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Relationship of Soybean Floral Growth Stage to Maturity and Yield

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Weather in recent years has caused many growers to delay seeding or to replant following a killing frost. As a result, growers in late summer ask whether their soybeans at a given growth stage will mature before the first killing frost.

Researchers in Iowa have conducted research pertaining to this question (Table 1). This data is a summary across several maturity groups and environments ranging from cooler climates to more tropical-like climates in the U.S.

Once soybeans reach the beginning pod stage, the number of days to maturity from the full bloom through beginning seed stages decrease rapidly. Once pods attain the full seed stage, a plant still needs a month to reach full maturity and has only attained 50% of its bean yield but 95% of its whole plant yield. Generally, however, a plant needs fewer than 20 days to attain

100% of its bean and whole-plant yields at the beginning maturity stage.

In order to get an idea of the variation you might expect in the averages in column 2 of Table 1, look at the range values in column 3. Many values, particularly the beginning pod values (56 - 66), overlap with those for the full pod stage (46 - 68). Therefore, treat the average days to maturity with caution since they were obtained from data summarized over many maturity groups and many environments.

Percent maximum yield in the bean and whole plant are reported as averages with no ranges given. Expect less variability in percent maximum yield compared to a highly variable factor like days to maturity, which is greatly influenced by the environment.

Table 1. Number of days to maturity and percent maximum yield from a given soybean floral growth stage.

Floral Growth Stage of Main Stem	Days to Maturity		Percent Maximum Yield	
	Average	Range	Bean	Whole Plant
Beginning Bloom (open flower, at any node) - R1	73	70 - 77	—	10
Full Bloom (open flower at one of the top two nodes) - R2	70	65 - 75	—	12
Beginning Pod (3/16" - long pod at one of top four nodes) - R3	60	56 - 66	—	25
Full Pod (3/4" - long pod at one of top four nodes) - R4	51	46 - 68	—	50
Beginning Seed (1/8" - long seed at one of top four nodes) - R5	42	38 - 47	6	70
Full Seed (seed fills pod cavity at one of top four nodes) - R6	27	18 - 39	50	95
Beginning Maturity (at least one pod is mature color) - R7	9	7 - 18	100	100
Full Maturity (95% of pods have attained mature color) - R8	0	—	100	100

Source: Adapted from Fehr, W. and C.E. Caviness. 1977. Stages of soybean development. Iowa Coop. Ext. Serv., Iowa Agric. Home Econ. Exp. Stn., Spec. Rep. 80.

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