

# Silage Corn Variety Trial in Central Arizona

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## **Abstract**

*Ten varieties of silage corn were tested at the Maricopa Agricultural Center in Central Arizona. Information on silage corn yield and quality can help the dairy industry and silage growers choose varieties that best fit their needs. There were no significant differences between any of the varieties tested with respect to 'yield per acre', 'crude protein', NDF or 'ash content'. We were able to find significant differences with ADF.*

## **Introduction**

Selection of the right variety is one of the most important decisions a grower needs to make. Due to the number of varieties in the market, Central Arizona growers have expressed interest in silage corn variety trials. The University of Arizona provides an unbiased testing of varieties being released into the market. The area under silage corn had gone down the past years from 35,000 acres in 2008; 30,000 acres in 2009 and 23,000 acres grown in 2010 (USDA, 2010).

Both yield and quality are important in silage corn production. In addition to crude protein, Acid Detergent Fiber (ADF) and Neutral Detergent Fiber (NDF) are two important indicators of silage quality. ADF refers to cell wall portions in the silage that are made up of cellulose (poorly digestible) and lignin (totally indigestible) and pectin (highly digestible). NDF refers to the total cell wall (ADF+hemicellulose). Low values of ADF and NDF are desirable because both are inversely related to digestibility of silage and dry matter intake (the amount of silage the animal can consume).

## **Materials and Methods**

A complete randomized block design experiment with ten silage corn varieties and four replications was conducted at the Maricopa Agricultural Center, Maricopa, Arizona (Table 1). These varieties were provided by several local seed distributors. The silage corn was planted in single rows on 40-inch beds on March 23, 2012. Each plot was four rows, 50 feet long. The planting rate was 46,000/acre for each variety.

The crop received 53 inches of water from planting to harvest (Table 2); from eleven irrigations and 0.46 inches from precipitation. Nitrogen (UAN 32) was applied at 345 lbs/acre; it was split with 46 lbs of N applied before planting, 51 lbs after 32 days, 186 lbs 52 days later and the remaining 62 lbs of N applied 88 days after planting. Pre-emergent herbicide Stealth<sup>TM</sup>

(Pendimethalin) applied at 2 pints per acre was the only product used during the course of the study.

Plant height was measured using a 8' graduated yardstick (Chicago steel tape). Actual height was not recorded. A picture of each variety with the yardstick was shot a few days before harvest. The yardstick was placed in one of the middle two rows before taking a picture (Figure 1). The crop was harvested on July 11, 2012 (110 days after planting) when average whole plant moisture ranged from 46% to 68% and kernel milk line was between one-half and two-thirds for most varieties. The two middle rows were green chopped with a Hesston 7155 chopper. The silage was saved in a bulk sack to record plot yield. A sample from each replication was collected for quality analysis. Silage yield was adjusted to a standard of 72% moisture. Percent moisture, crude protein, ADF, NDF and Ash from each sample were analyzed.

### **Results and Discussion**

We tested nine varieties and one conventional. The variety that yielded the most with 32.37 t/ac at 72% moisture was GA G8551 (Grand Valley Hybrids now acquired by Dow/Mycogen), however it was not significantly different from any other variety. Though the difference between the top and lowest yielder is more than 14 t/ac, variability between the replicated plots were big, thereby making the critical difference (LSD) large. Mean yield of DKC66-86 was the lowest in the study, however there was no significant difference between the top yielder. (Table 3).

The study did not show any significant differences among any of the varieties tested, with respect to crude protein. CP ranged from 9.87% the highest in TMF-2L-871 (Mycogen), to 8.07% the lowest in GA 28V81 (Golden Acres Genetics). Acid detergent fraction was the only variable that showed significant differences among the varieties tested. DKC66-97 (Monsanto) had the lowest ADF at 32.44% (lower, better). With the other varieties, the percentages ranged across the board to a maximum of 41.09% in TMF-2L-825 (Mycogen). Neutral detergent fraction, which is an estimate of cell wall fraction and hemicellulose, showed no significant difference between any of the varieties tested. DKC66-97 (Monsanto) had the lowest NDF at 51.16% (lower, better) and the TMF-3L-825 had the highest at 60.05%, though the differences were not significant. Ash had no significant differences between the 10 varieties tested. Plant height ranged between 6' to 7' (Figure 1).

