University of California Cooperative Extension • Tulare County

Field Crop Notes

Volume II, Issue 3 - April 05

Provided to you as an educational resource from the University of California Cooperative Extension • Kings County

THANK YOU!

The corn trials in 2004 could not have been conducted without the cooperation of growers, seed companies, chemical companies, spray applicators, and custom harvesters. Their cooperation is greatly appreciated.

Tom Barcellos
Gil Replogle
Frank Pacheco
Alex Zuniga
Matt Rackerby, FMC
Greg Fernandes
Gustufson Chemical
Western Farm Service
Syngenta Chemicals
Helena Chemical
Vieira Custom Chopping
D&G Custom Chopping
Hofste Custom Chopping
James Costa & Costa Spraying
Craig Sharpe, Eureka Seeds
Nate Johnson, HBT/Germain's Seeds
Josh Vierra & Vierra Custom Spraying

CORN SILAGE VARIETY TRIAL

The 2004 corn silage variety trial was planted on June 1 in a sandy loam field. There were 13 varieties replicated 3 times. Each plot was 5 rows and ran the length of the field, approximately ¼ mile. Stands were good for each variety. Some corn stunt was present but it was distributed throughout the varieties and was at low incidence. The field was well managed with few weeds. One variety, Technology Seed 518, had problems with lodging. In the first of three replications it was over 80% lodged. It was not as bad in the other 2 reps but there was some lodging in each rep.

Harvest proved to be difficult because the tail end of the field was wet due to a leaky valve. After struggling for two days and pulling several silage trucks out of the field with a chain and tractor, the rest of the harvest was postponed for 4 days. Unfortunately, we had to stop without completing the first replication so not all of the varieties were treated exactly the same. Varieties in the first replication that did not get harvested on the first attempt had 4 more days of growth and dry down than the other varieties in that replication. Their "at harvest" weights would tend to be lower than those cut on the first attempt due to loss of moisture during those 4 days. This would lower the average "weight as harvested" for those varieties.

Table 1 (see Page 2) shows the yield results for the average of the 3 replications for average weight at harvest, average moisture percent, and adjusted weight (adjusted to 70% moisture). It is impossible to harvest all varieties at the same moisture percentage because each will mature and dry down at a slightly different rate. In addition, harvest for this trial extended over a period of 5 days due to wet soil conditions. The adjusted weight takes the harvest weight and mathematically calculates what the yields would be with everything at 70% moisture but it favors those varieties that were lower than 70% at harvest and penalizes those varieties whose moisture content was above 70% at harvest.

Statistically, differences are not "significantly" different until there is a 95% certainty that the difference is due to the treatment (or variety) and not due to chance. The differences in this trial were almost significant ($P = 0.06$ or 94% chance the differences are real). In **Table 1**, yields within a column that are followed by a common letter are not different from each other at the 90% level of certainty.

Cooperator: Alex Zuniga, Vander Poel Dairy
Location: Rd 104, south of Avenue 96
Harvested: September 15 (8 plots), September 16 (2 plots), and the remaining plots on September 20, 04

Soil Type: sandy loam
Planted: June 1, 2004
Plot size: 5 rows x 1260 ft; 3 replications

TABLE 1. 2004 SILAGE CORN VARIETY TRIAL [1]

BRAND	Plant Stand 6/15/04	Tons/A as Harvested	% Moisture at Harvest	Tons/A adjusted to 70% Moisture	Stalk Height (ft)	Ear Height (ft)
Asgrow RX-940 RR	31200	33.56 a	66.1	37.99 a	11.1	5.9
Baglietto SX 5561	34400	32.65 a	64.5	37.85 a	11.6	6.1
DK 743 (field variety)	33600	30.87 a	63.3	37.69 a	10.6	6.0
Seed Tec ST7624 RR	35600	33.62 ab	68.0	35.76 ab	11.8	6.3
Dairyland 11907	30400	30.72 ab	64.5	35.64 ab	11.9	6.5
NK Nx8582	32133	33.72 abc	69.1	34.72 abc	11.3	6.1
NC+ 6958M	34677	31.76 abc	67.3	34.67 abc	11.5	6.0
Pioneer 33V15	32267	29.98 abc	65.1	34.41 abc	12.0	6.2
Simplot Golden Harvest H-2641	31600	30.59 abc	66.2	34.32 abc	11.7	6.2
Cropland 702	33200	29.25 abc	65.3	33.38 abc	11.2	6.0
Hytest/Germains HT 7815RR	32133	28.95 bcd	66.7	32.08 bcd	10.8	5.7
Technology Seed 518	32800	26.09 cd	64.7	30.73 cd	11.0	6.0
DeKalb DKC67-06	33600	25.46 d	66.4	28.38 d	12.1	6.2
Probability =		*0.05*	*0.57*	*0.06*	*0.13*	0.54
COV (%)		*5.76*	*4.28*	*9.78*	*5.61*	6.14

