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Field Crop Notes



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Fungicide Applications Fail to Increase Corn Yields

What Fungicides belonging to the category called strobilurins are very effective against certain fungal diseases and have the added reputation of improving plant appearance. There have been claims from the Midwest that fungicides from this family of compounds, when applied at early tassel, provide a yield bump in grain corn even in the absence of disease. To evaluate whether a yield increase would occur under California conditions, two trials were conducted in 2008; one in grain corn and the other in silage corn.

How Three fungicides were evaluated in each trial: Headline (with the active ingredient pyraclostrobin) at 6 fl oz/A; Quadris (azoxystrobin) at 9 fl oz/A; and Stratego (trifloxystrobin + propiconazole) at 10 fl oz/A. The rate for each material was based on the recommendation from the respective company. The fourth treatment was untreated.

In both trials the fungicides were applied by helicopter in a volume of 10 gpa with a non-ionic surfactant at 0.25% v/v. Each plot was 80 ft wide (2 passes of the helicopter) for the length of the field (1/4 mile). The treatments were replicated 4 times in a randomized complete block design. With 4 treatments replicated 4 times and each plot 80 ft wide, the trials were about 40 acres in size.

When The application in the grain corn trial was a few days after the desired growth stage. A few plants had silks which were starting to brown and ideally the application would have been applied when silks had emerged but none were turning brown. The timing for the trial in silage corn was ideal, shortly after silk emergence.

For the grain trial, Pioneer 32W86 seed was planted on April 8, 2008. Treatments were applied on June 23rd. On September 9th, 8 rows from close to the center of each plot were harvested and weighed at the field edge with a weigh wagon provided by Cal Agro Seed Company, Visalia. Bushel weights and moisture were determined for each plot.

For the silage trial, Pioneer 32W86 seed was planted on June 22, 2008. Treatments were applied on August 20th. The center 6 rows of each plot were harvested on October 21. Samples from each plot were taken for moisture determination at the silage pile.

Results There were no differences in either the grain or silage yields among any of the treatments (Table 1 and Table 2). For the grain trial there was no difference in bushel weight.

So? Reports from the Midwest that can be found on the internet indicate that for a little over half the fields that receive an application with these fungicide a yield increase occurs. Some of these fields may have disease issues that might not be dramatic but that do benefit from fungicide treatments. However, of the fields that respond, a smaller proportion has a yield increase sufficient to cover the cost of the material and application.

Bottom Line My recommendation is to not spray these fungicides. If they truly do give a bump in yield because of physiological changes within the plant not associated with disease control, then with time the conditions that would guarantee a yield increase can be identified. As it is now, it seems like a roulette game as to whether or not yields will be increased.

Be wary of trials where a field is split in two and one half receives a treatment and the other

does not. Even if nothing different was done to a field, but the yield on each was measured separately, chances are each half of the field would not yield the same as the other half. So how much difference would have to occur to guarantee the difference was due to a treatment and not just natural variability in the field? You just don't know.

These fungicides are very effective against some diseases that occur on wheat, alfalfa, tree and other crops. However, there is also documentation that pathogenic fungi can develop resistance to this class of fungicides. Applying these fungicides when no disease is present is not good stewardship of the fungicides nor is it good for the environment.

Silage Corn Variety Trial

The annual silage corn variety trial, with all varieties tolerant to glyphosate, was conducted at Windmill Ranch north of Visalia on a fine sandy loam soil. The field was planted on June 9 and harvested September 22. There were 3 replications and plots were 5 rows by the length of the field and the entire plot was harvested for yield data. Moisture and quality samples were collected at the silage pile, weighed and dried for moisture determination. Dried samples were then sent to Dairy One lab in New York for quality analysis by NIRS methodology. There were 3 replications.

Emergence was affected by high temperatures and a heavy manure application prior to planting. Some varieties showed tip burn. Other varieties such as ES 7654 RR, RX 940, Dairyland 1114, and Hytest 8720 were either not affected or the effects were much less.