### **Conclusion**

There was no variety that was superior to all, a variety that had the best nutritional content. The study showed no significant differences for 4 of the 5 quality traits that were tested. ADF was the only trait that had significant differences among varieties. As a result, we were unable to pick a variety or shortlist varieties that have the potential to perform better. It is always good to check the performance of variety at other locations (states) before deciding on one.

## References

USDA-NASS. 2010. 2010 Arizona Agricultural Statistics.

Table 1. Silage Corn Varieties included in the trial and the sources

Variety	Company
GA G8551	Golden Acres Genetics <sup>1</sup>
GA 28V81	Golden Acres Genetics
TMF-2L-825	Mycogen <sup>2</sup>
TMF-2L-871	Mycogen
TMF-2H-918	Mycogen
Conventional	
DKC64-69	Monsanto <sup>3</sup>
DKC66-86	Monsanto
DKC67-88	Monsanto
DKC66-97	Monsanto

More information about these varieties is available from the following websites:

<sup>1</sup><http://www.gaseed.com/index.php/products/test-sub-menu/optimalsilage>

<sup>2</sup><http://www.asgrowanddekalb.com/products/corn/SpecialtyMarkets/Pages/SilageProven.aspx>

<sup>3</sup><http://www.mycogen.com/Silage-Specific/SitePages/Hybrids.aspx>

Table 2. University of Arizona Silage Corn Variety Trial.

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Test Description										
Location		Management Practices:			Growing Conditions:					
					Av					
					Temp	Precip	Irrigation			
					F	in	in			
County:	Maricopa	Previous crop:	Cotton		Jan	52	0			
Longitude:	111963837	Planting date:	23-Mar		Feb	55	0.4			
Latitude:	33.062827	Harvest date:	11-Jul		Mar	60	0.25 2.93			
Elevation:	1184.4 ft	Production Inputs			Apr	71	0.07 9.38			
Soil name:	Casa Grande sandy loam				Jun	80	0.1	18.47		
Soil depth:	>60"	Fertilizer:			Rate	Date	Jul	90	0	19.18
Test Design		Nitrogen	46 lbs	27-Feb	Jul	90	1.98	3.25		
Replications:	4	Nitrogen	51 lbs	24-Apr						
Plot length:	50 ft	Nitrogen	186 lbs	14-May						
Rows per plot:	4	Nitrogen	62 lbs	19-Jun						
Row spacing:	40 in	Herbicides:								
Harvested rows:	2 rows 50' long	Stealth	2 pt/ac	26-Mar						
Seed rate:	46,000 /ac	Insecticides:								
Alleys:	10 ft	None			Precip	0.47 in				
					Irrig	53.21 in				

**Table 3. Yield and quality of seven silage corn varieties**

Variety	Yield *		Crude protein		NDF		ADF		Ash	
	(tons/A)		(%)**		(%)		(%)			
GA G8551	32.37	a	8.52	a	55.41	a	37.91	a,b,c	13.64	a
GA 28V81	28.84	a	8.07	a	56.00	a	37.24	a,b,c	13.18	a
TMF-2H-918	27.51	a	8.94	a	55.90	a	37.65	a,b,c	11.27	a
DKC64-69	27.27	a	8.79	a	53.22	a	33.81	c,d	11.16	a
TMF-2L-825	26.30	a	8.60	a	60.05	a	41.09	a	15.54	a
DKC67-88	25.86	a	8.30	a	57.13	a	37.17	a,b,c,d	11.84	a
Conv	24.75	a	9.14	a	58.62	a	39.32	a,b	13.64	a
TMF-2L-871	21.81	a	9.87	a	56.10	a	35.98	c,b,d	12.7	a
DKC66-97	20.84	a	8.17	a	51.16	a	32.44	d	9.63	a
DKC66-86	18.50	a	9.13	a	55.40	a	34.96	c,b,d	10.46	a

\*Crop yield was adjusted to 72% moisture.

