Row Width Trends, Advantages, and Considerations for Soybean

- Row width has been consistently related to soybean yield potential.
- Demonstrated in over 20 years of research, narrow rows can have a significant yield potential advantage over wide rows.
- Machinery and time management issues have driven a recent switch to 15-inch row spacing in soybeans.
- Benefits and challenges of narrow rows should be evaluated to determine the proper row width for a farming operation.

Background
Most literature indicates higher soybean yield occurs when rows are spaced less than or equal to 20 inches compared to 30-inch rows. A study conducted from 2009 to 2011 in six soybean producing states, compared wide (30-inch) soybean row spacings to narrow (less than 20 inches) rows with either normal practices (no additional treatment) or high input management. The results showed an average of 9.9 bu/acre advantage for narrow rows with high input versus the wide row under normal practices. With no additional treatment, soybeans planted in narrow rows had an average yield advantage over wide rows of 2.1 bu/acre. Research from the Midwest and Canada further supports a yield advantage for narrow rows versus wide rows and indicated yield increases of 2 to 9 bu/acre.

Current Trends
In 1992, it was more common to use a grain drill (< 10 inches row width) or a 30-inch row width to plant soybeans. Soybeans in 15-inch rows have become a popular row width in recent years. Differences in production areas, rotation, efficiency, and economics can influence the trend to use narrow rows. For example, residual phosphorus banded in corn rows could be used by soybeans the following year when planted over the band.

A grower can improve the efficient use of equipment by using a split-row planter with additional row units that can be raised and lowered to allow flexibility for soybean and corn planting. Iowa State University research found that investment in a split-row planter was economical for farms larger than 711 acres with more than 30% of land base in soybean production as long as a yield increase of 1.8 bu/acre was achieved. Farms larger than 355 acres with at least 50% of the land base in soybean production could benefit from the conversion from wide to narrow rows. Even though economics favor the decision to switch to narrow rows, there are additional pest and environmental considerations that may influence the decision.

Narrow Row Width Advantages
Narrow rows intercept more light earlier in the season and reach canopy closure more quickly than wide rows. The relatively equidistant plant arrangement leads to increased leaf development and light interception early in the season which can increase crop growth rate, dry matter accumulation, and seed yield potential. Canopy closure should occur before the R3 growth stage (pod set). In Iowa, 15-inch rows often reach canopy closure 15 days before 30-inch rows. Soybeans in 30-inch rows often do not reach canopy closure by the R3 stage of growth.

Soil moisture is preserved and sunlight penetration is reduced with rapid canopy closure. Consequently, weed emergence and weed seedling growth are suppressed by the canopy shading of narrow row crops. According to research, the critical
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time for weed removal in soybeans occurred earlier in wide rows versus narrow rows. These results potentially mean more flexible post-applications of herbicides in narrow row soybeans. Narrow row widths can improve combine efficiency because plant distribution is even, allowing better flow into the combine. Harvest losses may be reduced because narrow-row soybeans have the lowest pods set higher than in wide rows.

**Row Width Considerations**

Planter equipment, seed delivery, and placement concerns have limited the adoption of narrow row widths in soybean for some growers. Split-row planter technology can be a solution to the cost concerns of having a planter/drill for soybeans and a second planter for corn. Precision drills have improved seed placement which can help reduce the need for high seeding rates. A study conducted in Iowa found that a uniform harvest population of 100,000 plants/acre or more is adequate to attain yield potential. Additionally, research has demonstrated plant establishment was greater for narrow rows than for wider rows (Figure 2).

Narrow row soybean can create environmental conditions that are more favorable to disease development compared to wide rows. Cool, wet conditions during flowering promotes white mold (Sclerotinia sclerotiorum). Soybean product selection, seeding rate, and row spacing are essential for white mold management. A 15-inch row width, rather than drilling soybeans, can be a benefit along with other white mold management recommendations. A 30-inch row width may not be beneficial because of the yield trade-off, unless white mold incidence is frequent. Soybeans in narrow rows may be more susceptible to brown stem rot and soybean cyst nematode when the environmental conditions are correct.

A study conducted by Virginia Polytechnic Institute and State University and University of Delaware found that, wheel track damage during soybean reproductive stages can be a concern in narrow row soybean. Such damage was found to decrease yield in 7.5- or 15-inch row spacings, but not 30-inch rows. Water stress inhibited the ability of soybeans to compensate for damaged rows in this study. A related issue concerns pesticide penetration of the soybean canopy. While row width affected fungicide spray coverage, disease severity was not affected. Spray penetration into the canopy may be compromised more in narrow rows than wide rows, which may affect the efficacy of some pesticides.

**Summary**

Research has shown a potential yield advantage in narrow row widths compared with soybeans planted in 30-inch rows. Factors such as equipment costs, time allocation, and pest management can vary by region, and farm operational needs. Such factors must be part of the decision to change row width. An individual farm assessment of costs and benefits is needed to determine the best management practices for soybean production.