Yield Components of Soybean R5 to R8

- The reproductive stages begin at flowering (R1 to R2) and include pod development (R3 to R4), seed development (R5 to R6), and plant maturation (R7 to R8).
- The effects of frost, hail, moisture stress, diseases, insects, or weeds and the magnitude of their effect on yield potential can be estimated by the soybean plant growth stage when an event occurs.
- Timing of pesticide applications can be determined based on proper soybean growth staging.

Beginning Seed (R5)
The reproductive stage, termed beginning seed (R5), represents a seed that is 1/8-inch long in a pod at one of the four uppermost nodes (Figure 1). Seed fill during this growth stage demands large amounts of water and nutrients. Soybean plants redistribute stored nutrients from the plant’s vegetation to supply half of the needed nitrogen (N), phosphorous (P), and potassium (K) and the other half comes from N fixation and nutrient uptake by the roots. During this growth stage, both the N nutrient accumulation in the leaves and N fixation in the root peak and start to drop as seeds use nutrients. Dry matter accumulation continues and will stop halfway between R5 and R6. Maximum height, node number, and leaf area are obtained approximately halfway through R5. Seed dry matter accumulation continues until about R6.5 when about 80% of total seed dry weight should be reached. The plant is less able to compensate from stress and vegetative damage at this growth stage. At this stage, 100% leaf loss can reduce yield potential by about 80%. Reduction in yield potential typically occurs due to lower pod number and number of beans per pod. Seed size may also reduce yield potential but it is not as common at this stage.

Full Seed (R6)
Full seed (R6) may also be known as the “green bean” stage or beginning full seed. This stage starts with a pod containing a green seed that fills the pod cavity at one of the 4 uppermost nodes on the main stem (Figure 2). The beans have a rapid growth rate that slows around R6.5 and peaks at R7. Root growth is complete around R6.5. During R6, 3 to 6 trifoliate leaves may fall from the lowest nodes just before leaf yellowing starts. Following the R6 growth stage, rapid leaf yellowing begins through R8 or until all leaves have fallen. Halfway through R6, root growth is complete. R6 also marks the transition from the end of the critical period for yield potential reductions (R4.5 to R5.5) and the start of the period when stresses have very little effect on yield potential (R7).

Beginning Maturity (R7)
Beginning maturity (R7) signifies that one pod on the main stem has achieved the brown or tan mature color (Figure 3). Eventually the seed and pods appear yellow and all green color is lost, which denotes the peak of dry matter accumulation in individual seeds. When physiological maturity is achieved, seeds contain about 60% moisture. Stress during the beginning and full maturity growth stages does not affect yield potential unless one or more of the following occurs:

- Pods drop to the ground or seeds are shattered from the pods;
Yield Components of Soybean R5 to R8

- Plants lodge, reducing drying capability.
- or losses occur during harvest.

Full Maturity (R8)
The soybean crop is considered fully mature (R8) when 95% of the pods have achieved their mature color (Figure 4). Typically, 5 to 10 days of good drying weather after R8 is all that is needed for the soybeans to reach harvest moisture of less than 15%. This is a guideline; the rate of moisture loss can vary based on conditions. For example, warm, dry weather will lower the soybean moisture faster and wet weather slows down moisture loss. For long-term storage, soybeans should be stored at 13% moisture or less.

Prior to harvest, the final plant population should be assessed to help determine planting efficiency.

Management Considerations
The first and second generations of bean leaf beetle can occur in July and August. Insecticide applications during the R3 to R6 stages of soybean growth can be beneficial to reduce defoliation, pod feeding and transmission of bean pod mottle virus. Multi-state research has shown that well timed insecticide applications for soybean aphid are most beneficial during the R1 to R5 stage of soybean growth.²

Fungicide applications for late season diseases during the reproductive stages of growth can be beneficial. The optimum time of application is dependant on the specific fungicide used, but an application during the R2 to R5 stages of growth can help prevent leaf loss and potential yield reduction. R3 to R6 (pod set through seed fill) is the most critical period for seed yield.

Insect and disease situations are highly variable each season. Treatment thresholds and recommendations vary by state. Consult local experts to determine management options prior to taking action.

Sources:
Web sources verified 06/30/2015.

Figure 3. Soybean plant during the beginning maturity (R7) growth stage. Photo courtesy of Palle Pedersen, Iowa State University.

Figure 4. Soybean plant during the Full Maturity (R8) growth stage. Picture courtesy of Palle Pedersen, Iowa State University.