SOYBEAN GROWTH AND DEVELOPMENT

MANAGING A SOYBEAN CROP THROUGH GROWTH STAGES

How soybeans grow and develop plays an important role in managing the crop. Since a soybean plant’s vegetative and reproductive growth stages occur for several weeks, many environmental conditions can affect final yield. For example, too much or too little moisture at specific stages can affect performance. This information can help you determine the proper timing of various management practices.

VEGETATIVE STAGES

Emergence

During the germination and emergence process, when the soybean plants break through the soil, stems are very long and leafless sprouts form. Functional nodal hairs develop shortly after planting. Plants have 3 to 4 unfolded unifoliolate leaves.

Management Practices: Scout for proper emergence; check final stand and emergence. Optimum seed placement varies from 1 to 2 inches. Deeper than 2-inch planting depth can cause soil temperatures to jeopardize final emergence if seeds are in poor, repackaging may be needed.

Cotyledon

Unifoliolate leaves expand (leaf edges are not touching); the cotyledon are the main nutrient reservoir for plants (7 to 15 days). Damaged cotyledon can lower yields.

Management Practices: Scour for proper emergence. Wind control is important before and after soybeans emerge. If the climate is poor, repackaging may be needed.

First trifoliolate

Trifoliolate leaf unmolded (fully developed leaves at the unfollicate nodes). The plant becomes self-bounding as newly formed leaves expand. Uppermost trifoliolate leaves will reach full maturity, where 95% of pods have reached mature stage (five-node stage), and then every 2 to 3 days until the last vegetative node.


Second trifoliolate

Two trifoliolate (fully developed trifoliolate leaf at the node above the unfolicate nodes). Check for proper inoculation. Nitrogen has been established as the root at this stage and nitrogen fixation continues until reproductive stage. Effective nodulation results in higher yields and more protein when compared with non-inoculated soybean plants.

Management Practices: Scout for early season weeds, insects and diseases. Apply post-emergence herbicides if needed. If evaluation has been established effectively, nitrogen fertilizer is not recommended and it applied to large quantities it will inhibit nitrogen fixation testing.

REPRODUCTIVE STAGES

Beginning flowering

Plant has one open flower on any node on the main stem. Unifoliolate leaves start to roll and become upward. Determinate plants start at one of the top four nodes and flower downward.


Full bloom

Soybean plant has one open flower on one of the two uppermost nodes on the main stem with a fully developed leaf.


Beginning pod

Pods are 3/4 inch (2 cm) long on one of the four uppermost nodes on main stem with a fully developed leaf.

Management Practices: Scour for insects and diseases. Spray foliar insecticide or fungicide, if needed. examine water stress, which affects pod formation. Ignoring is critical at this stage. Non-commercial. Late season frost damage at the leaf stage at this source severely affects fruit yield.

Full pod

Pods are 3/4 inch (2 cm) long on one of the four uppermost nodes on main stem with a fully developed leaf. Almost 90% of nitrogen uptake occurs at this stage.

Management Practices: Scour for insects and diseases. Late season diseases severely lower yield. Spray foliar insecticide or fungicide, if needed.

Beginning seed

Seed are 1/2 inch (3 mm) long on one of the four uppermost nodes on main stem with a fully developed leaf. Primordia and bract emerge from Bradyrhizobium and Rizobium for root nodules that develop leaves fully and last longer than nitrogen fixation leaves.

Management Practices: Scour for insects and diseases. Late season diseases severely lower yield. Spray foliar insecticide or fungicide, if needed.

Full seed

Pdi containing a green seed that fills the pod cavity on one of the four uppermost nodes on main stem. Most root nodules have been taken by this time the plant reaches R6 stage.

Management Practices: Scour for insects and diseases. Late season diseases severely lower yield. Spray foliar insecticide or fungicide, if needed.

Beginning maturity

One pod on the main stem has reached mature pod color.


Full maturity

Approximately 8 to 11 days before harvest, pods should reach full maturity, where 90% of pods reached mature pod color.

Management Practices: Scour for pest syndrome. If the plant is still green, the best option is to harvest early and make sure the harvesting equipment is sharp and is suitable operating conditions.

Information and drawings about stages of soybean development are adapted from Fehr and Caviness (1980). Illustrations are provided as a courtesy of Kansas State University Department of Communications and Agricultural Education.