

# AGRONOMIC Spotlight



## Yield Components of Soybean during Seed Development R5-R6

Vegetative growth stages in soybean are numbered according to how many fully-developed trifoliolate leaves are present. The reproductive stages begin at flowering (R1-R2) and include pod development (R3-R4), seed development (R5-R6), and plant maturation (R7-R8). Growth stages can overlap. Determine the growth stage of a crop when 50% or more of the plants are in or beyond that growth stage in question. This Agronomic Spotlight is part three of four in a series that focuses on yield components of soybean during the reproductive growth stages.

### Beginning Seed (R5)



Figure 1. Soybean pod and seeds during the Beginning Seed (R5) growth stage. Picture courtesy of Palle Pedersen, Iowa State University.

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. The soybean plant redistributes stored nutrients with half of the needed N, P, and K coming from the plant's vegetation and the other half coming from N fixation and nutrient uptake by the roots. During this growth stage N nutrient accumulation in the leaves and N fixation both peak and then start to drop as the 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 half way through R5. Seed accumulation continues until about R6.5 when about 80% of total seed dry weight should have been reached. The plant is less able to compensate due to stress and vegetative damage at this growth stage. Leaf loss of 100% at this stage can reduce yield potential by 80%. Reductions in yield potential typically occur 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)



Figure 2. Soybean Pod and Seeds during the Full Seed (R6) growth stage. Picture courtesy of Palle Pedersen, Iowa State University.

Full seed (R6) may also be known as the "green bean" stage or beginning full seed. The stage starts with a pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem (Figure 2). The beans have a rapid growth rate that slows around R6.5 and peaks at R7. Total pod weight peaks during R6. During R6, three to six trifoliolate 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 reductions in yield potential (R4.5 to R5.5) and the start of the period when stresses have very little effect on yield potential (R7).

Sources: McWilliams, D.A., et al. 1999. *Soybean Growth and Management Quick Guide*. North Dakota State University Extension. Publication Number A1174, June 1999. <http://www.ag.ndsu.edu> (verified 7/14/10); Naeve, S. 2005. *Growth and Development (Soybean)*. University of Minnesota Extension. <http://www.soybeans.umn.edu> (verified 7/14/10); Pedersen, P. 2007. *Soybean Growth and Development*. Department of Agronomy. Iowa State University Extension. <http://extension.agron.iastate.edu> (verified 7/14/10).

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