Results are shown in Tables 3-5. Remember that for each table, within a column, if the values for 2 different corn varieties are followed by the same letter, these values are not statistically different. For example in Table 3, the moisture at harvest for L-9H22RR is statistically different than the moisture for Integra 967 IR (L-9H22RR has an "A" after it and Integra 967 has a "B"). However, Integra

967 IR had the same moisture as 8221 VT3 as both had a "B" in the column after moisture. Plant height, ear height and yield data are listed in Table 3. There was a very wide range in moisture among the varieties at harvest, with a low of 58% to a high of over 74%. This is the largest difference experienced in a silage corn trial since I began conducting them. It makes it very difficult to directly compare varieties. If one looks at the field yield at harvest, the driest varieties tend to weigh less because they contain less water. When yields are standardized to 70% moisture, dry varieties are favored because they not only got to fill their kernels to a greater degree than less mature varieties but they also have weight added on to get them to 70% moisture. Less mature varieties, those with more water or moisture at harvest, get penalized by the standardization process because they didn't get a chance to fill their kernels as much as more mature varieties and the moisture weight is subtracted. For this reason Table 4 has the varieties and their yields grouped by moisture categories.

Looking at Table 4, you can directly compare varieties that are listed in a group between the shaded lines. Varieties within these groupings had no statistical difference in their moisture content at harvest. For example, Integra 967 IR through 8221 VT3 were in the same moisture category (they all have the statistical letter "B" after their moisture content). Varieties within this group can be compared. The next group in the table (Dyna-Gro 58K02 through DKC 63-45) has the statistical letter C behind the moisture content. Note that some varieties are in several groupings because the statistical differences in moisture content overlap in many cases. For example, Integra 967 IR was not different in moisture from 8221 VT3 (both have a "B" after their moisture content) but it was different than DKC 63-45 which did not have a "B" but rather a "CD" after its moisture content.

There were few differences among the varieties in quality (Table 5). Remember that the samples that determine both moisture and quality are relatively small (pint sized baggy)

and are representing 5 rows by almost ¼ mile. Small handfuls from several places of the pile representing each plot are collected for these samples but they still are only a fraction of the total biomass of each plot.

These variety trials are conducted to help you choose a variety to plant on your fields. Soils,

water, and management will be different in your fields. Use these results as a guide but it is best to plant more than one variety if you have several corn fields. What performs best under your conditions may be different than the best performing varieties in the trials.

New Book on Alfalfa Production

The University of California has just published a 365 page book on alfalfa production written by UC Extension Specialists, Farm Advisors, and faculty. Irrigated Alfalfa Management for Mediterranean and Desert Zones (UC ANR publication 3512) was written for the Central Valley and California desert alfalfa production areas and is intended for growers, pest control advisors, and allied industry. There are color photographs of disease symptoms and insect pests, including a diagnostic key. The 24 chapters cover alfalfa production from start to

finish, from selecting varieties through harvest to marketing and economics. There are chapters on organic alfalfa, grazing, and manure application. The chapters can be viewed on the internet at: <http://alfalfa.ucdavis.edu/IrrigatedAlfalfa/>. The book costs \$65. It can be purchased on-line or is available at the UC Cooperative Extension office in Tulare. (Call in advance, 559-685-3303, to verify that it is in stock; if not the office can order more).

Sabbatical Leave

I will be on sabbatical leave from mid-February of this year through January 2010, to upgrade my plant pathology skills and to learn some modern techniques for disease diagnosis. I will be working on corn stunt and Sclerotinia on alfalfa and garbanzo beans. In the meantime, my colleague in the Fresno County Cooperative Extension Office, Shannon Mueller, can help with questions on alfalfa and blackeyes. Her phone number is 456-7261. My colleague in our Tulare office, Steve Wright, will be available for questions on weed control and corn. He can be reached by calling the Tulare County Cooperative Extension office at 685-3303.

Table 1. 2008 Fungicide Trial on GRAIN Corn - Tulare County¹

UC Cooperative Extension: Carol Frate, Farm Advisor

Cooperators: Ronnie and Tommie Clark

Field Location: Avenue 260, west of Rd 68

Variety: Pioneer 32W86 Date of Planting: 4/8/2008

Field Length (ft): 1216 (harveted length after ends were cut)

Row Spacing (in): 38

Number of reps: 4

Plot size: 80 ft wide x length of field (8 rows from inside the plot were harvested for yield data)

