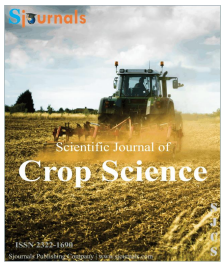

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Original article

Verification of foliar fertilizer (Fertigofol Ultra) to improve yield, yield related traits and quality of durum wheat

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ABSTRACT

A field experiment was conducted to maximize durum wheat yield and quality through foliar application of Fertigofol Ultras with and without inorganic fertilizer DAP and Urea. DAP and Urea were added to the first plot at the rate of 100 kg ha^{-1} and 200kg ha^{-1}, respectively with 5L ha^{-1} Fertigofol Ultra. The second plot was treated with the same amount of DAP and Urea with plot number one and 2.5L ha^{-1} Fertigofol Ultra. Only DAP and Urea were added to plot number three with the same rate with plot number one and two while the fourth plot remained without DAP, Urea and Fertigofol Ultra. Results indicated that application of DAP, Urea and Fertigofol Ultra at the rate of 5L ha^{-1} significantly (0.05) increased plant height, spike length, kernels $spike^{-1}$, bio-mass yield, grain yield and protein %. The highest grain yield (5000 kg/ha), bio-mass yield (11083 kg/ha), 1000 grains weight (49.3g) and Protien %(13.9) were recorded for the treatment 100kg DAP+200kgUrea+5L Fertigofol Ultra. Results suggested that foliar application of Fertigofol Ultra along with basal application of recommended rate of DAP and Urea increased yield and quality parameters of durum wheat. Hence foliar application of Fertigofol Ultra along with basal doses of DAP and Urea are recommended to increase durum wheat yield and quality due to its low dose and low cost per unit area as compared to soil applications of nutrients.

1. Introduction

Foliar fertilization in recent times is receiving considerable attention for increasing crop yields and quality. About 50% of applied Nitrogen and 70% of applied Potassium to the soil remain unavailable to a crop due to a combination of leaching, fixation, and volatilization (Seisepour, 2007). However, the waste of the nutrients can be reduced by foliar application of dilute solutions of the nutrients to supplement basal applications which have been shown to be effective and economical for some crops. The foliar application of nutrients is more effective as compared to soil applied nutrients because of effective utilization by plant and minimum cost per unit area (Narang et al., 1997). Among the essential nutrients needed by the plant, Nitrogen, Phosphorus, Potassium and Sulphur, play a highly recognized role in plant life. An adequate supply of these nutrients greatly improves the quantity and quality of crop productivity. Fertigofol Ultra is a foliar fertilizer in the form of liquid containing 8.9%N, 3%P_2O_5, 7.19%K_2O, 0.109%MgO, 0.1065%SO_2, 0.0417%B, 0.0117Cu, 0.0205%Fe, 0.0415%Mn, 0.004%Mo and 0.0335%Zn (Weight/Weight). It improves the nutritional status of the crop. Used in foliar spraying, it activates the metabolism of each vegetal cell. This action on the whole plant improves the photosynthesis and the capacity of taking the mineral elements through the root system (Yaseen et al., 2011). Fertigofol Ultra is a polyvalent product which is suitable to numerous crops. It is specifically adapted to the nutrition, the stimulation and the growth of the vegetative system. There is high risk of mineral loss through soil erosion, volatilization and leaching. Foliar fertilizer application hence reduces the mineral loss due to the above factors since it involves direct application of the mineral solution on to the crop for absorption through above ground parts.

2. Materials and methods

The foliar fertilizer test was conducted by Sinana Agricultural Research Center under Oromia Agricultural Research Institute by the agreement signed between the Institute and the chemical agent called “Lions International Trading P.L.C.” The trial was conducted at Sinana on-station and Sinana on-farm (2 sites) of Sinana district in Bale highlands. The test crop was Durum wheat (Variety Dire). Fertigofol Ultra was applied as supplemental for our target treatment in two different rates (2.5L and 5L/ha) in 200L/ha water at two different stages (15 and 35 days after emergence) using manual knapsack sprayer. The trial was conducted for one year in 2018 during the main cropping season.

3. Results and discussion

The analysis showed that statistically significant differences between the treatments. Combined analysis over three test sites indicated that all the measured parameters significantly responded to the highest rate of fertigofol Ultera supplementing treatment. (i.e. Fertigofol Ultra 5L/ha). The maximum plant height (80.3cm), Bio-mass yield (11083 kg/ha), Grain yield (5000 kg/ha) and, Thousand kernel weight (49.3g) were recorded from plots supplement with Fertigofol Ultra 5L/ha. For all measured parameters the second maximum result was recorded by treatment supplement with 2.5 L//ha Fertigofol Ultra in statistical parity with plots received 100 kg DAP and 200kg Urea (Recommended rate for Durum wheat). Maximum grain protein content was also recorded by fertigofol ultra 5L/ha supplementing treatment (Table 1).

Table 1
Effect of foliar fertilizer (Fertigofol Ultra) on yield, yield components and, quality of durum wheat combined over locations, in the highlands of Bale, 2018 main cropping season.

Treatments	PH(cm)	SL(cm)	KPS(cm)	BM(kg)	GY(kg)	TKW(g)	P%
100kg DAP+200kgUrea+5L Fertigofol Ultra	80.3a	5.77a	53.7a	11083a	5000a	49.3a	13.9a
100kg DAP+200kgUrea+2.5L Fertigofol Ultra	75.9b	5.57a	51.5ab	9833b	4500b	46.3b	13.3ab
100kg DAP+200kgUrea	75.4b	5.3b	47.7bc	9500b	4250b	45.2b	13.0b
Without DAP and Urea	74.5b	5.1b	43.3c	7583c	3417c	43.0c	10.8c
LSD (5%)	1.5	0.25	4.7	706.4	322.4	1.5	0.8
CV%	1.5	7.9	5.8	12.1	7.2	1.9	4.9

PH = Plant height; SL = Spike length; KPS = Kernels per spike; BM = Bio-mass yield; GY = Grain yield; TKW = Thousand kernel weight; P = Protein %; ns = Non-significant; LSD = Least significant difference at(5%); CV (%) = Coefficient of variation (%).

Similar studies indicated that foliar application of nutrients along with soil application of nutrients gave higher crop yield and quality (Seisepour, 2007).

4. Conclusion

Foliar application of Fertigofol Ultra (5L/ha) on the wheat plant have increased the yield and the quality compared to nil and recommended NP fertilizer application. Fertigofol Ultra (5L/ha) supplemental application to recommended NP showed the grain yield advantage of 31.6% and 15% over nil and recommended NP, respectively. Grain protein also have increased with supplemental application of Fertigofol Ultra (5L/ha) to recommended NP rate.

Therefore, if economically affordable and available to the farmers, Fertigofol Ultra (5L/ha) is recommended for use as foliar fertilizer for improved yield and quality of Durum wheat in bale highlands and similar agro-ecologies.

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