


Plant Population and Fertilization Impacts on Irrigated Corn in Kansas

By W.B. Gordon

A high-yield irrigated corn research project in north central Kansas was completed in the fall of 2003. Four years of data investigating the effects of fertilization...nitrogen (N), phosphorus (P), potassium (K), and sulfur (S)...rates and timing, and corn plant population have been collected. Some highlights of this research are shown in **Table 1**.

Results show a strong interaction between plant population and nutrient management, thus illustrating the importance of using a systems approach when attempting to increase yields. Increasing plant population failed to increase yield unless fertility was increased simultaneously, and a significant portion of the

fertility response was lost if plant population was not increased. In 2003, over 60% of the response to increased fertility was lost at the lower population.

This 4-year study also reinforces the critical need for soil test calibration and nutrient management research that is conducted at high yield levels using cultural practices and varieties relevant to today's farming practices. The standard P+K+S recommendations at these two locations would not have produced maximum attainable yields. 

Research Project No. KS-33F.

Dr. Gordon is Professor, Department of Agronomy, Kansas State University, North Central Kansas Experiment Field; e-mail: bgordon@oznet.ksu.edu.

Table 1. Interaction between population and nutrient management for irrigated ridge-till corn in Kansas.

Population plants/A	P ₂ O ₅ + K ₂ O + S, lb/A ¹			P+K+S Resp.
	N=2 splits 30+0+0 ²	N=2 splits 100+80+40 ³	N=4 splits 100+80+40 ³	
Grain yield, bu/A				
Carr sandy loam, average of 2000-2002				
28,000	162	205	206	43
42,000	159	223	222	64
Crete silt loam, 2003				
28,000	176	203	220	27
42,000	174	247	251	73

¹ Plus 230 lb N/A with 2 splits (preplant, V4) or 4 splits (preplant, V4, V8, VT).
² KSU recommendation. Carr site Bray P-1 = 20 parts per million (ppm), K = 240 ppm; Crete site Bray P-1 = 25 ppm, K = 180 ppm.
³ Drop out comparisons showed all three nutrients contributed to the response in 2001-2002, but only P and K at the 2003 site.

