Fluid Fertilizer Foundation

Fluid Facts

ACHIEVING 300 BU/A CORN SUSTAINABLY

As the world's greatest producers of corn, we are obligated to pursue both higher yields and sustainable production practices. Academic thought regarding sustainable farming of staple crops is shifting from a low-input, low-intensity philosophy to a system of intensification. The low-input, low-intensity method preserves soil resources, yet sacrifices yield potential. This may be acceptable for most commodities, but for the world's three staple food crops (rice, wheat, and corn) we must find ways to increase, not decrease, the yield per unit of cropped land. The new philosophy of intensification pursues higher yields exclusively on land best suited for crop production and uses agricultural practices that protect the soil resource and enhance efficiency of nutrient uptake.

Summary Points

- *The combined use of five high-tech" factors versus traditional" practices yielded 14 to 66 bu/A more than the treatment combining only traditional" inputs and practices (Table 3 below).*
- *In all cases the value of a given high-yield factor was more influential on yield when combined with other high-yield factors, rather than provided alone.*
- *To realize the full potential of new genetics, modern hybrids must be grown at higher plant populations than their predecessors.*

Table 3. Traditional vs. high-tech, two years.

	Traditional		High-tech	
Factor	Yield	*	Yield	**
	Bu/A^{-1}			
None or all	193		245	
Fertility	197	+4	236	-9
Nitrogen	198	+5	232	-13
Genetics	202	+9	225	-20
Population	187	-6	238	-7
Fungicide	198	+5	218	-27

Data from Champaign and Dixon Springs
* *Difference when changed to high-tech level*
** *Difference when changed to traditional level*
*** *Adapted from Ruffo, Henninger, and Below. A new experimental design to analyze the value of management factors contributing to high corn yield. Am. Soc. Ag. Mtg. Oct 31-Nov 4, 2010.*

Conclusions

Single production factors used alone do not guarantee high corn yields; rather, it is the positive interaction among multiple complementary factors that will optimize the production potential of each plant and result in higher corn yields.

Increasing corn plant populations has been shown to improve N and phosphorous (P) use efficiency as well as uptake of other agricultural inputs such as sulfur (S fungicides, and insecticides. Evidence also suggests that increasing corn plant populations using narrower corn rows may produce more corn stover traditional 30-inch rows as well below ground plant biomass.

From an environmental perspective, the outcome of this project will be highly beneficial, resulting in preservation of our soil and water resources for future generations.

Research Credits

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Full paper is available from the Fluid Journal archives:
http://www.fluidfertilizer.com/PastArt/2009.htm

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