



The Rotation Effect for Corn Yields

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There will be more corn planted in Minnesota this year. As a result, there will be more acres of corn following corn versus the normal corn and soybean rotation. There's a lot being published now about the rotation effect or the higher yield of corn grown following another crop rather than following itself. The questions are 1) what is the expected lower yield from growing corn following corn? And 2) is the rotation effect less at higher yields? .

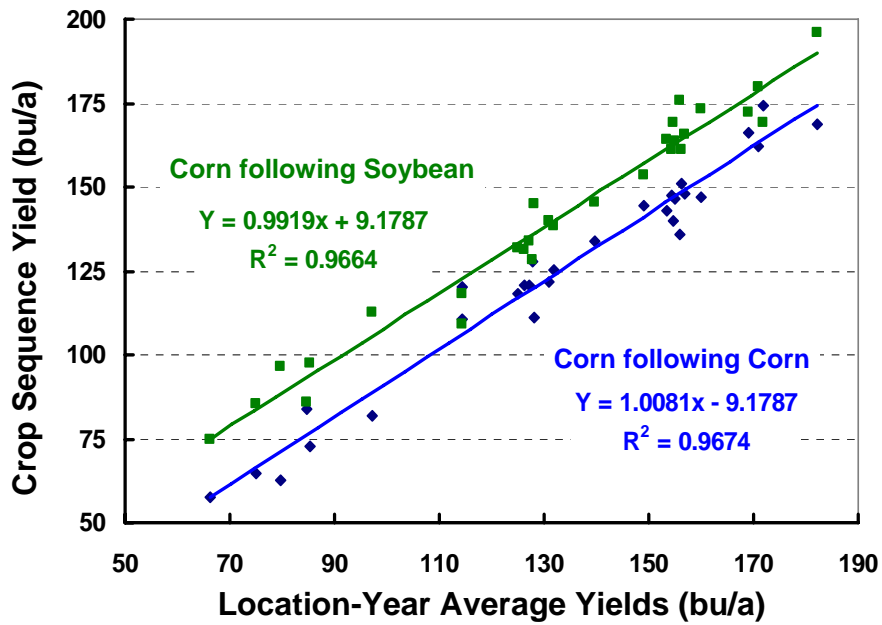
What is the yield reduction for corn following corn? A long term study was conducted from 1985 through 1995 at the Southern and Southwest Research and Outreach Centers in Minnesota and at the Arlington Research Center in Wisconsin. The yield difference between corn grown following corn (referred to hereafter as C/C) and corn following soybean (rotation corn) averaged 11.8 bu/a across the 29 location-years of the study. For the individual 29 location-years, the yield difference between rotation and C/C yields ranged from -11 to 40 bu/a. When this difference is expressed as a percentage, C/C yields averaged 9% lower than rotation yields. This percentage is similar to those reported in other states.

Is the rotation effect the same as yield level changes? The data from the rotation experiments cited above are graphed in the figure below.

In the figure, rotation and C/C yields are plotted against the location-year average. The upper line is the rotation yields and the lower line the C/C yields. The yield levels for the 29 individual location-years ranged from 66 to 182 bu/a. The difference between the two lines is the rotation effect, the higher yield due to rotating corn with soybean versus growing corn following corn. The lines are parallel showing that the rotation advantage is roughly a constant as yield levels range from 66 to 182 bu/a.

These experiments were conducted more than ten years ago and corn yields have increased substantially since then. Some that are currently growing corn following corn are producing high yields and believe the rotation effect is gone. We don't think that's the case. The highest yields in the old studies we've cited were above 180 bu/a and the rotation effect was there at that yield level. We had research at Lamberton for the past three years that included rotation and C/C. The average yield for the experiment was 198 bu/a; the rotation advantage was 8.5 bu/a or 4%, which is less than the 9% obtained in the earlier work. Nevertheless, there was a yield advantage for rotation compared with C/C.

In summary, growing corn following corn is not a bad agronomic practice – in fact that was normal in Minnesota during the 1970' and 1980's with the traditional corn/corn/soybean rotation. However, one should expect a lower yield from growing corn following corn because of the rotation effect, even at the higher corn yield levels of today.



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