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Twin Row Corn Silage Trial, a method to increase silage production

Conducted by:

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Objective

To determine response of corn silage hybrids to increased seeding rates (34k and 50k seeds/ac.) with two planting methods; with a drill in 30 inch rows, and with a drill in twinned rows on 30 inch centers.

Background

Cooperator: Darke County Farm	Herbicide:
County: Darke	Burn down: May 10- 22 oz. Mirage glyphosate + 1.8 lb. AMS
Soil Type: Eldean-Maimian Complex	Post: April 16- 17.5 oz. Cinch ATZ + 62.5 lb. 28% N
Drainage: non-systematic tile	Variety:
Previous Crop: Soybeans/Rye Grass	Croplan DS107 w/Cruiser
Tillage: no till	Seed Consultant SC1082 w/Maxim
Soil Test (2005): pH 6.1, LTI- 67, CEC 14.5, P 163 lbs/A, K 496 lbs/A	Row Width: 30 inch
Fertilizer applied:	Planting Rate:
Starter (broadcast) May 6- 70 lbs N/ A	35,000 s/A
Side dress (inject) Jun 8- 140 lbs N/A	51,000 s/A
	Planting Date: May 7, 2005
	Harvest Date: November 22, 2005

Methods

The trial was designed as a randomized complete block.

A Great Plains Precision Plant no-till drill was used to plant the “drill 30” and “twin row” plots. The Precision Plant drill has a seeding mechanism capable of handling seed corn reasonable well. We did choose appropriately sized seed to best work in this seed mechanism – medium rounds. The twin row plots were set up on 30-inch centers, with two rows 7.5 inches apart every 30 inches. The drill can also be used to plant drilled soybeans on 7.5-inch centers. Plot sizes planted were 15 feet wide by 300 feet long, with 10 feet of the middle harvested (center four rows of six).

The hybrids were chosen based on their characteristics as a dual purpose variety (Silage & Grain production). Croplan DS107 with Cruiser is a 107 relative maturity hybrid that has a high tonnage/acre and a high dry matter digestibility rating. It also has a medium high population rating by Croplan. The Seed Consultant SC1082 with Maxim XL is a 112 day relative maturity hybrid with high ratings for grain quality and test weight. It also is ranked high for stress tolerance and it's recommended planting populations for soils with greater than 15 C.E.C. is 28,000-31,000 seeds per acre.

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Planting was May 7th and harvest for the silage plots was conducted on September 7th and 12th, 2005. A hand harvested sample was taken from 1/1000th of an acre from each of the 4 reps. The samples were then chopped weighed. Silage samples were collected and analyzed for dry matter content, NDF and CP values by The Ohio State University Animal Science Department.

On November 22, 2005 harvesting of all plots was done, to compare grain yields, with a Case IH combine, yield and moisture were determined with an on-board yield monitor.

Data analysis was performed using Microsoft XL, Analysis of Variance – two factor with P value > 0.10.

Results

Table 1. Dry matter yields/acre for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

	Yield 100% DM Tons/A	
Treatment at seed rate	34k	50k
Twin row DS107 34K	8.81	
Twin row SC1082 34K	9.29	
30 DS107 34K	8.85	
30 SC1082 34K	9.36	
30" SC1082 50K		8.90
Twin row DS107 50K		9.90
Twin row SC1082 50K		8.43
30" DS107 50K		10.03
P value > 0.10	No SD	No SD

Table 2. NDF(neutral detergent fiber) and %CP (crude protein) values for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

Treatment	NDF value	CP%
TR DS107/34K	56.75	8.18
TR DS107/50K	60.84	7.59
TR SC1082/34K	55.58	8.52
TR SC1082/50K	55.55	8.04
30 DS107/34K	58.01	8.29
30 DS107/50K	52.49	8.22
30 SC1082/34K	57.51	8.31
30 SC1082/50K	55.55	7.76
P value > 0.10	No significant difference	

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Table 3. Final Stand Population Averages for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

