

## ROW SPACING CONSIDERATIONS FOR CORN AND SOYBEANS

During the past several decades, corn and soybean producers have switched increasingly to narrow rows, or those less than 30 inches wide. This change resulted from the perception that narrow rows will produce greater yields because of increased light interception and reduced competition among individual plants due to more equidistant spacing.

Recent articles in *Crop Management* and *Agronomy Journal* present summaries and results on how row spacing affects yield and other factors in corn and soybean management systems. The reports are authored by Kevin Bradley of the University of Missouri, Chad Lee of the University of Kentucky, and USDA-ARS researchers Gary Lehrs and colleagues in Idaho. Key components of their findings and conclusions as related to corn and soybean production in the southern US follow.

**Yield.** Soybean varieties planted early (before about April 20) and late (after about May 25) produce higher yields when grown in narrow rows. Yield increases from narrow rows are greater under irrigated conditions. Full-season varieties (> Maturity Group 4) planted in May generally do not produce increased yields when grown in narrow rows.

Full-season (generally 118 to 120 days relative maturity) corn hybrids grown in rows less than 30 inches wide do not yield more than hybrids grown in rows that are 30 inches wide. When short-season or short-statured hybrids are used, rows less than 30 inches wide may result in increased yields because of greater early-season light interception and quicker canopy closure.

Today's southern production systems for both soybeans and corn have increasingly included earlier planting and earlier maturing varieties/hybrids. Thus, a yield advantage for both crops should be achieved from narrow rows in these systems.

**Weed management.** In soybeans, narrow row spacings reduce the amount of light that reaches the soil surface and the amount of time to full canopy closure. As a result, late-season weed emergence and/or resurgence are reduced, resulting in greater late-season weed control in narrow-row systems. This is especially important in early plantings of early-maturing varieties that are short-statured and have little branching, and where weed management is based solely on glyphosate which has no residual activity to prevent late-season weed germination.

Row spacing has a marked impact on the critical period of weed management in soybeans. Generally, the critical time of weed removal occurs earlier in wide- vs. narrow-row soybeans. Thus, soybeans grown in wide rows will require weed control measures earlier in the season than those grown in narrow rows. This is important in a glyphosate weed management system where early-season weed control measures may be delayed because of weather and time constraints.

Available research indicates that weed management in corn is not enhanced by rows less than 30 inches wide. Wide and narrow rows provide similar late-season weed control in a majority of cases, and the critical period of weed removal in wide-row corn is no earlier than in narrow-row corn. Where newer systems of early planting of short-season hybrids that may be short-statured are used, rows less than 30 inches wide should be advantageous.

**Nitrogen management in corn.** Lehrs and co-authors found that soil-applied nitrogen was used more efficiently when it was banded on one side of a row and irrigation water was always applied to the furrow on the opposite side of the row. Irrigating the same non-fertilized furrow also minimized end-of-season nitrogen in the soil profile, which should reduce nitrate leaching in the off-season. When nitrogen had been broadcast-applied, alternating-furrow irrigation appeared to leach residual nitrogen from the corn root zone. They concluded that

surface-applied nitrogen fertilizer should be placed separate from surface-applied irrigation water to improve nitrogen management under furrow irrigation and to protect groundwater quality. This procedure worked best in 30-inch compared to 20-inch-wide rows, indicating that the distance of the irrigated furrow from the fertilized, nonirrigated furrow is important. Thus, if there is no yield or weed management advantage for using narrow rows, a 30-inch row spacing should be used so that nitrogen fertilizer and furrow irrigation can be applied in alternating furrows to enhance nitrogen fertilizer management in corn.