by Gene and Dean Carstens

Mega-Yields With Twin-Row Planting

Authors foresee exceeding 300 bu/A corn and 85 bu/A soybean yields at a profitable level and with no adverse environmental impact.

Summary: *Twin-row corn and soybean planting is on course to achieve our expectations. We believe corn yields in excess of 300 bu/A and soybean yields in excess of 85 bu/A are well within our reach and will happen shortly. Not only will we reach these levels, but they will also be achieved profitably and with no adverse environmental impact. Most noticeable about twin-row planting has been stalk quality. It appears that with greater use of sunlight from uniform plant spacing, the stalks are substantially larger than conventionally planted corn and that the twin-row plants grow faster. Another observation was that 95 percent of the corn plants in the corn/soybean strips developed a second ear. Yield experiences so far have put those systems at 235 to 280 bu/A of corn, which is 60 to 80 bu/A better than 10-year averages on our farms.*

We realized back in the early '80s that sunlight use by plants was a limiting factor in crop production. We looked for a planting system that would provide uniform spacing between plants and therefore give us a potential for higher yields. We felt that twin-row planting was a practical approach since existing cultivators and combines would still be adaptable to the system. Cultivation or harvesting thus far has never been a problem. With our early efforts, we obtained substantial yield increases with sound fertility management. Marginal yields were common in our area with typical fertilizer programs used at that time. With an original planter built in 1979, we were not obtaining a "diamond" equidistant pattern in placing the seed in twin rows. It was immediately evident that if the spacing was not exact, it affected ear size.

As we have pursued higher production levels, we have kept some important issues in mind. One is their effect on the environment. Two others are the practicality of achieving these yield levels and the profitability for the farmer. Briefly, how we set out to achieve our goals and solve problems at the same time follows.

Approach

Planter. We began in 2001 by building two eight-row planters, designed to give us a true diamond stagger of plants in twin 8-inch rows. Both planters could change the population of each row (explained later). They incorporated latest technologies, our own inexpensive fluid starter attachment, and were user friendly. Because each twin-row planter unit could drop two eight-inch rows (a total of 16 rows), our unit costs were lowered, plus it reduced the amount of metal needed.

Tillage. We used a strip-till unit on all 2,200 acres of twin-row corn in the spring. The unit created the row for the planter and cleared existing residue. A portion of the fertility program (N and P) was deep placed immediately under the twin rows. Following emergence of the crops, they were either cultivated or a fertilizer injection rig was used to apply additional N. The only modification to the cultivators was narrowing the width of the shovels.

Fertility. "Fertility recovery" is a key in this system. With that in mind, we incorporated all the agronomic facts we knew to manage our applications. Positional availability, split applications, and high N fluid starters were keys to our twin-row success. The strip-till unit applied 100 lbs/A of N. Phosphorus was deep placed under the twin row at the rate of 60 to 70 lbs P_2O_5/A. The N rate was common on all corn plots and one we felt comfortable with to minimize leaching. A high N fluid starter (20-10-0-5S at 150 lbs/A) was also applied two inches to the side of each row. The balance of the N could then be applied with a cultivator, high injection rig, or through a center pivot irrigation system. On all corn test plots, we used a factor of 0.8 lbs N/bu of yield goal.

Cropping. If sunlight was the limiting factor, we decided to carry the concept further by using a corn/soybean strip rotation. Our purpose was to create more outside rows. We varied population from the outside rows to the inside rows. Rows 1 and 8 (twin rows 1 and 2, 15 and 16) were dropped at a combined total of 40,000 plants/A, rows 2 and 7 at 36,000 plants/A, rows 3 and 6 at 32,000 plants/A, and the inside rows at 28,000 plants/A. As we lowered the populations towards the inside rows, more sunlight reached the lower populations for better ear flex. The idea was the average population in the system would be 34,000 plants/A and if each plant produced an 8-ounce ear, the end result would be over 300 bu/A of corn. This was merely a starting point on populations. Further studies will increase and decrease populations.

One important final note is as we varied populations row to row, we also increased the amount of N as the populations increased. This was done with UAN. With a series of orifices, we could precisely manage the actual amount applied.

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