[1] Values within a column followed by a common letter do not differ significantly using Duncan's Multiple Range at the 10% probability level.

Under the conditions of this trial, the top 3 varieties were better than the lower 3 varieties. Soil type, temperature patterns, fertility, management and many other factors can influence the performance of a variety in any given test.

THE LATEST ON REDUCED TILLAGE IN CORN

In 2004 two replicated trials were conducted looking at no-till or reduced tillage production systems: 1) reduced tillage following wheat on beds and 2) row spacing in no-till.

MINIMUM TILL FOLLOWING WHEAT ON BEDS

The purpose of this trial was to investigate no-till and strip-till production following forage wheat grown on beds because water management had been the major problem encountered in the 2003 trials comparing no-till and strip-till corn following silage wheat grown in bordered checks.

The wheat performed well on beds and harvest presented no significant problems. The field was cut and windrowed with pick up the next day. No lodging had occurred and there was little straw residue left behind in the field. This field is affiliated with a dairy so corral manure was spread immediately after wheat harvest with no damage to the beds by the trucks – but remember last spring was warm and dry so the ground was quite dry when manure was spread.

After spreading, it was obvious that large clumps of manure would interfere with water flowing down the furrow. A pass was made before pre-irrigation with a furrowing-out bar that was set just low enough to lightly scrape the surface of the furrow, pushing the manure clumps out if the way. This was done in all the treatments.

Two timings of strip tilling were planned: one before pre-irrigation and one after. However, after strip-tilling just 50 feet prior to pre-irrigation it was obvious that the ground was so dry the beds were practically destroyed so that treatment was dropped from the trial. Strip-tilling after pre-irrigation went smoothly.

Planting of the conventional tilled plots was with either a standard planter or a John Deere no-till planter. Both worked equally well. Stands were good in all plots. There we no significant differences in yield among all the treatments (**Table 2**).

TABLE 2. YIELDS FROM 2004 SILAGE CORN REDUCED TILLAGE UCCE TULARE COUNTY TRIAL.

	Tons/A as harvested	Tons/A adjusted to 70% Moisture
Conventional on beds	25.8	28.5
Strip-till w/shank after pre-irrigation	26.6	28.3
No-till	26.0	27.0
No-till with no manure	24.0	27.7
Probability	Not Significant	Not Significant

DO 15 INCH ROWS INCREASE YIELDS?

In the no-till trial, row spacing and plant populations were investigated. The field was pre-irrigated immediately after winter forage was harvested. After drying sufficiently, plots were planted with DK C66-80 RR on May 13 (15-inch spacing) and May 14 (30-inch rows), 2005. The field was border flood irrigated and, in-between borders, rows were either the standard 30-inch spacing or 15-inch spacing. Both spacings were planted with a John Deere no-till planter using GPS guidance. For the 15-inch spacing the planter came back over the 30-inch rows that had just been planted and seeded in-between those rows.

Each plot was 25 ft wide (ten 30-inch rows or twenty 15-inch rows) and 2,532 ft long with 4 replications. Within each border check of either 30 or 15-inch spacing, there were 3 plant populations. The goal was to have 3 identical populations in each spacing but, although close, there were slight differences between the low, medium and high populations in each spacing (see **Table 3** on Page 4). Dairy lagoon water was used in several irrigations so fertility levels should have been adequate for all populations. Harvest was on September 11, 2004.

TABLE 3. POPULATIONS FOR 15 AND 30-INCH ROW SPACINGS, 2004 NO-TILL SILAGE CORN TRIAL.

