Early Planting in Soybean

- Early planting is critical in producing high yield potential, as long as planting recommendations are followed.
- Planting a soybean crop early can help develop a larger canopy, which can lead to an increase in photosynthesis, extension of the reproductive growth stage, and an increase in the growth rate during pod setting, all of which can help maximize yield potential.
- While there are risks associated with early planting, technologies and tools are available to help mitigate potential risks.

It is well known that soybean planting date affects yield potential. Several university research studies have shown that early planting, when field conditions are suitable, often positively affect yield potential for soybean:

- Data collected from the Michigan Soybean Yield Contest showed that the average planting date for the high-yield producers was May 4th, which was 13 days earlier than that of the low-yield producers.¹
- Iowa State University found that most farmers can increase yield by three to four bu/acre by planting early.³
- Yield losses of 0.25 bu/acre occurred in poor growing conditions and losses of 0.6 bu/acre occurred under good growing conditions for each day soybean planting was delayed after May 1st in Nebraska.²

Benefits
The following reasons have been identified for the potential yield increase associated with an early planted soybean:

- Soybean plants produce larger canopies earlier in the season, which can intercept more light, leading to a higher seasonable canopy photosynthesis rate and conservation of soil moisture, which is critical during reproductive periods.
- An increase in the number of nodes on the main stem, due to a longer growing season, potentially can lead to more pods per plant. This has been supported by data collected from the Michigan Soybean Yield Contest where the high-yield producers averaged 10 more pods per plant than the low-yield groups.²
- Lengthening the reproductive period due to earlier flowering, and increasing the crop growth rate during pod set, which can lead to a greater seed filling rate.

Soil Conditions

- Temperatures - Planting soybean early can help to maximize yield potential despite cold soil temperatures and slow seedling growth. Although the ideal soil temperature for rapid soybean germination and emergence is between 77 and 86° F, soybean seeds can germinate when the soil temperature is about 50° F. However, soybean emergence may take as long as two to three weeks under cold soil conditions.

Moisture content - When planting early, it is important to wait until good soil and seedbed conditions exist. Planting when soil is too wet can result in compaction, poor seed placement, and poor stand establishment. Excessive tillage or a heavy rain soon after planting can result in soil crusting, which can lead to a poor stand. Soybean planted in wet soils will likely negate any yield advantage from planting early.

Risks and Management
Risks to early planting can be mitigated with improved technologies. Cold soil temperatures can slow root development and make soybean stands more susceptible to soil-borne pathogens. Planting treated seed can help to achieve appropriate stands and maximize early season soybean growth. Fungicide seed treatments can provide protection from early season diseases such as Phytophthora, Pythium, Rhizoctonia, and Fusarium. Insecticide seed treatments can help provide protection against early season insect pests, such as the first generation of bean leaf beetle (BLB) (Figure 1).

The following cultural practices should be considered at planting to help establish a good stand capable of producing high yield potential:

- Tillage - Some tillage may be necessary to reduce residue, but soils should be dry enough to support equipment and reduce compaction.
- Nutrients - Adequate fertility is important to maintain soybean growth throughout the growing season.
- Soil drainage - Adequate soil drainage helps soybean plants develop a good root system.
- Equipment - Planting equipment should be optimized and
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calibrated for the planting depth and seeding rate required to achieve an adequate stand.
Always refer to the manufacturer’s manual before performing any maintenance.

- **Seed** - Planting quality seed is recommended because seeds with damaged seed coats absorb soil moisture more rapidly, which increases the possibility of imbibitional chilling injury.

- **Disease and insect pressure** - Sudden death syndrome (SDS) is a disease associated with cool, saturated soils that are common during the early growing season (Figure 2). These conditions favor pathogen development and can predispose soybean plants to infection.

* Selecting soybean products with SDS tolerance and planting fields with no history of SDS are management options to reduce the risk of SDS infection and development later in the season. Additionally, planting soybean products that are resistant to soybean cyst nematodes (SCN) (Figure 3) can help, as the presence of SCN has been associated with increased SDS.

* Monitoring fields frequently during the season is important to address problems and prevent soybean yield loss to pests. A larger canopy earlier in the season can provide a favorable environment for diseases such as white mold and frogeye leaf spot (Figure 4). In addition, with early planting, it might be important to monitor and prevent damage from BLB.

- **Chilling injury** - A late-spring frost could damage emerged soybean plants since the growing point is exposed and vulnerable to freezing temperatures. If conditions are good at planting, the chances for imbibitional chilling injury and frost damage can be minimized.

Soybean tissue is more resistant to freezing temperatures than corn tissue. Temperatures need to reach 28° F for soybean tissue damage to occur. Sometimes only the upper portion of the emerged plant is damaged and not the growing point, and growth will resume from the surviving buds.

- **Weed management** - Starting with a clean field is essential. Weed control programs using a residual herbicide along with post-emergence herbicides should be planned for season-long weed management.

**Summary**

Planting into a suitable seedbed condition requires management considerations and patience, especially if the goal is to plant early. Early planting has advantages and disadvantages. The advantages include earlier flowering, more vegetative nodes, increase in reproductive nodes, and potential for an early harvest. The disadvantages include soil crusting, damping off, late spring frost, pests pressure such as BLB, and potential diseases such as SDS.

Additional sources:  
Web sources verified 1/7/2015.