Treatment	Population 1000 plants/ac
TR DS107/34K	33.50
TR SC1082/34K	30.00
30 DS107/34K	31.50
30 SC1082/34K	30.50
30 SC1082/50K	46.25
TR DS107/50K	46.25
TR SC1082/50K	48.50
30 DS107/50K	46.50
P value > 0.10	No significant difference

Table 4. Stalk Lodging Scores for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

Treatment	Ave. Lodging Score
TR DS107-34k	5.75
TR DS107-50k	5.00
TR SC1082-34k	3.25
TR SC1082-50k	6.88
30 DS107-34k	4.50
30 DS107-50k	4.25
30 SC1082-34k	2.88
30 SC1082-50k	5.38
P value > 0.10 = 0.035	Significant difference
LSD (0.10)	1.93

Table 5. Corn Production Yields for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

Treatment	Ave. Yield bu/ac
TR DS107-34k	136.71
TR DS107-50k	109.16
TR SC1082-34k	153.24
TR SC1082-50k	118.49
30 DS107-34k	131.59
30 DS107-50k	99.37
30 SC1082-34k	149.93
30 SC1082-50k	145.65
P value > 0.10	Significant difference
LSD (0.10)	11.02

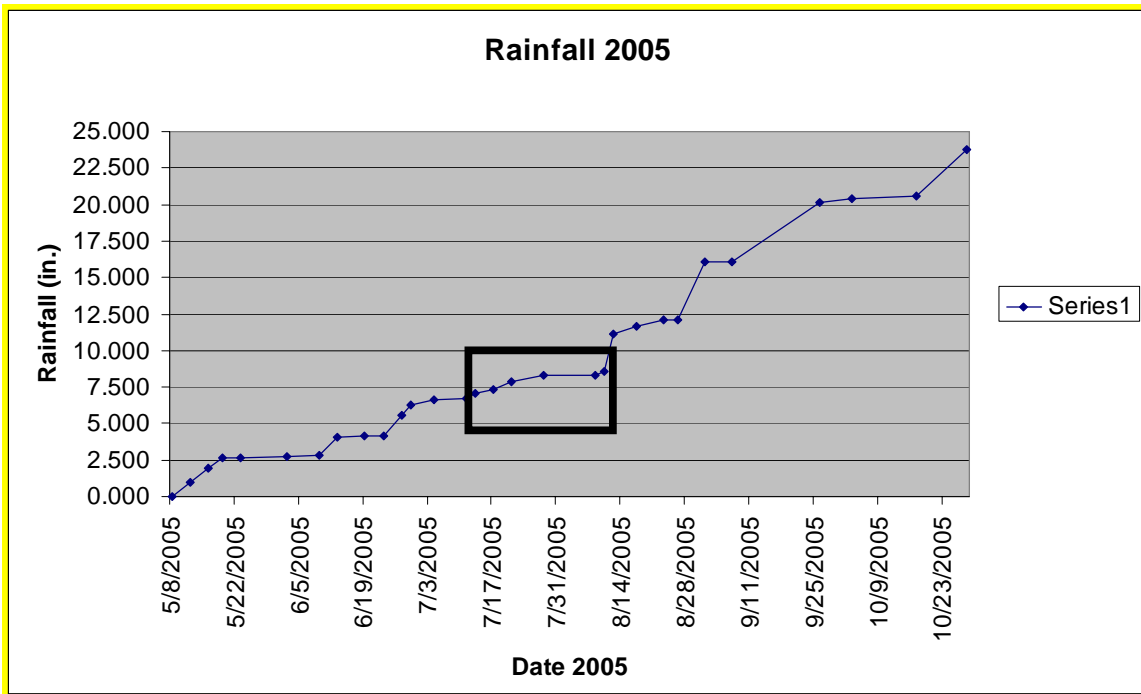
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Table 6. Correlation coefficient for average yield (bu/ac) and lodging score for two hybrids in two different planting systems at two different seeding rates, Greenville Ohio, 2005.

