

LONG TERM EFFECTS OF CORN ON CORN

In general, corn that is rotated with soybeans annually has a higher yield potential compared to 2nd year corn or continuous corn. A common belief is that 2nd year corn has lower yield potential than continuous corn; however, research data does not support this concept^{1,2}. When evaluating crop rotation options, agronomics and economics should be considered .

MATERIALS AND METHODS

A demonstration was established at the Monsanto Learning Center in Monmouth, Illinois to evaluate the effects of crop rotations with various years of corn in the rotation schedule on corn yields. A 112-day relative maturity (RM) corn with Genuity® VT Triple PRO® technology was planted on April 25th, 2012, at 36,000 seeds per acre in 30-inch rows. Nitrogen was applied in the spring as 32% urea ammonium nitrate (UAN) at a rate of 240 pounds per acre. Weeds were effectively controlled with a preemergence application of Harness® Xtra 5.6L followed by a postemergence application of Roundup PowerMAX® brand herbicide. Fertility was managed for high yield situations.

RESULTS

Corn Yields

Data collected from this demonstration illustrated that year and environment can have a larger effect on corn yield than the number of years of corn on corn in the rotation (Figure 1). The hot and dry conditions in 2012 likely contributed to a lower than normal yield.

Yields for 2nd year corn were greater than yields for rotations that had more years of continuous corn. This supports previous research and contradicts the common concept that additional years of corn on corn can help increase yield potential^{1,2}.

Economics of Corn on Corn and Soybeans

The economics of corn on corn rotations were compared with soybeans by using 2012

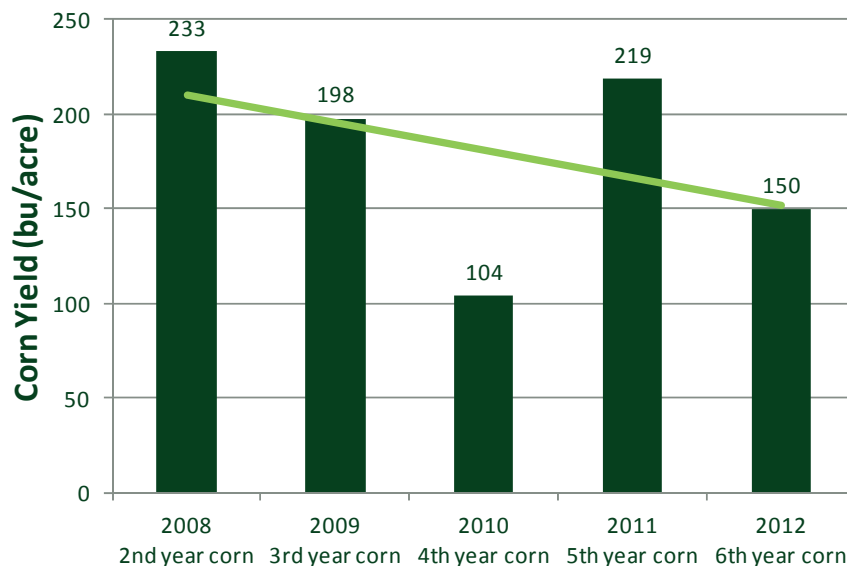


Figure 1. Average corn yields after various years of corn on corn.

	2008	2009	2010	2011	2012
Actual Corn Yield Averages (bu/acre)	233	198	104	219	150
Soybean Yield (bu/acre) With Same Net Profit	92	76	33	86	54

Grain prices used were \$7.50/bu for corn and \$16.00/bu for soybeans. Input costs were 2012 estimates³.

Figure 2. Soybean yield needed for equal net profits of the average corn yields observed in various years of the demonstration.

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input costs from Ag Decision Maker³. Grain prices of \$7.50/bu of corn and \$16.00/bu of soybean were used for economic comparisons based on market prices at the time the data was summarized. Figure 2 provides the soybean yields that would have been needed to provide the same net profits as the corn on corn each year of the demonstration. Figure 3 helps provide a perspective of what soybean yield would be needed to provide equal net profits for various corn yield environments.

SUMMARY COMMENTS

On average, yields decline in long-term continuous corn rotations and do not stabilize or rebound after the second year^{1,2}.

The negative effect continuous corn can have on yield potential may be enhanced or negated by factors that include weather conditions, soil type, and residue management.

Rotating corn with soybean can be beneficial for agronomic purposes including helping to manage corn rootworm populations, reducing inoculum levels of pathogens, and managing residue levels.

Although it is impossible to predict what conditions will be like in the growing season, the risk of drastically reduced corn yields under adverse conditions appears to occur more consistently in long-term continuous corn rotations than in corn-soybean rotations.

Continuous corn can be more profitable in some years; however, the trend for declining corn yields is a strong reason to

Corn Yield Environment (bu/acre)	Soybean Yield (bu/acre) With Same Net Profit
120	41
150	54
180	68
210	82
240	95

Grain prices used were \$7.50/bu for corn and \$16.00/bu for soybeans. Input costs were 2012 estimates³.

Figure 3. Soybean yield needed to provide equal net profits of given corn yield environments.

plan for crop rotation. Periodically breaking the disease and insect cycle with another crop species can be profitable and have many other positive effects. The economic and agronomic conditions that favor rotation will vary by farming operation.

Sources:

1 Hoefl, R.G. et. al. 2000. *Modern corn and soybean production*. MCSP Publications. Champaign, Illinois. Pages 45, 121-131, 153-155.

2 Erickson, B. 2008. *Corn/soybean rotation literature summary*. Purdue University. <http://www.agecon.purdue.edu> (verified 10/15/2012).

3 Duffy, M. August 2012. *Historical costs of crop production*. Ag decision maker. Iowa State University Extension. A1-21.

The information discussed in this report is from a single site, non-replicated, 5-year demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

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