Target Population	15-inch rows	30-inch rows
Low 28,000	34,675	32,665
Medium 35,000	36,700	36,802
High 42,000	42,000	40,850

No obvious differences in time of tassel were noticed between the row spacings or among the different plant populations and no differences in stalk or ear height were detected. Stalk diameters were taken after tassel and there was a trend for stalks to be bigger in the 15-inch rows than in the 30 inch rows for a given population range (**Table 4** on Page 5). Despite differences in stalk diameter, there was no lodging in the trial regardless of spacing or plant population.

Harvesting the 15-inch rows was a challenge. Without beds and with corn rows only 15 inches apart, the driver could not stay straight. Data from two plots were lost entirely and missing plot analysis was used. Plant material could have been lost as the chopper did not always get the full swath of rows or could have been higher in areas where it did not go straight. These harvest issues must be remembered when looking at the yield data in **Table 4** on Page 5. Yields at harvest were definitely higher for 30-inch spacing than for 15-inch spacing regardless of spacing. However, plants from all of plant populations in the 15-inch spacing were drier than in the 30-inch spacing. When yields were calculated to 70% moisture, the differences between the 15-inch and 30-inch spacings were less but the trend is still evident that the 30-inch spacing produced higher yields. Population differences within their respective row spacing did not differ in yield from each other. Plans to repeat this trial are in the works. In the meantime, a rush to go to 15-inch spacing is not justified.

CORN STUNT TRIALS

Two trials were conducted evaluating systemic insecticide seed treatments with and without foliar insecticide applications. Seed from the same lot of a variety was treated with either the standard seed treatment or with the standard + Cruiser CRW (Syngenta) or the standard + Poncho 1250 (Gustufson). Both Poncho and Cruiser are systemic insecticides that are taken up in tissues of young seedlings. A tank mixture of Capture (6.4 oz/A) + Dimethoate (1 pt/A) was applied by ground before lay-by to half of the rows with the different seed treatments. Plots were 16 rows wide in the early planted trial and 12 rows in the late planted trial with 4 replications in each trial. Both fields were about ¼ mile in length. Yellow sticky cards, 3x5 inches in size, were placed at both ends of each plot, approximately 40 ft into the field. Leafhopper counts were based on the total number of insects on the two cards. Cards were collected on a weekly schedule for the most part and corn leafhoppers counted. Corn leafhoppers are not attracted to yellow cards so how these counts related to the number of corn leafhoppers in the field is not known. However, the higher the population in the field the more likely leafhoppers will fly into the card.

EARLY PLANTED TRIAL

This trial was planted on April 1, 2004, on 38-inch beds. It was not the first planted field in the local area and corn was already up in adjacent fields at planting. This area had light to moderate stunt in 2003. Leafhopper pressure during this trial was light. The foliar spray (Capture 2EC @ 6.4 oz/A + Dimethoate 4E @ 1 pt/A + First Choice emulsified cottonseed oil surfactant @1.5 qt/A) was applied by ground using drop nozzles on May 25, 2004, when the corn was 4-5 ft in height with 7-9 leaves. At this time there were no obvious insect populations in the field but it was the last opportunity to get in with a ground rig. The field was harvested on July 31, 2004.

Leafhoppers did not begin to show up on the sticky cards in any appreciable numbers until early July, just a few weeks before harvest. The peak count in the untreated control was 22 for the week of July 22. There was a short spike of aphids for 2 weeks in early July. The untreated control had a higher aphid infestation than plots treated with either Poncho or Cruiser. Harvest occurred on July 31. Yields are shown in **Table 5** (Page 5).

Poncho 1250 and Cruiser CRW treatments were significantly higher in yield (average of 2.5 T/A) compared to the standard seed treatment – and this was with little leafhopper and stunt pressure. There was no significant difference in yields comparing plots that were sprayed and those that were not sprayed, which isn't too surprising since at the time of the foliar spray no noticeable insect populations had been documented.

Cooperator: Tom Barcellos
Field Location: Rd 160, 1/4 mile south of Avenue 152
Variety: DK C66-80 RR
Planted: May 13 (15-in rows) and May 14 (30-in rows), 2004

No-till following winter forage
Plots 25 ft x 2582 ft; 4 replications; 6 rows harvested for yield data.
Soil Type: fine sandy loam
Harvested: September 11, 2004

TABLE 4. YIELD AND OTHER MEASUREMENTS FOR 2004 ROW SPACING AND PLANT POPULATION SILAGE CORN TRIAL.