Treatment	Yield	Lodging
TR DS107-34k	136.7	5.75
TR DS107-50k	109.2	5.00
TR SC1082-34k	153.2	3.25
TR SC1082-50k	118.5	6.88
30 DS107-34k	131.6	4.50
30 DS107-50k	99.4	4.25
30 SC1082-34k	149.9	2.88
30 SC1082-50k	145.7	5.38

Correlation = -0.388814

Table 7. Rainfall records for Darke County Research Farm, Greenville Ohio, 2005.



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Summary

A similar trial was conducted in 2003 and 2004 for twin row corn production only. For 2005, we decided to do a twin row corn silage production study along with the twin row corn production. Once again we used a Great Plains Precision Plant no-till drill to plant the “drill 30” and “twin row” plots. The Precision Plant drill has a seeding mechanism capable of handling seed corn reasonable well. We did choose appropriately sized seed to best work in this seed mechanism – medium rounds. The twin row plots were set up on 30-inch centers, with two rows 7.5 inches apart every 30 inches. Plot sizes planted were 15 feet wide by 300 feet long, with 10 feet of the middle harvested (center four rows of six).

The hybrids were chosen based on their characteristics as a dual purpose variety (Silage & Grain production). Croplan DS107 with Cruiser and Seed Consultant SC1082 with Maxim XL. There was no significant difference between the final stand populations for treatments planted at 34k seed/ac and 50k seed/ac, as indicated in table 3.

Planting was May 7th and harvest for the silage plots was conducted on September 7th and 12th, 2005. On November 22, 2005, harvesting of all plots was done with a Case IH combine, yield and moisture were determined with an on-board yield monitor.

The trial results for silage production per acre as shown in Table 1, indicate our results for tons of 100% Dry Matter produced per acre. There were no significant differences between any of the treatments. The range of 100% DM/ac was 8.81 tons/ac. - 10.03 tons/ac.

Silage samples were hand harvested from 1/1000th of an acre from each of the 4 reps. The samples were then chopped weighed. Silage samples were collected and analyzed for dry matter content, NDF and CP values by The Ohio State University Animal Science Department. As indicated by table 2, there was no significant difference between the treatments and the NDF (neutral detergent fiber) and %CP (crude protein) levels. NDF ranged between 52.49-60.84 and the %CP ranged between 7.59%-8.52%.

Treatments were planted at 34K seeds per acre and 50K seeds per acre. Final stand counts were conducted during the collection of the silage samples. Final stand counts for the plots planted at 34K seeds per acre ranged from 30.00K plants/ac – 33.50K plants/ac. Final stand counts for the plots planted at 50K seeds per acre ranged from 46.25K plants/ac – 48.50K plants/ac. Table 3 shows that there was no significant difference between stand populations planted at 34k/ac and no significant difference between stand populations planted at 50k/ac.

Lodging differences by hybrid were noticed as shown in Table 4. Lodging evaluations were made from the combine at harvest, on a 1-10 scale with 1 being

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fully upright and 10 being completely flat. For Croplan DS107 there was no issue with planting system or population. For Seed Consultant SC1082 as we increased the seeding rates lodging was increased.

In table 6. Lodging scores were compared to corn grain yields to see if there was any correlation. A correlation coefficient of -0.389 indicates that there is not a strong relationship between lodging scores and yield. A score of -1.0 to -.80 would indicate a possible relationship, but not causability.

Grain yield differences by treatments were notice as shown in Table 5. Hybrid DS107 planted at 34k seeds/ac out yielded the DS107 planted at 50k seeds/ac in both the twin row and 30" row plots. Hybrid SC1082 planted at 34k in twin row plots out yielded the twin row plots planted at 50k seeds/ac. Croplan DS107 yielded better at 34k population then the plots planted at 50k seeds/ac in 30" rows. There was no difference between the plots of SC1082 planted in 30" rows and twin rows, planted at 34k and 50k seeds/ac.

Rain fall as indicated in Table 7 shows that the plots received very little rain fall during pollination and kernel development. These conditions were probably not very favorable for high population studies.

As this study shows there was no significant improvement in silage production (DM/ac. or Nutritional value) in planting corn in twin-rows or high populations on the Darke County Farm in 2005.

Submitted by Steve Foster.