SOYBEAN WATER USE AND IRRIGATION SCHEDULING

More than half of soybean acreage in Arkansas, Louisiana, and Mississippi is irrigated. Most of these irrigated acres are in the Delta portion of these states. The impact of this irrigated soybean acreage is significant because yields from properly irrigated fields should be 20 or more bu/acre greater than yields from nonirrigated acres.

There is often confusion about when to initiate irrigation of soybeans to realize maximum yield potential. The following can serve as a guide for making this decision.

Six planting dates for MG IV soybeans are shown in Table 1. For each of these planting dates, estimated dates for R1 [beginning bloom], R3 [beginning podset], and R6 [full seed] are shown, along with average rain and pan evaporation—PE [approximates potential evapotranspiration—PET] between the indicated stages at Stoneville, MS. Estimated water use was derived from PE multiplied by a crop coefficient for the period. Weather and water use at other locations in the lower Mississippi River Valley are similar to those for Stoneville.

Between planting and R1 for every planting date, water use does not exceed rainfall in an average year. Thus, irrigation in an average year will not be needed before R1 for MG IV varieties.

Water deficit [water use minus rainfall] between R1 and R3 for all plantings is less than the 2-inch deficit normally used to trigger irrigation. Thus, irrigation will not be needed prior to R3 in an average year because soil can easily supply the deficit amount.

The R3 to R6 period of all planting dates in an average year experiences water deficits that range from 6.5 to 7.7 in. When added to the R1 to R3 deficits, the R1 to R6 water deficits range from 7.3 to 8.2 in. Thus, in an average year, plantings of MG IV varieties will need 7.3 to 8.2 in of irrigation water to realize maximum yield potential. Irrigation should be initiated no later than R3 when planting date is between March 20 and May 10.

Of course, no year has weather exactly like that for an average year. Some years will have conditions that result in larger deficits than those shown here for the various periods. This means that irrigation should be initiated before R3 in some years, and/or more water will need to be applied during the season to realize maximum yield potential.

The information presented here can be used as a benchmark for irrigation planning in a given year at a given location. Actual rainfall amount received on a given field can be compared to that shown in the table to determine when irrigation should begin and how much irrigation water should be applied to supplement rainfall during the growing season.

Table 1. Planting date (DOP), average rain and pan evaporation (PE) from planting to R1, R1 to R3, and R3 to R6 at Stoneville, MS, and estimated soybean water use by the R1, R3, and R6 dates. Assumes mid-MG IV variety. Rain, PE, and water use in inches.

	Estimated	DOP to R1*		Estimated	R1 to R3*		Estimated	R3 to R6*	
DOP	R1 date	Rain/PE	water use	R3 date	Rain/PE	water use	R6 date	Rain/PE	water use
Mar. 20	May 5–10	9.2/8.4	2.9	May 20–25	2.6/4.0	3.2	July 10–15	6.5/14.5	13.5
Mar. 30	May 10–15	8.0/9.7	3.1	May 25–30	2.4/4.1	2.9	July 20–25	6.9/15.7	14.6
Apr. 10	May 15–20	7.3/9.2	2.6	June 5–10	3.0/5.9	3.9	July 25–30	6.1/13.9	13.2
Apr. 20	May 20–25	6.3/8.5	2.1	June 15–20	3.4/7.6	4.6	Aug.1–5	5.4/12.4	11.9
Apr. 30	June 1-5	5.8/9.3	2.3	June 25-30	3.3/7.4	4.5	Aug. 10-15	4.8/12.0	11.5
May 10	June 10-15	5.2/9.9	2.5	July 1-5	2.7/5.9	3.3	Aug. 15–20	4.5/11.8	11.2

*R1 = beginning bloom; R3 = beginning seed; R6 = full seed.

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