

# Everything But The Kitchen Sink

Extra crop inputs may maximize yields, but do they increase profits?

STORY BY JOHN POCOCK | PHOTOS BY DAVID L. HANSEN

Recipes to boost soybean yields often include everything but the kitchen sink—a pinch of sugar here, a fungicide application there. A study to determine if all those ingredients are necessary shows some are more important than others.

Narrow rows provide the most consistent overall yield increases, says Seth Naeve, the University of Minnesota agronomist coordinating the research. Commissioned by the United Soybean Board and financed with national checkoff dollars, the multiple-year effort is aimed at identifying which crop inputs and management practices provide greater yield and profit than others.

**STUDY SETUP.** The “Kitchen Sink Study” was designed in 2007 and implemented in six states (Minnesota, Michigan, Iowa, Kentucky, Arkansas, Louisiana) from 2008–2011. A new, second study began in 2012 in nine states (Minnesota, Wisconsin, Michigan, Indiana, Illinois, Iowa, Kansas, Kentucky, Arkansas). Naeve says droughty conditions in 2012 made results difficult to interpret. He’s still going through 2013 data, but the study has pointed to some overall trends.

Results from the first study determined a high-input system on 20-inch rows or narrower provided an average 6.9-bushel-per-acre yield increase compared to control plots planted to 30-inch rows. Narrow rows alone also provided the biggest yield benefit of any single practice in both northern and southern states, Naeve points out. “Either 20-inch or 15-inch rows provided a significant

yield benefit over 30-inch rows,” he says.

Narrow rows could

even be considered the mainstay ingredient for boosting yields in soybeans, says Chad Lee, University of Kentucky Extension soybean production specialist. “In Kentucky, we looked at 15- versus 30-inch row spacings, and the 15-inch rows provided a 5- to 6-bushel-per-acre yield increase,” he says. “So, the first thing that farmers can do to increase their soybean yields is to go to narrow rows. Until you do that, all the other inputs don’t pay off as much.”

Having narrow rows also provides a greater return on investment compared to other practices examined in the study, Lee notes. “Economically, we could pay for the narrow rows,” he says. “The narrow rows gave us as big of a jump in yield as everything else that we did combined.”

**NO YIELD BORDERS.** “The trends for what increased yields seemed to be the same at almost all locations, north and south,” Naeve explains. “For example, a foliar fungicide was the second top yield enhancer after narrow-row spacing. Of all the treatments that we applied, it appeared that a foliar fungicide gave us the biggest individual benefit.”

In Kentucky, a foliar fungicide at the R3 growth stage provided about a 1½-bushel-per-acre yield increase, Lee says. “We had treatments where we did everything [the

University of Minnesota agronomist Seth Naeve is looking closely at a host of soybean-production practices to see which ones offer the highest returns.





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kitchen sink treatment], and other treatments where we did everything minus something,” he adds. “When we did the kitchen sink treatment minus the fungicide, we lost a little bit of yield, which indicated that a fungicide was pretty important to the overall yield increases that we saw.”

Research plots in Arkansas showed similar results. “It surprised us all that there’s really not a whole lot of difference in yield-enhancing soybean-production practices between the Mid-South and upper Midwest,” says Jeremy Ross, University of Arkansas Extension soybean specialist. “In addition to a big yield boost from narrow-row spacing, foliar fungicide applications at the R3 and R5 growth stages helped provide another slight yield increase—about a 1½- to a 2-bushel yield bump, with the bigger yield boost coming at the R3 application.”

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—SETH NAEVE, AGRONOMIST

Arkansas, Kentucky and Louisiana had a little higher yield at the high population levels than in northern states. “That surprised us,” Lee says. “We expected the higher populations to do better in the northern states due to their shorter growing season, but it was just the opposite.”

In southern states, 185,000 seeds per acre supplied the maximum yield; a 150,000 seeding rate supplied 99% of maximum yield; and a 110,000 seeding rate supplied 95% of maximum yield, Ross says. However, he adds it might not always pay to seed at the maximum rate.

“If you need to save cost on your seeding rate, you can still obtain almost maximum yields at 110,000 seeds per acre,” Ross adds. “That’s about 40% less seed than the maximum rate.”

**AGRONOMY OR ECONOMY.** Maximum product input and maximum profit output aren’t always synonymous. “One of the takeaways from the USB study was that if you apply all the extra inputs on soybeans, it did increase yields, but not enough to pay off,” Lee says. “The study

A third yield enhancer for all regions proved to be high plant populations. “Across all of our locations, we needed to plant at least 175,000 seeds per acre to maximize yields,” Naeve says. “However, we got more benefit from higher soybean populations in the South than what we expected.”



showed that if you put everything on but the kitchen sink, you only got about a 5-bushel-per-acre yield increase; but that 5-bushel increase didn’t pay for all the extra inputs. So, agronomically, an everything-but-the-kitchen-sink approach was great, but economically, it wasn’t.”

Outcomes can also vary by year. “In that first round of studies, it appeared that foliar fungicides were really important for increased yields,” Lee says. “However, last year [2012], when it was extremely hot and dry, foliar fungicides were no help whatsoever. That’s why we’re looking at field trials over multiple years.”

**NO BENEFIT.** Other practices provided little or no yield increase, and thus no profit, year in and year out. “There were a few things in which we saw virtually no benefit in doing,” Ross explains. “One was applying inoculant in fields that have routinely been planted to soybeans and where no recent flooding has occurred. Another was a foliar fertility application on fields where fertilizer applications were made according to soil tests. There was also no benefit from adding extra N.”

Before applying new or additional crop inputs over large acreages, be logistically prepared to do so, Lee cautions. “Make sure the fundamentals are taken care of first. There are a lot of fields that start out fundamentally correct, but logistically, it can be a challenge to do everything right on every field during the entire growing season. Planting on time, avoiding compaction, doing weed control at the right weed height is not easy. It’s even more difficult to do when adding extra inputs,” he says. ●