\*\* All percentages in the table are on a dry matter basis.

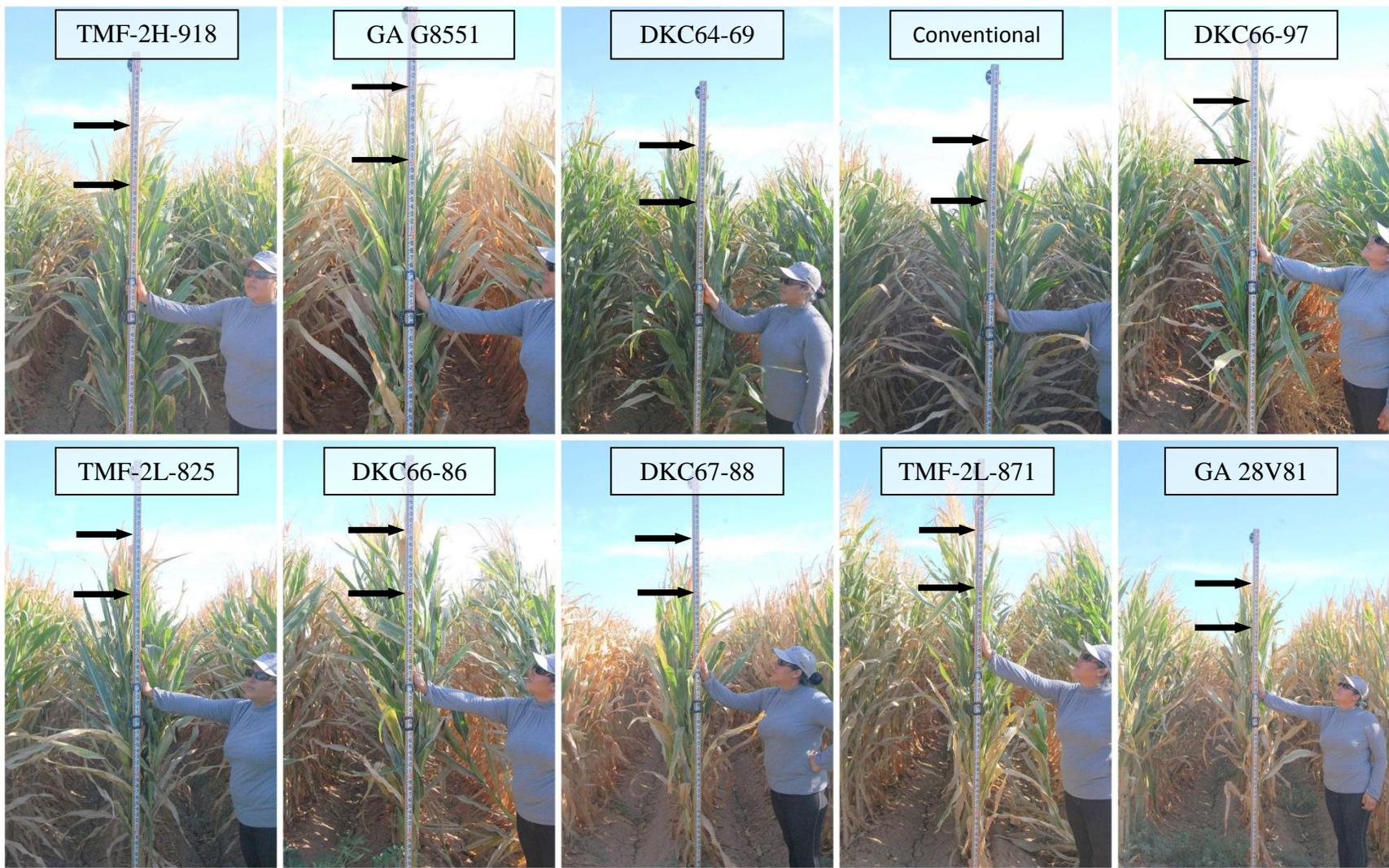


Figure 1. Plant height of seven varieties tested. The graduated stick is 8' tall, the lower arrow points to 6' and the upper arrow at 7'.