

Corn Row Widths

Twin-Row Corn Adds Value To Purchase Of Twin-Row Planter

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Twin-row (TR) versus single-row (SR) corn planting patterns, in an effort to increase the value of a twin-row planter, claimed the attention of Dr. Wayne Ebelhar, Research Professor, Delta Research and Extension Center, recently. He has worked on this project since before Hurricane Katrina drenched the gulf in 2005.

"The first year we started working in TR on-farm with George Rea Walker and his son, Martin Walker, Reality Partnership, here in Stoneville," he said. "They were some of the first producers in the area to take a look at TR corn, having purchased a TR planter for soybean production on beds. They were looking at opportunities to spread the cost of this planter over multiple acres, so they looked at using it for corn."

Most of the corn in the country is planted in 30-inch rows. In the South, farmers stay in 38- to 40-inch rows to accommodate cotton production.

"Most of our production, when you employ cotton as part of the rotation system, still uses the wide beds," Ebelhar explained. "The TR production system offers us an opportunity to put two rows fairly close together, usually about 8 to 10 inches apart on top of a bed with the beds 38- to 40-inches apart. If you take two rows, 8 inches apart on the top of a 38-inch bed, you still have 30-inch row corn. You have 30 inch, 8 inch, 30 inch, 8 inch. So you've created, in a sense, 30-inch row corn. No additional changes are needed and the combine can harvest the TR system with very little modification."

One consideration very early in this project was to study how nitrogen rates and plant population affect TR production systems. Reason dictates that with narrower rows, the plants have more room, and you can increase the plant populations and possibly increase yields.

"So as long as you can add plants without adding barren stalks, we should be able to add some production potential to the field," he said. "At first we were looking strictly at seeding rates and nitrogen rates on a TR planting pattern."

The project began in 2005, and that year Katrina lodged the crop so no yield data resulted from that first year. The farmers in this case, George Rea and Martin, felt they still harvested 180 bushel of corn out of that field, but it was all laying down and resulted in much more wear and tear on the combine.

"In 2006, we went back to a different field on the same farm and planted the same type study, using a single variety. We produced 280 bushel corn," Ebelhar said. "The 40,000 plants per acre on 38-inch rows planted in a TR pattern were irrigated. That year in Mississippi the National Corn Grower corn contest winners for irrigated corn were at 280 bushels. That beat second place by 48 bushel. So there is tremendous potential there."

Twin-row comparisons continued on-farm. By this time, researchers had completed the initial research with N rates and seeding rates.

"We did have three years of data, after four years of evaluating TR production, counting the first year when we didn't get yields," he added. "The first year we started with one variety, then switched in the second and third year."

"In the fourth year we changed things a little bit. We went with a different variety in a field that had been planted to corn the previous year. Normally we've been rotating but we wanted to see what would happen at the request of the producer and other farmers in the area. We stayed in the same field from the previous year but changed the variety. We didn't see the same response to seeding rates that we saw in the previous years. We saw no response above 35,000 plants per acre with that particular variety."

That brought up the question: "How important are the varieties?" The on-farm study was modified the following year to use three seeding rates, 30,000, 35,000 and 40,000 plants per acre, and six varieties.

"The Walkers went to a 12-row planter in 2009 instead of an 8-row planter, so we split the planter. We put one variety in one half of the planter, one variety in the other half of the planter, and we started planting with three different seeding rates," Ebelhar explained. "Then, we'd go through those seeding rates, change out the seed, put in two more varieties. So we're now evaluating six varieties at three different seeding rates and these are all on-farm."

The plots range in size from four-tenths of an acre up to three-quarters of an acre. The length of each row was measured at harvest and yields calculated based on the row length. The study is now concentrated on varieties and some of the varieties from the companies have "flex" characteristics allowing for some flexibility in seeding rates.

"The flex idea is the plant's ability to compensate for stand," he said. "Some of the low flex corn has erect leaves. To get the maximum yields we probably need to have higher plant populations. We're using some low flex varieties just to see that and it's showing up. Some of the varieties do well at the lower plant populations. You may not see much of an advantage as you increase seeding rates. Other varieties, for example, the low flex variety, like Pioneer 33F87 which we're using, shows nice incremental increases in yield as we increase seeding rates. But that's a variety where we would expect to see that advantage. So basically, we're seeing some variety influence."

"With some varieties we're able to go to higher plant populations, and the seed companies are spending time now trying to define what plant populations they really need for their varieties to get optimum yield," Ebelhar said. "There is a difference between optimum yield, maximum yield and economic yields. We're looking for the highest economic yield, the most profit per acre. If it costs you \$100 to put on \$50 more in yields, that's not profitable. The practice may give more grain yield but it isn't profitable."

