

AGRONOMIC Spotlight



Yield Components of Soybean during Pod Development R3-R4

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 two of four in a series that focuses on yield components of soybean during the reproductive growth stages.

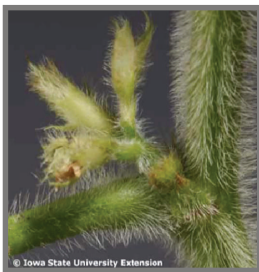


Figure 1. Soybean plant during Beginning Pod (R3). Picture courtesy of Palle Pedersen, Iowa State University.

Beginning Pod (R3)

At the beginning pod (R3) growth stage, one of the four uppermost nodes is $\frac{3}{16}$ inch (5 mm) (Figure 1). Stress during this growth stage may affect yield potential by decreasing total pod number, bean number per pod, or seed size. Typically, soybean plants can compensate, at least partially, from temporary stress. One reason for the ability to compensate is the long flowering period; however, the soybean plant loses this ability as the soybean plant matures from R1 to R5.5. During R3, 60-75% of the flowers can abort and as many as 50% of the formed pods may abort. Stress during this reproductive stage may increase those abortion rates and decrease yield potential. Conversely, favorable conditions may increase pod number per plant and increase yield potential. At this time, soybean plants can be 23-32 inches tall and may be at the V11-V17 vegetative growth stage.



◀ Figure 2. Soybean plant during the Full Pod (R4) growth stage. Picture courtesy of the University of Wisconsin, Madison.

Full Pod (R4)

At the beginning of the full pod (R4) growth stage, one of the four uppermost nodes will have a pod that is $\frac{3}{4}$ inch long (Figures 2 and 3). At first, rapid pod growth and seed development take place, followed by finalization of pod number. Pod dry weight increases from R4-R5. This stage marks the beginning of the critical period for determining seed yield potential. Stress during R4-R6 can cause more reduction in yield potential than at any other growth stage. The most critical time is during pod formation in late R4.5 to early seed fill at R5.5. Reductions in yield potential can occur from fewer pods. If needed, irrigation during this critical time may help reduce potential yield loss. As a tip to help determine the end of this critical period, the last flower occurs at the main stem tip through R5.

Figure 3. ▶ Soybean pods during the Full Pod (R4) growth stage. Picture courtesy of Palle Pedersen, Iowa State University.



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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