TREATMENTS	Average Stand Count	Average Stalk Height (ft.)	Average Ear Height (ft.)	Average Stalk Diameter (in.)	Tons/Acre as harvested	Moisture at harvest (%)	Tons/Acre adjusted to 70% Moisture
30-Inch Spacing	36,000	12.3	7.0	0.96*	30.9*	69.1*	31.7
Low Population	*30,654*	*12.2*	*6.9*	*1.01*	*32.18*	*69.3*	*32.9*
Medium Population	*36,904*	*12.3*	*7.0*	*0.96*	*31.53*	*70.1*	*31.4*
High Population	*40,850*	*12.4*	*7.1*	*0.92*	*28.96*	*67.9*	*30.9*
15-Inch Spacing	37,791	12.3	7.1	1.02*	25.5*	65.6*	29.2
Low Population	*34,674*	*12.3*	*7.1*	*1.10*	*26.36*	*67.4*	*28.4*
Medium Population	*36,700*	*12.3*	*7.0*	*1.03*	*25.72*	*64.7*	*30.2*
High Population	*42,000*	*12.3*	*7.1*	*0.95*	*24.5*	*64.6*	*28.8*
Probability =	>.50 *0.05*	>.50 *0.31*	0.16 *0.38*	0.01 *<.00*	<.00 *0.08*	0.04 *0.26*	0.10 *0.4*
COV (%)	17.55	1.15	2.27	2.61	7.22	7.31	4.73

TABLE 5. YIELD DATA FOR "EARLY" PLANTED CORN STUNT TRIAL.

Treatments	Moisture @ harvest	Tons/A as harvested	Tons/A adj. 70% moisture
Main Plots			
no insecticide seed treatment	0.70	33.2	33.5 a
Poncho 1250	0.70	35.3	35.5ab
Cruiser CRW	0.68	34.2	36.3 b
Probability	*0.16*	*0.086*	*0.04*
LSD @ P=.05	*NS*	*NS*	*2.09*
Split plots			
no foliar spray	0.69	33.9	34.8
foliar spray	0.69	34.6	35.4
Probability	*>.50*	*0.07*	*>.50*
LSD @ P=.05	*NS*	*NS*	*NS*
Coefficient of Variability (%)	*1.5*	*2.6*	*4.4*

LATE PLANTED TRIAL

The "late" trial, located near Woodville, was planted June 23 and harvested October 14. The foliar spray (Capture 2EC @ 6.4 oz/A + Dimethoate 4E @ 1 pt/A + Pentrator non-ionic spray adjuvant @ 1 qt/A) was applied August 8 but should have been applied in early July based on insect counts. However irrigation scheduling and problems with a pump made it impossible to get into the field with a ground rig until almost a month later. **Figure 1** (Page 7) shows leafhopper counts for the season. Note that significant numbers of leafhoppers were collected just 2-3 weeks after planting in plots without systemic seed treatments. Leafhopper counts dropped in late July due to either water stress (problems with the pump) or air applications of insecticides to adjacent corn fields. As counts began to increase again in early August the foliar spray lowered counts in plots without systemic seed treatments but did not have much impact on leafhopper counts in plots with Poncho or Cruiser.

At harvest, about 11% of plots without the systemic seed treatments had "classic symptoms" of stunt. Only 4% of the plants in Poncho or Cruiser plots had "classic symptoms". However, when the counts of "classic" symptoms plus "possible" symptoms were combined, there were no differences among any of the treatments.

Yields are shown in **Table 6** (Page 7). Although yields for the seed treatment plots were on average 1.75 T/A higher than for the standard seed treatment, these differences were not statistically significant to the 95% level of confidence. The probability that the seed treatments yields were better than the standard seed treatment was 78%. The foliar spray increased yields by 0.8 T/A which was not significant.

SUMMARY OF 2003 AND 2004 STUNT TRIALS

- Poncho 1250 and Cruiser CRW reduce the numbers of leafhoppers, may have a benefit for aphids, may delay spread of corn stunt, and may result in a modest increase in yield (usually 1-2 tons/A).

- Foliar sprays may also help but it seems to depend on incoming flights of leafhoppers, coverage, and timing.

- Neither seed treatments nor foliar sprays are a "magic bullet."

- A trial where the foliar spray is "piggy-backed" on top of a systemic seed treatment in a timely manner is still needed.