Date of Treatment: 6/23/08

Harvest Date: 9/9/2008

Material ^{2,3}	Rate/Acre	Rate/10 acres	Treatment Date	8/19/2008 Dry Wt (lbs) of Kernels from 12 ears	9/9/2008 Tons/A (adjusted to 15.5% moisture)
Untreated	-	-	-	4.98	7.15
Headline	6 fl oz	60 fl oz or 3.75 pt	6/23/2008	4.92	6.94
Quadris	9 fl oz	90 fl oz or 5.6 pt	6/23/2008	4.88	6.92
Stratego	10 fl oz	100 fl oz or 6.25 pt	6/23/2008	4.91	7.10
			Overall Mean	4.92	7.026
			Probability	0.954	0.238
			LSD .05	NS	NS
			Co-efficient of Variability (%)	5.31	2.49

¹Values are the means of 4 replications.

²NIS @ 0 .25% v/v was added to each treatment

³ Headline contains 2.09 lbs pyraclostrobin per gallon; Quadris contains 2.08 lbs azoxystrobin per gallon; Stratego contains 1.04 lbs trifloxystrobin and 1.04 propiconazole per gallon

Table 2. 2008 Fungicide Trial in SILAGE Corn, Tulare County, CA¹

UC Cooperative Extension: Carol Frate & Shannon Mueller, Farm Advisors, Tulare & Fresno Counties respectively
 Cooperators: John Gailey and Gil Replogle, Milky Way Dairy
 Plant Date: June 22, 2008 Variety: Pioneer 32W86 Number of reps: 4
 Plot size: 6 30-inch rows x field length
 Date of Application: August 20, 2008
 Application Method: helicopter @ 10 pga by Gilbert Aviation, Inc.
 Stage of Growth at treatment date: early tassel with new silks about 2-4 inches long
 Harvest Date: October 21, 2008 Harvested: 6 rows x 1015 ft

Material ^{2,3}	Rate Material/Acre	Application Date	Harvest 10/21/08		
			Tons/Acre at harvest moisture	% Moisture at Harvest	Tons/Acre adjusted to 70% moisture
Untreated	- -	-	29.86	62.60	37.09
Headline	6 fl oz	20-Aug	29.14	62.70	36.27
Quadris	9 fl oz	20-Aug	30.73	62.00	38.91
Stratego	10 fl oz	20-Aug	29.58	63.00	36.46
		Overall Mean	29.83	62.60	37.18
		Probability	0.5536	0.6922	0.3291
		LSD .05	NS	NS	NS
		Co-efficient of Variability (%)	5.22	1.92	5.65

¹ Values are the means of 4 replications.

² NIS @ 0.25% v/v was added to each treatment

³ Headline contains 2.09 lbs pyraclostrobin per gallon; Quadris contains 2.08 lbs azoxystrobin per gallon; Stratego contains 1.04 lbs trifloxystrobin and 1.04 propiconazole per gallon

2008 UCCE Tulare/Fresno County Silage Corn Variety Trial

C. Frate and S. C. Mueller, UCCE Farm Advisors, Tulare & Fresno Counties respectively

Table 3. Plant height, ear height, and yield results.

Cooperator: Windmill Ranches, Jay TeVelde, Tony Schotanus

Plot Size: 5 30-in beds x 1200 ft

Planted on: June 9, 2008

Number of replications: 3

Harvested: September 22, 2008

At planting: 10 gal UAN32.4 inches to the side w/ 2 pt of Zinc mix, Pounce applied

