Technical Data Report

Review

Prepared by Pawel Wiatrak, Ph.D.
Director of Technical Services

Effects of NUTRIPLANT™ SD on Corn Production

Objective

The objective of the study was to evaluate the effects of Nutriplant SD on production of corn.

Materials and Methods

Field trials were conducted on corn (*Zea mays* L.) of 105 to 110 day maturity at the independently owned and operated agricultural research facility, Irrigation Research Foundation located in Yuma, Colorado, USA, under the supervision of Colorado State University. Trials were conducted in 1998, 1999, 2001, 2002, 2003 and 2004. The planting population was 79,072 seeds/ha (32,000 seeds/acre). Corn was planted on 15 May in 1998, 9 May in 1999, 11 May in 2001, 23 April in 2002, 21 April in 2003 and 28 April in 2004. Corn hybrid Midwest G7620 was used in 1998. Uniform two to six plots were selected each year for the trial. In 1999 plots size were 30 m by 30 m (100 feet by 100 feet). For the remaining years, each plot consisted of four rows, each 76 cm (30 inches) wide and 198 meters (650 feet) long. Two treatments were tested each year: 1) Nutriplant SD and 2) untreated control. Plots designated as product treatment were planted with corn seeds treated with Nutriplant SD applied just prior to planting. Seeds were thoroughly mixed with the product to obtain a uniform coating. The control plots were planted with untreated seeds. The first three years, Nutriplant SD was applied at 750 g/100 kg (12 oz/100 lb) of seed and treatments were replicated three times. The last three years, Nutriplant SD was applied at 500 g/100 kg (8 oz/100 lb) of seeds. Each year fertilizer program was adjusted to meet crop requirement. In 1998, liquid 8-20-5-5S-0.5Zn fertilizer was applied at 168 l/ha (18 gal/acre) during planting followed by application of 32 N at 9.4 l/ha (1 gal/acre) 44 days after planting. In 1999, plots were fertilized with 168 kg N/ha (150 lb N/acre) in the form of liquid ammonia, starter 38-38-0-11S-0.3Zn fertilizer at 178 l/ha (19 gal/acre), and 28-0-0-5S at 94 l/ha (10 gal/acre) with 1.9 cm (0.75 inches) of irrigation. In 2001, 157 kg/ha (140 lb/acre) of nitrogen was applied pre-plant as urea on 2 April, 178 l/ha (19 gal/acre) of 17.2-16.52-0-5.34S-0Zn starter fertilizer was applied at planting, The sulfur product was applied at 94 l/ha (10 gal/acre) two months after planting via the overhead irrigation system and 32-0-0 fertilizer was applied via irrigation at 140 l/ha (15 gal/acre) at 36 and 66 days after planting. In 2002, 157 kg/ha (140 lb/acre) of nitrogen was applied pre-plant in the form of urea, followed by 159 l/ha (17 gal/acre) of 25-40-3-6S starter fertilizer applied at planting, and 65 l/ha (7 gal/acre) of 32-0-0 applied 38, 52, 66, and 75 days after planting through sprinkler irrigation system. In 2003 and 2004, 157 kg/ha (140 lb/acre) of nitrogen was applied pre-plant as urea, with Agrotein urease inhibitor at 4.2 l/1000 kg (1 gal/2000 lb), starter fertilizer was applied at 159 l/ha (17 gal/acre) of 25-40-3-6S-0.2Zn at planting, followed by 65 l/ha (7 gal/acre) of 32-0-0 fertilizer applied 45, 63, 71, and 80 days after planting via sprinkler irrigation. Herbicide control was different for each of the first three years of testing and consisted of Tough at 1.2 l/ha (16 fl oz/acre) with Basis Gold at 1 liter/ha (14 fl oz/acre) and Crop Oil Concentrate at 1.2 l/ha (16 fl oz/acre) applied 44 days after planting on 28 June 1998 with liquid nitrogen; Bicep Lite II applied at 4.7 l/ha (2 qt/acre) 10 days after planting in 1999; and Roundup applied pre-plant at 2.3 l/ha (1 qt/acre) on 9 May followed by pre-emergence herbicide Degree Xtra at 6.8 l/ha (2.9 qt/acre) applied at planting in 2001. Herbicide program for the last three years was the same and consisted of Degree Xtra applied pre-plant at 6.8 l/ha (2.9 qt/acre) followed by application of Callisto at 219 ml/ha (3.0 fl oz/acre) with Aatrex at 0.56 kg/ha (0.5 lb/acre) and ammonium sulfate at 1 kg/100 liter (8.5 lb/100 gal) with crop oil concentrate at 1% volume by volume at 37, 50 and 35 days after planting in 2002, 2003 and 2004, respectively. Cultural practices, including fertilization and pest management, followed local