The Economic Impact

In the early work on twin-row corn, the study centered on the nitrogen (N) component and the seeding rate component. Statistically, there was a yield response with incremental increases in N; even though statistics said that it was a significant response, it was only a couple of bushel. It was taking a 40-pound/acre increment of N to get a significant yield response.

"If 40 pounds of N costs 50 cents a pound, that's \$20 and you get three extra bushel at \$6 a bushel, you've only gained \$18 and it cost you \$20 in material alone," he reasoned. "So even though there's a statistically higher yield, you lost money getting there. The data indicates this; we've gotten much better response to increasing seeding rates than we have increasing N rates, even though both have given us positive responses."

In changing their harvest equipment from single- to twin-row, the only modifications these farmers have made on their equipment is a wear plate; they've added a metal strip about 18 to 24 inches long and about 4 inches wide on the sides of the nose cones of the headers. This is the point of contact where the twin rows hit. Normally on a combine, the center of the harvest row is heading straight into the header; with TR, two rows together are fed in, so there's a wear point there. The first point of contact moves the stalks to the middle and they are able to harvest at the same speed they were harvesting SR corn. There has been no major changes in the field except for the wear plate on the corn header.

"We've done a lot of work and there's has been a lot of discussion about how the beds need to be shaped for TR versus SR planting," he said. "With TR, we have to take more care in the shape of the bed because we want the bed wide enough that we can get both rows up there with brace roots. Guidance also has become a big issue, being able to stay on top of the beds. With corn, if one row shades the other row then the shaded row never catches up. You've got a dom-

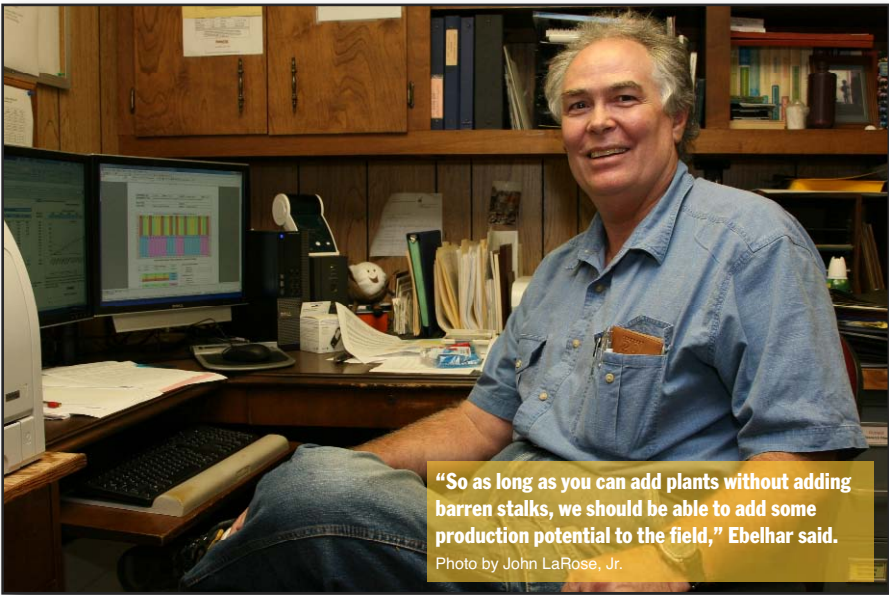
inant row and a baby row and it will never catch up no matter what you do. That second row now becomes more of a weed because it doesn't have the yield potential, but it is still pulling nutrients and water. Our goal is to have two even rows on a bed."

With soybean, that's not so critical. Soybean is not as particular about the bed shape as corn because there are no brace roots. Corn needs to be braced and you can get one row ahead of the other row. In soybean, the plants have a much better ability to adapt to stand but there is some work being done on stands even in TR.

More Questions Surface

"However, producers still have that question about SR versus TR, whether TR is really better, whether a SR planter is needed," he continued. The producers' interest is to put the TR planter across more acres, but they had to know if there is an advantage.

"At the Delta Research and Extension Center (DREC) in 2009, we started looking at SR ver-



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Photo by John LaRose, Jr.

sus TR production systems," Ebelhar reported. "We were using 25,000, 30,000, 35,000, 40,000 plants per acre just like the on-farm studies. We also continued with the nitrogen component, using 140, 180, 220, and 260 pounds of N in the system. We planted the twin-row with a Monosem TR planter and the single-row with a John Deere planter, using the recommended settings for each. We've shown in 2009 that every plant population made higher yields in TR than in SR. In 2010, a dry year even with irrigation, I don't think we did as well but there was no clear advantage to TR over SR. In 2010 they were pretty much the same."

