Row Width Considerations for Soybean

Row width is an important agronomic practice that growers can control to improve yield potential. Decades of research has shown that narrow rows have a significant yield potential advantage over wide rows. Equipment and time management issues have driven a recent switch to 15 inch row spacing in soybeans. The pros and cons of narrow rows should be considered to determine the proper row width for a farming operation.

Row Width Research

Most of the research over the last 15 years has compared 7.5, 15 and 30-inch soybean row widths. The results show that 7.5 and 15 inch rows provide greater yield potential, an average of 3 to 4 bu/acre, than 30 inch or wider rows. A study conducted from 2009 to 2011 in six soybean producing states, compared 30-inch rows with narrow rows (> 22-inches) under normal practices (control) or high input management. The results showed an average of 6.4 bu/acre advantage for narrow rows with high input versus the wide row control (Figure 1). The difference between the high input narrow versus high input wide row treatments was 2.3 bu/acre. Other research studies throughout soybean producing areas show similar results with the yield advantage for narrow rows ranging from 2 to 9 bu/acre, depending on environmental and production conditions.

Current Trends

Growers in the largest soybean producing states have moved away from planting soybean in drilled rows to a 15-inch row width (Figure 2). There are substantial differences in row width between states and production areas. For example, sugarbeets are planted in 22-inch rows in western Minnesota which influences corn and soybean row widths. The trend away from drilled soybeans is a compromise to obtain higher yield potential, and economics provided by more precise seeding rates, seed placement and singulation with planters, and a grower can plant corn and soybean with one planter. A grower can improve the efficient use of equipment by using one planter for corn and soybean.

Iowa State University research found that farms larger than 355 acres with 50% of the land base in soybean production would benefit from the conversion from wide to narrow rows. A 1,000 acre farmer required a one bushel difference while a 2,500 acre farm needed a one-half difference. There are additional pest and environmental considerations that may influence the decision to switch to narrow rows.

Narrow Row Width Advantages

Narrow rows intercept more light earlier in the season and reach canopy closure more quickly than wide rows. The relatively equidistance 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.
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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 soybean set the lowest pods higher than in wide rows.

Row Width Concerns

Equipment concerns have limited the adoption of narrow row widths in soybean for some growers. The cost of a planter/drill for soybeans and a second planter for corn has been an impediment for some growers. Split-row planter technology can be a solution. The additional cost of planting equipment can often be offset by the yield advantage narrow rows can provide.

High seeding rates in drilled soybeans have been recommended in the past to overcome inaccurate seed delivery and placement, which limited adoption of narrow rows. Newer precision drills have improved seed placement which can help reduce the need for high seeding rates. Research has established that a uniform harvest population of 100,000 plants/acre or more is adequate to attain yield potential (Figure 3).

Narrow row soybean can have cooler canopy temperatures and retain moisture longer than wide rows which may increase the probability of foliar disease problems. White mold (Sclerotinia sclerotiorum) is favored by cool, wet conditions during flowering. Soybean product selection, seeding rate and row spacing are essential for white mold management. Shifting from drilled soybean to a 15-inch row width, coupled with other white mold management recommendations, is generally recognized as a benefit. Moving to 30 inch rows may not be beneficial because of the yield trade-off, unless white mold incidence is frequent. Brown stem rot, sudden death syndrome, and soybean cyst nematode may also be more problematic if susceptible soybean products are planted in narrow rows.

Potential yield loss due to wheel track damage during soybean reproductive stages can be a concern in narrow row soybean. Wheel track damage was found to cause reduced yield in 7.5 or 15-inch row spacings but not 30-inch rows. Potential yield loss was reduced when boom length increased (Table 1). In addition, water stress compromised the ability of soybean to compensate for damaged rows in this study. A related issue concerns pesticide penetration of the soybean canopy. Row width has not been found to reduce fungicide efficacy even though canopy penetration may be reduced. Insecticide penetration into the canopy may be compromised more in narrow rows than wide rows, potentially reducing insecticide efficacy. Applying a fungicide or insecticide for pest control most likely will out-weight wheel track damage.

Conclusions

Narrow row width soybean research has shown an average three to four bu/acre advantage in yield potential compared with soybean planted in 30-inch rows. Other considerations (equipment costs, time allocation, pest management, and others), that can vary by region and farm operational needs, 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.

Sources:

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