Soybean Growth and Management Quick Guide

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Introduction
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Growth, development and yield of soybeans are a result of a variety's genetic potential interacting with environment and farming practices. Correct production decisions using plant growth staging and timing are important for successful soybean production. Minimizing environmental stress will optimize seed yield. Farmers who understand how a soybean plant grows and develops can establish their field practices to maximize the genetic potential of the varieties grown. Management practices that may influence crop growth include seedbed preparation, variety selection, planting rate, planting depth, row width, pest management (diseases, insects and weeds), fertilization and harvesting.

Soybeans are classified as indeterminate, semi-determinate or determinate in growth in the United States. Many southern varieties are determinate in growth and cease vegetative growth when the main stem terminates in a cluster of mature pods. Most northern varieties are indeterminate in growth habit. Indeterminate varieties develop leaves and flowers simultaneously throughout a portion of their reproductive period, with one to three pods at the terminal apex. With soybean development being driven by photoperiod, northern varieties have vegetative growth limited by the season length. Semi-dwarfs, determinate varieties that are usually only 40-50% as tall as indeterminate varieties, are commonly grown in the Midwest. They were developed for their better standability (they are less susceptible to lodging) and are very appropriate for

R8 describe plant maturation.

Vegetative Growth Stages

1. Emergence (VE)

Soybean seed begins germination when water is absorbed equal to about **50% of the seed's weight**. The radical, or primary root, is first to emerge from the seed. Shortly afterward, the hypocotyl (stem) emerges and begins growing toward the soil surface pulling the cotyledons (seed leaves) with it. This hook-shaped hypocotyl straightens out once emerged and as the cotyledons unfold. **Emergence (VE) normally takes five to ten days** depending on temperature, moisture conditions, variety and planting depth. During this time, lateral roots are also beginning to grow from the primary root. Root hairs can be visible within five days of planting and provide the key nutrient and water absorbing functions of the plant in this early stage. The taproot will also continue growing and branching so that lateral roots can reach the center of a 30-inch row within five to six weeks. Eventually the soybean root will reach a depth of 4 to 8 feet with most of the roots in the upper 6 to 12 inches of soil. Soybeans should be **planted 1 to 1½ inch deep but not deeper than 2 inches**. Because the soybean must often push through crusted soil, deeper planting can limit viability of seed and final stand number. Rotary hoeing can help seed push through crusted soil as well as help in early weed control. Very small amounts of fertilizer (P or K if needed) in a band to the side and slightly below the seed may help early plant growth, especially if soils are still cool. Do not place fertilizer too near the seed or directly in the furrow as salt injury from the fertilizer can result. **Soybeans are very salt sensitive** (about twice as sensitive as corn). If fields have **not been in soybeans in the last four years or the field has been flooded, seed should be inoculated** with *Rhizobium japonicum* bacteria (such as Brady) to form nodules on the soybean roots that will later provide much of the plant's nitrogen supply. As the hypocotyl arch is exposed to light and straightens to pull the cotyledons out of the ground, growth called epicotyl growth begins with expansion and unfolding of unifoliolate leaves.