



Row Spacing in Soybean

Key Facts

Planting soybeans in rows narrower than 30 inches can improve yield potential. Most Midwest research documents that narrow rows (less than 30 inches) yield greater than wide rows (30 inches or greater). On average in Iowa a 4.5 bu./acre yield increase can be expected using 15-inch row spacing, compared to 30-inch row spacing. These data have been fairly consistent for the past 20 years.

Soybeans often yield more in narrow row spacing if weeds and pathogens are managed. Data from the upper Midwest and southern Canada document a yield advantage of 2 to 9 bu./acre with narrow row spacing. In Iowa, an average of 4.5 bu./acre yield advantage with 15-inch vs. 30-inch row spacing has been confirmed (Figure 1).

Currently about 50 percent of the soybean acres in Iowa are planted in wide rows (Figure 2). While the number of acres planted in wide rows remains consistent, the number of acres planted with a drill in 7-inch and 10-inch row spacings has declined. The most likely reason for this decrease is the high incidence of white mold in drilled fields and the notably higher seed cost. In contrast, the use of 15-inch, 20-inch, and 22-inch row spacings has increased rapidly.

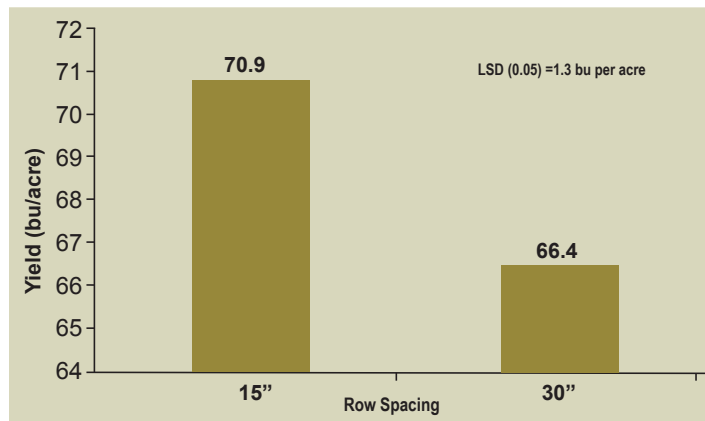
If white mold is an issue in particular fields, plant those fields last and use ultra low seeding rates if planting in 15-inch rows.

Benefits of narrow rows

Narrow rows have a yield advantage because they achieve canopy closure more quickly and intercept more light throughout the growing season. Soybean canopy development is a function of row spacing, seeding rate and environmental conditions. The relative equidistant plant distribution leads to increased leaf area development and greater light interception early in the season. This increases crop growth rate, dry matter accumulation, and seed yield.

Rapid canopy closure also provides greater shading of weed seedlings as the result of increased light interception by the soybean

Figure 1. Soybean yield influenced by row spacing at three locations (De Witt, Nevada, and Whiting) from 2005-2007.



canopy and can significantly reduce soil moisture loss. Canopy closure of 15-inch rows will often happen 15 days earlier than 30-inch rows; this is critical since canopy closure is needed by the start of pod set (R3). Often soybeans grown in 30-inch rows fail to achieve canopy closure by this critical yield-determining growth stage.

Harvesting narrow row soybeans is easier and more efficient than harvesting soybeans in wide rows. Combine efficiency is increased because a more even distribution of plants makes them easier to cut and feed into the combine. Harvest losses are reduced because there are no cultivator ridges to interfere with cutting height.

Figure 2. Row spacing distribution of Iowa soybean crops, 1995-2006 (Adapted from Iowa Agricultural Statistics Services, 2007).

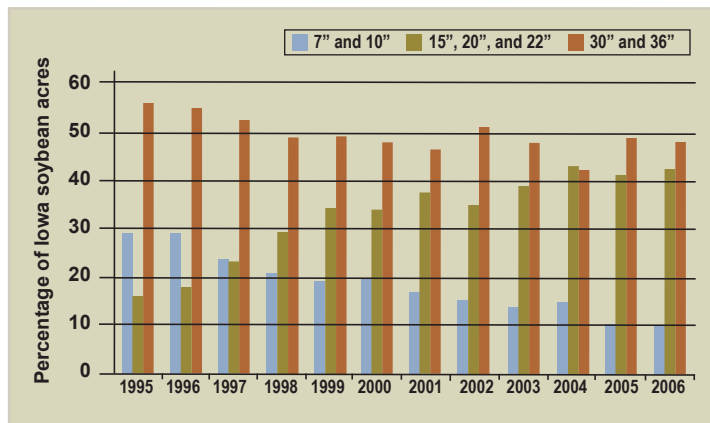




Figure 3. Soybean yield influenced by row spacing and seeding rate at three locations (DeWitt, Nevada, and Whiting) from 2004-2006.