Field Variety: Pioneer 31G97

Brand	Stand Count plants/acre June 19	# June 19	Moisture % at Harvest	Yield Results					Avg Plant Height (ft) Sept. 5	Avg Ear Height (ft) Sept. 5		
				Tons/Acre at Harvest	Harvest Tons/Acre standardized to 70% moisture		Tons/Acre at Harvest	Tons/Acre at Harvest				
					Harvest	Harvest					Harvest	Harvest
L-9H22RR	32,780	AB	74.3	A	37.94	A	32.42	DE	12.1	CD	5.6	BCD
Integra 967 IR	31,780	ABCD	69.1	B	32.95	BC	33.81	BCDE	11.8	DE	5.4	CDE
NC+ 7374 RB	31,400	BCD	68.6	B	30.75	DEF	32.20	DE	10.9	G	5.1	EF
Dyna-Gro 58K02	31,040	CDE	67.8	BC	33.66	B	36.17	ABC	12.4	BC	5.8	B
Pioneer Brand 31G97	32,980	A	67.4	BC	30.98	CDE	33.74	BCDE	12.4	ABC	5.3	DE
RX 940	32,070	ABCD	67.3	BC	34.73	B	37.80	A	12.6	AB	6.3	A
TMF 2H917	32,010	ABCD	67.1	BC	31.15	CD	34.14	BCDE	11.7	DE	5.6	BCD
8221 VT3	30,690	DE	66.4	BC	28.77	FG	32.25	DE	11.7	DE	5.7	BC
DKC63-45	31,780	ABCD	65.8	CD	27.76	GH	31.66	E	11.4	EF	4.7	GH
STP 7808	32,620	AB	63.3	DE	26.98	GH	32.92	CDE	12.4	BC	4.4	H
Dairyland 11914	33,170	A	63.0	E	28.78	FG	35.41	ABCD	12.1	CD	5.5	BCD
Pioneer Brand 33F85	32,270	ABC	62.3	EF	28.94	EFG	36.39	AB	11.8	DE	5.1	EF
HT 8720	29,750	E	61.9	EF	27.14	GH	34.45	BCDE	11.2	FG	5.1	EF
ES 7654 RR	31,940	ABCD	61.7	EF	25.82	H	32.95	CDE	12.1	CD	5.3	DE
Garst 82K79	31,980	ABCD	59.5	FG	26.28	H	35.42	ABCD	12.8	A	5.4	CDE
SX 5470	31,880	ABCD	57.8	G	22.62	I	31.85	E	11.5	EF	5.0	FG
Overall Mean	31,884		65.196		29.703		33.970		11.93		5.34	
Probability	0.006		0.0000		0.0000		0.1250		0.00		0.00	
LSD .05	1465.9		2.754		2.145		3.280		0.44		0.35	
Co-efficient of Variability (%)	2.8		2.53		4.33		5.79		2.20		3.96	

Values are the means of 3 replications.
 Within a column, values followed by a common letter do not differ at the 5% level of Probability, using Least Significant Difference for mean separation.

2008 UCCE Tulare/Fresno County Silage Corn Variety Trial

Table 4. Yields grouped by moisture at harvest

Cooperator: Windmill Ranches, Jay TeVelde, Tony Schotanus

Plot Size: 5 30-in beds x 1200 ft

Number of replications: 3

Planted on: June 9, 2008

Harvested: Sept. 22, 2008

At planting: 10 gal UAN32 4 inches to the side w/ 2 pt of Zinc mix, Pounce applied

Field Variety: Pioneer 31G97

Brand	9/22/2008		9/22/2008		Harvest Tons/Acre standardized to 70% moisture	
	Moisture % at Harvest		Tons/Acre at Harvest			
L-9H2RR	74.30	A	37.94	A	32.42	DE
Integra 967 IR	69.13	B	32.95	BC	33.81	BCDE
NC+ 7374 RB	68.55	B	30.75	DEF	32.20	DE
Dyna-Gro 58K02	67.75	BC	33.66	B	36.17	ABC
Field Variety (Pioneer Brand 31G97)	67.37	BC	30.98	CDE	33.74	BCDE
RX 940	67.32	BC	34.73	B	37.80	A
TMF 2H917	67.11	BC	31.15	CD	34.14	BCDE
8221 VT3	66.38	BC	28.77	FG	32.25	DE
Dyna-Gro 58K02	67.75	BC	33.66	B	36.17	ABC
Field Variety (Pioneer® Brand 31G97)	67.37	BC	30.98	CDE	33.74	BCDE
RX 940	67.32	BC	34.73	B	37.80	A
TMF 2H917	67.11	BC	31.15	CD	34.14	BCDE
8221 VT3	66.38	BC	28.77	FG	32.25	DE
DKC63-45	65.78	CD	27.76	GH	31.66	E
DKC63-45	65.78	CD	27.76	GH	31.66	E
STP 7808	63.33	DE	26.98	GH	32.92	CDE
STP 7808	63.33	DE	26.98	GH	32.92	CDE
Dairyland 11914	62.95	E	28.78	FG	35.41	ABCD
Pioneer Brand 33F85	62.28	EF	28.94	EFG	36.39	AB
HT 8720	61.92	EF	27.14	GH	34.45	BCDE
ES 7654 RR	61.65	EF	25.82	H	32.95	CDE
Pioneer Brand 33F85	62.28	EF	28.94	EFG	36.39	AB
HT 8720	61.92	EF	27.14	GH	34.45	BCDE
ES 7654 RR	61.65	EF	25.82	H	32.95	CDE
Garst 82K79	59.54	FG	26.28	H	35.42	ABCD
Garst 82K79	59.54	FG	26.28	H	35.42	ABCD
SX 5470	57.78	G	22.62	I	31.85	E