"If you look at the cost of the planter, if you're only buying it for corn, then yes it probably wouldn't have paid for itself in 2010," he said. "When you add the effects of using it for soybean you're using it over more acres. Twin-row soybean is a no brainer. That system has shown that we can benefit from putting two rows up there on the beds, and allowing for quicker canopy cover."

Irrigate, Fertilize Both Sides

"With irrigation, we're watering both sides of the row, especially in corn; we're fertilizing both sides of the row, every middle, couple of knives per row, because in corn if one row gets ahead, it stays ahead. You put out the fertilizer on the left side and that fertilizer has to reach through a row to a row on the right side; there is no way for that plant to be able to get as much N as the plant closest to the knife row. It's the same with watering."

One recommendation in TR is that you fertilize both sides and you water both sides of the row so you keep the plants uniform.

"Our rows look very uniform out there," Ebelhar said. "We've rolled those beds at different times, but the goal is to get a good solid bed up there, a bed that really works. In 2011 we've been extremely dry, it's going to be interesting to see how the single row versus the twin row is going to work this year in a really droughty year, even though we're watering it."

TR Planter Is Cost Effective

Ebelhar offered a take-home message: "If a farmer makes the decision to buy the equipment for soybean, that same piece of equipment can be used in corn effectively."

"In a lot of years we see an advantage, especially as we increase plant populations in corn," he said. "I see advantages there. I think we can push the plant populations 4,000 or 5,000 seeds per acre profitably. That gives us higher yields. The only modification the farmer must make is those wear plates on the corn head. So farmers raising half corn, half soybeans, can use that planter and cover twice the acreage, decreasing the cost of that planter by putting it across more acres."

Some Further Thoughts

"I think we have some opportunities to look at the potential for starter fertilizer," Ebelhar said. "I haven't made starter fertilizers work in corn, but I think there is a possibility of putting starter fertilizer between the twin rows of corn in wetter soil conditions on heavier soils. I think it's a good tool and there may be a profitability side of it."

"The year of Katrina, lodging wasn't worse in TR than it was in SR. It was bad, and it really didn't make any difference. So I have not seen much lodging in a TR production system, but we need a good bed to be able to get the brace roots in there. Bed preparation for TR corn is more important than it may be for soybean. It's important to have good beds, stay on the beds and keep those two rows even. We have good potential for twin rows and the seed companies are on board with this. As you drive through, you'll see a lot of twin rows around. Another plus is the entry of John Deere into the twin-row market. They have introduced their first TR planter for the southern United States."

"However, water is key, nitrogen is key, early planting is a key, as several key factors are involved there. I think we've got the potential there."

Ebelhar couldn't promote twin-row cotton, because harvesting is a problem. He discussed the things he's seen the past 30 years.

"We've seen 7-inch row cotton, we've seen 30-inch row cotton, we've seen 32-inch cotton, we have seen two-in-one skip row, we've seen 32-48, we've seen 50-inch, 60-inch cotton planting patterns," he said. "But where are most of our producers today? They're at 38 and 40. Lots of people have tried changing things, but they always end up in the same spot. As to whether we're going to have cotton, I think cotton acreage was up in 2011, but it is just hard to compete with \$6-\$7 corn and \$13-\$14 grain."

More Companies Are Offering TR Planters

In the south, there will be three TR planters available, John Deere, Monosem, and Great Plains. There are some Great Plains planters in use around this area, but most of them are Monosem.

Dr. Wayne Ebelhar, Research Professor, Delta Research and Extension Center, spoke at a John Deere equipment release exhibition where the company showed their offerings to dealers. John Deere has made the decision to enter the TR market and feels that the market warrants their efforts.

"There were dealers there as far away as Florida and South Texas because of the potential for the planter in this part of the world as opposed to the midwest where corn is raised on 30-inch rows and not on beds," He pointed out. "The TR system is a bedded system in our area. It's going to be interesting to see how well it's adapted."

One of the advantages of the Monosem is the ability to stagger the plants.

"I'm not sure how critical that is but the new Monosem planters have a way to adjust the stagger as you change the seed spacings," Ebelhar explained. "I think the plants can orient themselves to a certain extent and corn works great for this because the leaves are horizontally opposed. The main thing is to increase plant populations to where we do not get barren stalks. If we have a barren stalk then we need to back off. Environmental conditions can influence that to a certain extent."

Twin rows is not a new concept, in fact TR peanuts were grown 30 years ago in the Mississippi Delta.

"Some of the first twin rows I ever saw were peanuts up north of Clarksdale," he said. "We had several thousand acres of peanuts in Coahoma County 30 years ago, so it's not new, but the ability to plant it and to plant it effectively is new."

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