

# **CORN HYBRID RESPONSE TO DRAINAGE, DRAINAGE PLUS SUBIRRIGATION, AND NON-DRAINED OVERHEAD IRRIGATION**

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Within-season climate variability is a primary factor affecting corn yields in Missouri. Although Midwestern farmers have been planting up to two weeks earlier than in the 1980's, recommendations for initiating planting continue to be based on field conditions and soil temperature. Soils that are cool and wet can delay planting. Adequate soil drainage helps soils dry and warm quickly. The distribution of rainfall in upstate Missouri generally peaks in mid-April to mid-May, with periods of drought and little water available to plants in late June, July, and early August. Drought conditions during July and August are usually yield-limiting in claypan soils, due to their low water-holding capacity. However, these soils' poor drainage may contribute to excessive yield loss, due to stand loss, fertilizer loss, and poor root development.

A study evaluated corn (*Zea mays* L.) hybrids (Asgrow 785, DKC 61-73, DKC 63-42, LG 2642, and Kruger 2114) and water management systems (nondrained, nonirrigated (NDNI); drained, nonirrigated (DNI) with subsurface drain tiles 20 and 40 ft apart; drained plus subirrigated (DSI) with tiles 20 and 40 ft apart; nondrained, overhead irrigated (NDOHI)) on yields, plant population, and grain quality from 2008 to 2010. Precipitation during this study was 1.4 to 11 inches above the past decade average. Planting date was delayed 18 d in the nondrained control in 2009, and additional delayed planting controls were included this year (Table 1). Grain yields were similar in the 20- and 40 ft-spaced DNI and DSI systems in 2008 and 2010 (Table 2), but plant population increased 74% (data not presented) and yields were 49 bu/acre greater with DSI at a 20 ft spacing compared to 40 ft spacing in 2009 (Table 1). At a 20 ft spacing, DNI or DSI increased yield 17 to 105 bu/acre (10 to over 50%) compared to NDNI or NDOHI soil (Table 2). High yielding hybrids achieved similar yields with DNI, while NDNI DKC63-42 had 19 bu/acre greater yields compared to DKC61-73. A 20 ft spacing for DNI claypan soils is recommended for high yielding corn production in high rainfall years. Additional information on this research is available in Nelson, K.A., and R.L. Smoot. 2012. Corn hybrid response to water management practices on claypan soil. *Int. J. Agron.* doi:10.1155/2012/925408.

**Table 1.** Water management main effects for grain yield in 2009. Data were combined over hybrids.

Water management system	Yield
	bu/acre
Non-drained, non-irrigated (NDNI)	72
Non-drained, non-irrigated, delayed planting (NDNIDP)	229
Drained, non-irrigated (DNI) at 20 ft	146
Drained, non-irrigated (DNI) at 40 ft	121
Drained plus subirrigated (DSI) at 20 ft	156
Drained plus subirrigated (DSI) at 40 ft	107
Overhead irrigated, non-drained (NDOHI)	41
Overhead irrigated, non-drained, delayed planting (NDOHIDP)	204
LSD ( $P = 0.05$ )	48

**Table 2.** Corn grain yield response to water management systems and hybrid in 2008 and 2010. Data were combined over years.

Hybrid <sup>†</sup>	NDNI	DNI 20	DNI 40	DSI 20	DSI 40	NDOHI
	----- bu/acre -----					
DKC63-42	176	194	186	184	192	170
LG2642	172	186	188	176	176	181
Asgrow785	167	192	184	175	170	175
Kruger2114	164	178	178	167	176	169
DKC61-73	157	192	178	172	165	162
LSD ( $P = 0.05$ )	----- 17 -----					

<sup>†</sup>Abbreviations: DNI 20, drained, non-irrigated (20 ft drain spacing); DNI 40, drained, non irrigated (40 ft drain spacing); DSI 20, drained, subirrigated (20 ft drain spacing); DSI 40, drained, subirrigated (40 ft drain spacing), NDNI, non-drained, non-irrigated; and NDOHI, non-drained, overhead irrigated.