2008 UCCE Tulare/Fresno County Silage Corn Variety Trial

Table 5. Quality results

Cooperator: Windmill Ranches, Jay TeVelde, Tony Schotanus

Plot Size: 5 30-in beds x 1200 ft

Planted on: June 9, 2008

At planting: 10 gal UAN32 4 inches to the side w/ 2 pt of Zinc mix, Pounce applied

Field Variety: Pioneer 31G97

Number of replications: 3

Harvested: September 22, 2008

Brand	Quality Results - all based on 100% Dry Matter											Milk Lbs./Ton of DM
	% Crude Protein	% Acid Detergent Fiber (ADF)	% Neutral Detergent Fiber (NDF)	% TDN	% Calcium	% Potassium	% Starch	NDFD 24hr, % of NDF	NDFD 48hr, % of NDF			
L-9H22RR	8.73 A	34.27	52.00	64.67	0.21 ABC	2.16 A	17.33	43.67	57.00			2556
Integra 967 IR	7.80	CDE	48.10	68.67	0.20 BC	1.75 BCDE	24.67	43.67	59.33			2712
NC+ 7374 RB	7.97	BCD	45.40	69.33	0.17 D	1.77 BCDE	28.43	46.33	58.33			2783
Dyna-Gro 58K02	7.63	DEF	51.90	64.33	0.20 C	1.86 ABCDE	21.77	41.33	55.33			2454
Pioneer Brand 31G97	7.07	FG	48.70	67.33	0.14 F	1.68 DE	23.30	43.67	57.67			2595
RX 940	7.50	DEFG	31.23	49.27	0.18 D	1.72 CDE	23.77	45.67	58.67			2675
TMF 2H917	7.90	BCD	33.57	51.63	0.20 BC	2.03 ABC	19.77	43.67	54.67			2504
8221 V73	7.90	BCD	29.17	46.30	0.23 A	1.65 DE	28.17	43.67	58.33			2695
DKC63-45	8.63 A		31.63	50.10	0.21 ABC	2.01 ABC	22.97	43.33	58.00			2583
STP 7808	8.40 ABC		35.03	52.70	0.22 ABC	2.06 AB	20.37	40.00	57.33			2451
Dairyland 11914	7.83 BCDE		31.73	51.37	0.18 D	1.85 ABCDE	22.57	42.67	56.33			2533
Pioneer Brand 33F85	7.23 EFG		29.20	45.90	0.15 EF	1.74 CDE	27.33	46.00	58.67			2748
HT 8720	7.767 DE		31.03	49.93	0.20 C	1.56 E	24.90	46.67	61.33			2681
ES 7654 RR	8.43 AB		34.13	54.50	0.18 D	1.95 ABCD	19.27	43.33	59.00			2495
Garst 82K79	6.93 G		29.43	46.83	0.16 DE	1.65 DE	27.47	45.00	58.33			2678
SX 5470	7.93 BCD		33.03	53.07	0.17 D	1.76 BCDE	24.23	41.33	58.67			2488
Overall Mean	7.85		31.65	49.86	0.19	1.83	23.52	43.75	57.94			2601.94
Probability	0.000		0.251	0.207	0.000	0.017	0.063	0.172	0.252			0.485
LSD .05	0.614		NS	NS	0.034	0.316	NS	NS	NS			NS
Co-efficient of Variability	4.68		9.60	8.15	10.87	10.38	17.59	6.08	4.15			7.27

Values are the means of 3 replications.

Within a column, values followed by a common letter do not differ at the 5% level of Probability, using Least Significant Difference for mean separation.

Quality was determined by NIRS. "TDN" is Total Digestible Nutrients; "NDFD" is Neutral Detergent Fiber Digestibility

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Carol Frate, Farm Advisor

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