FIGURE 1. LEAFHOPPER COUNTS FROM 2004 JUNE-PLANTED CORN STUNT TRIAL

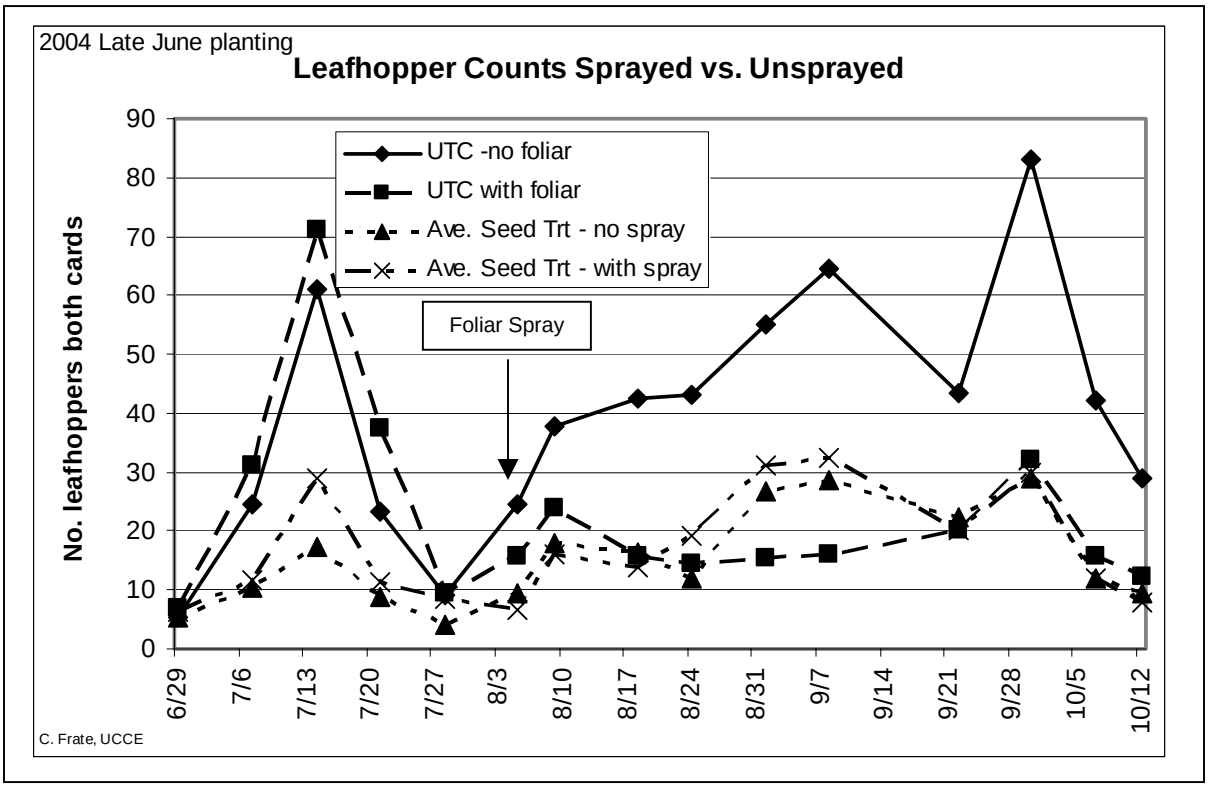

TABLE 6. YIELD RESULTS FROM "LATE" PLANTED CORN STUNT TRIAL.

Treatments	Moisture @ harvest	Tons/A harvested	Tons/A adj. 70% moisture
Main Plots			
no insecticide seed treatment	61.1	19.28 c	24.96
Poncho 1250	62.1	21.42 a	27.10
Cruiser CRW	61.6	20.59 ab	26.32
Probability	*>.50*	*0.04*	*0.22*
LSD @ P=.05	*NS*	*1.61*	*NS*
Split plots			
no foliar spray	61.6	20.14	25.73
foliar spray	61.6	20.72	26.52
Probability	*>.50*	*0.26*	*0.25*
LSD @ P=.05	*NS*	*NS*	*NS*
Coefficient of Variability (%)	*2.5*	*5.8*	*6.0*

University of California
Cooperative Extension
Kings County
680 N. Campus Dr. Ste A
Hanford, CA 93230

Nonprofit Organization
US Postage Paid
Hanford, CA 93230
Permit No. 49

Field Crop Notes

April 05

In This Issue:

Carol Frate, Farm Advisor