

Kansas Corn, with K-State Research and Extension, conducted the Kansas Corn Yield Contest for the 2019 growing season. This contest was open to all active members of the Kansas Corn Growers Association.

The contest:

- Recognizes Kansas farmers who have high corn yields.
- Improves crop management practices and increases efficiency for greater sustainability and profitability.
- Shares data among Kansas farmers and provides tips for improving management practices.

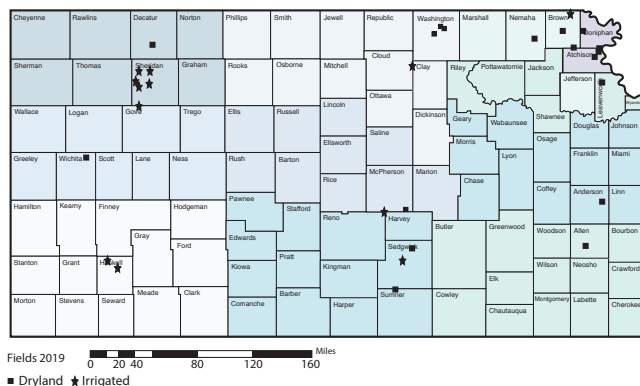
## Field Locations

The fields were predominantly located in northeast and northwest Kansas (Figure 1).

## Summary of Results

### Yield

- Average yield entry for the plot yields for dryland was 193 bushels per acre, while the irrigated group was 234 bushels per acre. Yields ranged from 132 to 295 bushels per acre.
- Average yield of the dryland fields was 166 bushels per acre and 251 bushels per acre for irrigated fields.
- For dryland entries, yield increased moving west to east in the state. This could be partially explained by the delay in planting date when moving from east to the west across Kansas. For yields less than 200 bushels per acre, yield for the plot portrayed a larger yield than for the entire fields.



**Figure 1.** Field location for high-yield corn contest entries for Kansas. Dryland (25 entries), Irrigated (9 entries).

### Crop management

- Corn hybrids represented four seed companies.
- Average seeding rate was 28,955 seeds per acre varying between 16,000 and 40,000 seeds per acre.
- 70% of the fields implemented 30-inch row spacing.
- Soybean was the most frequent previous crop (+50%), followed by corn and wheat.
- 62% of the farms conserved the residue of the previous crop, 35% grazed it, and 3% harvested residues.
- 62% of the farms planted corn under no-till, 22% strip-tillage, and 16% other tillage practices (e.g., disk, vertical, chisel).
- On the irrigated farms, irrigation amounts ranged from 3 to 24 inches, with the most frequent amount being 6 inches (50% of all entries with irrigation).
- A majority of the corn received (88%) both pre- and post-emergence herbicide.
- For pest management, 55% of the corn received both fungicide and insecticide applications, 41% received only fungicide application, and 4% only received an insecticide application.

### Nutrient management

- 80% of the corn received starter fertilizer, nitrogen fertilization average 166 pounds nitrogen per acre, phosphorus fertilization 39 pounds  $P_2O_5$  per acre, and potassium fertilization averaged 30 pounds  $K_2O$  per acre.
- Grain yield and nitrogen fertilization were positively related with yields increasing 0.5 bushel per acre per unit of nitrogen applied (pounds per acre).
- None of the farmers reported iron deficiency.
- Lime was applied to fields (6%), manure application (4%), and a combination of lime and manure (4%).

## Yield Environments Summary

### Yield

- Average grain yield increased 30% from low (163 bushels per acre) to medium (231 bushels per acre) and 17% from medium to high (278 bushels per acre yielding environments (Table 2).

## Crop management

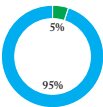
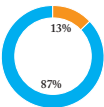
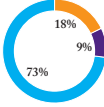
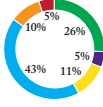
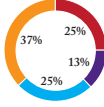
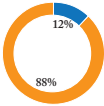
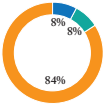

- Average seeding rate increased from 22,625 to 33,875 seeds per acre from low- to high-yielding environments (Table 1).
- Irrigation adoption was clearly a factor for the medium- and high-yielding environments (ranging from 52 to 88%) versus a low level of irrigation adopted (8%) for the low-yielding environment (Table 1).
- Most of the low- and medium-yielding fields (~85%) used both pre- and post-emergence herbicides, while all of the entries were reported to have used both pre- and post-emergence herbicides for the high-yielding environments (Table 1).
- A greater proportion of the fungicide was reported applied as the yield environment increased (39%, 52%, and 63% for low-, medium-, and high-yield environments, respectively) (Table 1).

## Fertilization

- A lower amount of phosphorus and potassium fertilizers was applied in low-yielding fields (17 and 12 pounds per acre of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively) compared to medium-yielding fields (58 and 48 pounds per acre of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively).
- Average rate for fertilizer nitrogen application increased by 28% from low- to medium-yielding and by 13% from medium- to high-yielding corn contest-winner entries.

In summary, different management practices affect corn grain yield. Results from the 2019 Kansas Corn Yield Contest indicated that the use of irrigation, a balanced fertilization program (nitrogen, phosphorus, and potassium), seeding rate above 30,000 seeds per acre, use of fungicides, and both pre- and post-emergence herbicides were all management practices implemented by farmers to maximize corn grain yields in Kansas.

**Table 1.** Summary of grain yield, crop management practices, and fertilizer strategies for different yield categories (low, medium, and high yield).

		Yield Category		
		Low (<214 bu/a)	Medium (214-257 bu/a)	High (>257 bu/a)
Grain Yield (bu/a)	Plot	163	231	278
	Field Average	146	210	247
	Field Minimum	95	116	220
	Field Maximum	180	250	295
Seeding Rates (seeds/a)		22,625	31,000	33,875
Row Width (in.)				
Irrigation (% adopted)		8	52	88
Crop Management	Tillage			
	Herbicide			
	Fungicide (% adopted)	39	52	63
Insecticide (% adopted)		0	33	75
Fertilizers	Starter (% adopted)	46	48	75
	P <sub>2</sub> O <sub>5</sub> (lb/a)	17	58	none reported
	K <sub>2</sub> O (lb/a)	12	48	none reported
	N (lb/a)	134	186	213
	Manure (% adopted)	11	0	17
	Lime (% adopted)	0	8.3	17

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