practices and were the same for the treated and control plots. Corn was harvested on 22 November in 1998, 28 October in 1999, 8 October in 2001, 26 October in 2002, 13 October in 2003 and 26 October in 2004. Corn grain yield was adjusted to 15.5% moisture. Unit conversions were calculated using USDA Conversion Factors and Tables posted at:
http://www.mn.nrcs.usda.gov/technical/ecs/nutrient/planning/planning.htm.

Results

Nutriplant SD consistently increased corn yield (Table 1). Each year, plots treated with Nutriplant SD produced from 132 to 615 kg/ha (2.1 to 9.8 bu/acre) higher corn grain yields than the control. The average yield increase for the six years was 3.5% and ranged from 0.9% in 2003 to 8.2% in 1998. The highest yield increase of 8.2% occurred in a year when crop was not cultivated producing high weed pressure and no additional nitrogen was applied. High yield increases of 326 and 464 kg/ha (5.2 and 7.4 bu/acre) with Nutriplant SD treatment were observed also in the years when high input fertilization programs were used, which included pre-plant and starter fertilizer applications followed by four fertilizer applications through the sprinkler irrigation. Low overall corn yield in 2004 was due to severe crop damage caused by four hail storms reported on 10 May, 20 June, 2 and 15 July. Severe crop damage with estimated 20% loss caused by two hail storms (1 July and 15 September) was also reported in 2001 explaining low yield increase this particular year. Nutriplant SD increased yield by 132 kg/ha (2.1 bu/acre) also in 2003 when the overall corn yield was the highest among all trial exceeding 14,000 kg/ha (220 bu/acre).

Table 1. Effect of Nutriplant SD on corn grain yields. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Corn Yields						
	Control		Nutriplant SD		Difference		Difference
	(kg/ha)	(bu*/acre)	(kg/ha)	(bu/acre)	(kg/ha)	(bu/acre)	(%)
1998	7,520	119.9	8,135	129.7	615	9.8	8.2%
1999	12,425	198.1	12,858	205.0	433	6.9	3.5%
2001	11,986	191.1	12,136	193.5	150	2.4	1.3%
Means	*10,644*	*169.7*	*11,043*	*176.1*	*399*	*6.4*	*4.3%*
2002	13,560	216.2	13,886	221.4	326	5.2	2.4%
2003	14,074	224.4	14,206	226.5	132	2.1	0.9%
2004	9,559	152.4	10,023	159.8	464	7.4	4.9%
Means	*12,398*	*197.7*	*12,705*	*202.6*	*307*	*4.9*	*2.7%*
Overall means	*11,521*	*183.7*	*11,873*	*189.3*	*351*	*5.6*	*3.5%*

**One bushel (bu) of corn equals 56 lb at 15.5% grain moisture*

Results from these six trials indicate that higher Nutriplant SD application rate of 750 g/100 kg (12 oz/100 lb) was more effective than 500 g/100 kg (8 oz/100 lbs) with an average yield increase of 4.3% compared to a 2.7% increase with the lower rate.

Conclusions

Nutriplant SD increased corn yields by an average of 3.5% compared to the untreated control.
Higher Nutriplant SD application rate of 750 g/100 kg (12 oz/100 lb) improved grain yields by 4.3% as compared to 2.7% increase when Nutriplant SD was applied at 500 g/kg (8 oz/100 lb).

References

CORNUSCO9801 CORNUSCO0201
CORNUSCO9901 CORNUSCO0301
CORNUSCO0101 CORNUSCO0401