Technical Data Report

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Effects of NUTRIPLANT™ SD and NUTRIPLANT™ AG on Production of Dryland Winter Wheat

Introduction

Nutriplant SD and Nutriplant AG alone were found effective in increasing production of dryland winter wheat (TDR Review Volume 2(6)2012 and WHEAUSCO0902, respectively) but effects of application of both products have not been evaluated. The objective of this study was to determine effectiveness of foliar treatment of Nutriplant AG, applied in addition to Nutriplant SD seed treatment, on the production of dryland winter wheat. Four different Nutriplant AG treatments were evaluated to determine the most effective time of application.

Materials and Methods

Field trials were conducted on winter wheat (*Triticum aestivum* cv. Bond) at the independently owned and operated agricultural research facility, Irrigation Research Foundation, at Yuma, Colorado, USA, under the supervision of Colorado State University. Wheat was planted under dry-land conditions at a rate of 67 kg/ha (60 lb/acre). All seeds were treated with Charter at 2 ml/kg of seeds (3.1 fl oz/100 lb of seeds), Acquire at 0.1 ml/kg (0.15 fl oz/100 lb), Stamina at 0.26 ml/kg (0.4 fl oz/100 lb) and Axcess at 1 ml/kg (1.5 fl oz/100 lb). Five uniform sections of the field were selected for the treatments. Each section measured 4.6 by 198 meters (15 by 650 feet). The following five treatments were evaluated:

1. Nutriplant SD and Nutriplant AG applied once in the fall at the 6-8 leaf stage (about six weeks after planting).
2. Nutriplant SD and Nutriplant AG applied once in the spring at “green-up”.
3. Nutriplant SD and Nutriplant AG applied twice: in the fall at the 6-8 leaf stage and in the spring at “green-up”.
4. Nutriplant SD and Nutriplant AG applied twice in the spring: at “green-up” and again at the “boot” stage (Fickes 10.5 stage)
5. Untreated control.

Nutriplant SD was applied to the seeds at a dose rate of 2.5 g/kg of seeds (4 oz/100 lb of seeds) just prior to planting. The product was thoroughly mixed with wheat seeds to obtain a uniform coating. Nutriplant AG was applied to the crop foliage at 1,200 ml/ha (16 fl oz/acre) in a total volume of spray solution of 84 liter/ha (9 gallon/acre), using a ground spray applicator at timings listed above. Liquid fertilizer 32-0-0 was applied to all plots at a rate of 141 liter/ha (15 gallon/acre) in the spring, ten days after the first spring Nutriplant AG application, using a stream bar. About one month after the first spring Nutriplant AG application, all plots were treated with Beyond herbicide at a rate of 440 ml/ha (6 fl oz/acre), a non-ionic surfactant at 946 ml/379 liter (1 quart/100 gallon) and ammonium sulfate at 7.7 kg/379 liter (17 lb/100 gallon) in a total volume of spray solution at a rate of 141 liter/ha (15 gallon/acre). Two weeks later, Prosaro fungicide was applied by air at a rate of 293 ml/ha (4 fl oz/acre). All other cultural practices followed local practices and were the same for the treated and the untreated plots. At harvest time, grain yield, percent moisture and grain density were determined and grain yields adjusted to 12% moisture and 772 g/liter (60 lb/bu) grain density.

Results

All treatments substantially improved wheat yields (Table 1). The most effective treatment was Nutriplant SD applied to the seeds at planting followed by a foliar application of Nutriplant AG at spring "green-up", which increased yields by 566 kg/ha (8.4 bu/acre), a 25.2% over control. Similar results were obtained on irrigated winter wheat (TDR Review Volume 2(8)2012) when Nutriplant SD applied to the seeds at planting followed by a foliar application of Nutriplant AG in the spring produced highest yield. Nutriplant SD and a single foliar application of Nutriplant AG in the fall was the least effective, increasing yields by 371 kg/ha (5.5 bu/acre), a 16.5% over control. Nutriplant SD and two foliar applications of Nutriplant AG, one in the fall and one in the spring, produced similar results to one spring application, increasing yields by 539 kg/ha (8 bu/acre), a 24% over control. Second application of Nutriplant AG in the spring at "boot" stage did not improve yield over single spring application, increasing yield by 505 kg/ha (7.5 bu/acre), a 22.5% over control. The treatments did not affect grain moisture or grain density.

Table 1. Effects of Nutriplant SD and Nutriplant AG on dryland winter wheat. Irrigation Research Foundation, Yuma, Colorado, USA.

Treatment	Grain Yield*					Grain Moisture	Grain Density	
	(kg/ha)	(bu/acre)	Difference			(%)	(g/liter)	(lb/bu)
			(kg/ha)	(bu/acre)	(%)			
Control	2,245	33.3	--	--	--	6.2	708	55.0
Nutriplant SD, with Nutriplant AG in fall at "green- up"	2,616	38.8	371	5.5	16.5	6.2	708	55.0
Nutriplant SD, with Nutriplant AG in spring at "green-up"	2,811	41.7	566	8.4	25.2	6.1	695	54.0
Nutriplant SD, with Nutriplant AG in fall and again in spring at "green-up"	2,784	41.3	539	8.0	24.0	6.1	708	55.0
Nutriplant SD, with Nutriplant AG at spring "green-up" and again at "boot" stage	2,750	40.8	505	7.5	22.5	6.1	695	54.0

**Adjusted to 12% moisture and 722 g/liter (60 lb/bu) grain density.*

Although all treatments substantially improved dryland winter wheat yields, the spring application of Nutriplant AG at "green-up" was the most effective treatment.

Conclusions

Nutriplant AG applied to dryland winter wheat in the spring at "green-up" in addition to Nutriplant SD application at planting was the most effective treatment resulting in 25% yield increases.

Second application of Nutriplant AG at "boot" stage did not produce additional benefits on production of dryland winter wheat.

Application of Nutriplant AG in the fall to dryland winter wheat is not as effective as spring application.