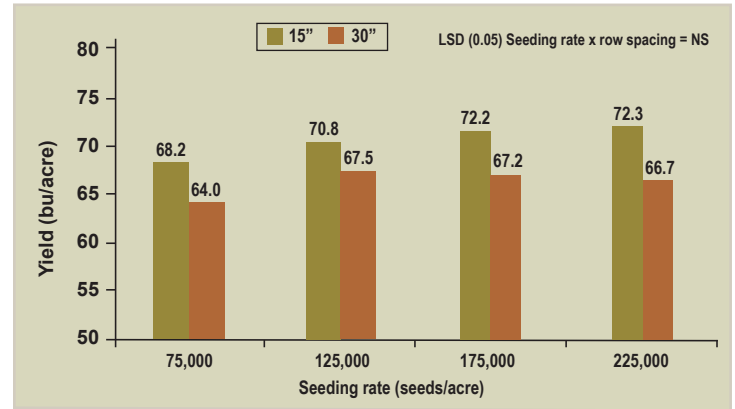
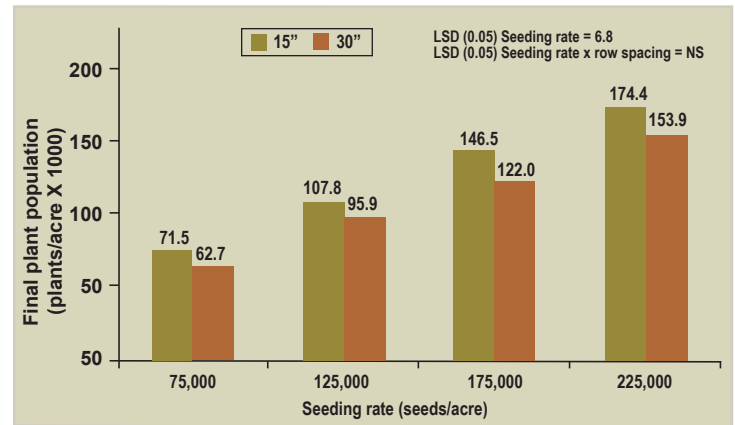


Figure 4. Final plant population influenced by row spacing and seeding rate at three locations (DeWitt, Nevada, and Whiting) from 2004-2006.



Concerns about using narrow row spacing

The use of narrow row spacing is increasing in popularity in Iowa, but at a much slower pace than in neighboring states. The most common reasons farmers do not use narrow rows include:

1) Disbelief that it will actually increase yield since they have already tried it once and did not see a yield increase.

Row spacing is influenced by the field environment, and there are cases where narrow rows yield the same as wide rows. This is often associated with management decisions such as improper variety selection. The presence of diseases like brown stem rot and soybean cyst nematode can reduce the yield benefit from narrow rows if susceptible varieties are planted.

2) Lack of equipment to plant in narrow rows. Lack of willingness to invest in a planter specifically for soybeans is the dominant reason for the slow adoption of narrow row soybean production. However, split-row planter technology may allow for production of corn and soybeans at the optimal row spacing for each crop. Split-row planters have additional row units between traditional 30-inch row units that can be raised or lowered depending on the crop. Although split-row technology is more expensive, the return on investment is relatively high considering an average 4.5 bu./acre yield advantage with 15-inch rows.

3) High seed cost and failure to achieve a uniform stand.

Previous recommendations suggest increasing soybean seeding rates as row spacing narrows. However, current research conducted in Iowa since 2004 suggests that a uniform harvest population of 100,000 plants/acre or more will maximize yield and profitability regardless of row spacing (Figure 3). However, if a drill or an air seeder is used, higher seeding rates are necessary. Finally, plant establishment is higher for narrow rows than it is for wide rows (Figure 4), indicating that it takes a higher seeding rate to get the desired stand in wide rows.

Conclusion

Narrow row spacing is a risk management tool that helps stabilize yields in stressful environments. Since 2004, multiple experiments have been conducted in Iowa, and on average there is a 4.5 bu./acre yield advantage of 15-inch rows compared to 30-inch rows. These data suggest that soybeans grown in narrow rows will frequently yield more than soybeans grown in wide rows.

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