AGRONOMIC Spotlight

Technology Development & Agronomy by MONSANTO

When to Terminate Irrigation in Soybean Production

- Timing of irrigation is an important factor in soybean production for optimum growth and yield.
- Soybean seed fill growth stage (R5-R6) is an important irrigation time to avoid moisture stress.
- Timely irrigation management may help to increase and stabilize crop yields long-term.

Moisture and Yield

Water demand is highest during the reproductive stage of soybean. An extra irrigation during this period can help maximize seed weight and yield potential. Water stress during seed development can significantly reduce yields as much as 10 bushels per acre.[1] The yield reduction is due to less number of pods per plant and the fewer number of seeds per pod. Between R5 and R6 growth stages, a lack of moisture can result in smaller seeds that have not reached their full potential.

Figure 1. Soybean pod at full seed (R6 growth stage). Photo source: Tom Eubank, Mississippi State University Extension Service.

Terminating Irrigation

The decision to terminate irrigation can be difficult, and it will likely depend on the weather, available soil moisture, water availability, soil type, and the product planted. While water requirements decrease as the plant gets closer to maturity, it is still important to maintain proper soil moisture to help minimize stress and maximize yield potentials. If good soil moisture is present at R6 stage, no additional irrigation is needed and the irrigation can be terminated. If soil is dry at or just before R6 then one final irrigation is necessary to provide enough soil moisture to completely fill the seeds. Terminating irrigation too soon can result in smaller seed, therefore reduce the overall yield potential.

The coarser the soil texture, the later the final irrigation should be. In the absence of rain, soybeans growing on clay soil should receive a last surface irrigation at R6 growth stage. Soybeans growing on coarse-textured soils with a low water holding capacity may need a final irrigation after R6 stage.[3]

Table 1. Soybean Growth Stages

R1	Beginning Flowering - at least one flower on any node
R2	Full Flowering - open flower at one of the two uppermost nodes
R3	Beginning Pod - pods are 3/16 inch at one of the four uppermost nodes
R4	Full Pod - pods are 3/4 inch at one of the four uppermost nodes
R5	Beginning Seed - seed is 1/8 inch inside pod located on the main stem at one of the four uppermost nodes
R6	Full Seed - pod contains at least one green seed filling pod capacity. Pod is located on the main stem at one of the four uppermost nodes
R7	Beginning Maturity - one pod located on the main stem has reached mature pod color
R8	Full Maturity - 95 percent of the pods have reached their mature pod color

Source: Iowa State University[2]

Sources:

[1] Soil and water management, soybean – crop irrigation. University of Arkansas Cooperative Extension Service. May 28, 2008. http://www.aragriculture.org (verified 7/08/2013).

[2] Pedersen, P. 2008. Soybean growth stages. Iowa State University Soybean Extension and Research Program. http://extension.agron.iastate.edu (verified 7/08/2013).

[3] Heatherly, L. G. 2012 . Soybean Irrigation Guide for Southern US. http://mssoy.org (verified 7/08/2013).

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