

Yield Enhancement of Short-Season Soybeans

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The reduced period of growth between emergence and pod fill for short-season varieties results in smaller plants with fewer nodes at which to set pods. Late-maturing varieties remain vegetative for a longer period before flowering and therefore produce more nodes where pods can form. This larger plant size results in greater yield potential which is only partially realized due to reduced sunlight availability later in the season when those late-maturing varieties are filling pods.

To illustrate this point, the yield of soybeans as a function of variety maturity is presented in the figure on the next page. These data were taken from the Ohio Soybean Performance Trials for 1995 through 1997 which included 17 test sites containing 1,962 observations. Because later-maturing varieties tend to produce slightly higher yields, producers have shifted to later and later varieties over the past 15 years, hoping to increase productivity.

In recent years, many producers have experienced difficulty getting soybeans harvested early enough to allow timely wheat planting. The delayed planting of wheat makes it more susceptible to both winter kill and heaving in the spring. Additionally, later planting delays wheat heading which shortens the grain fill period and reduces the yield.

Because early maturing soybeans are small, more plants per acre are needed to maintain high yields. Ohio soybean producers typically do not increase seeding rates when planting short-season varieties, and yields are lower than possible. If the yield of early-maturing varieties could be increased by 1.5 to 2.0 Bu/Ac, then they become as profitable as the later-maturing varieties.

A proposal to test that hypothesis was presented to the Ohio Soybean Council for funding in the winter of 1996. After reviewing that proposal, the Council agreed to provide funding because the potential benefits to Ohio producers would be:

- A wider harvest window so more soybean acres could be harvested at the proper moisture for higher test weights.
- Access to early cash markets may increase a farm's average soybean price.
- Wheat could be planted more timely, which would improve winter hardiness and yield.
- Soybean harvest would be less rushed.
- Total farm profits should increase.

Four varieties with relative maturities of 1.5, 1.9, 2.2, and 2.5 were seeded at rates of 200,000, 250,000, and 300,000 seeds per acre on eight farms in central and northern Ohio. The study was conducted in Union, Hardin, Allen, Crawford, Henry, VanWert, and Fulton Counties. This study will be repeated in 1998 by the same cooperating farmers and their county Extension agents who helped plant, harvest, and record yield and other necessary data. The results for 1997 are presented in Table 2.

Table 2. Effect of Variety Maturity and Plant Population on the Yield of Four Soybean Varieties in 1997.

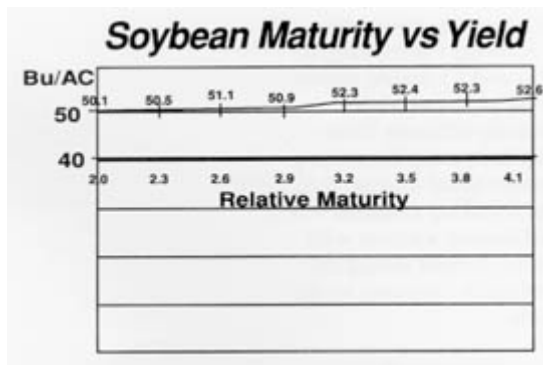
Variety Maturity	Seeding Rate			
	Low	Med.	High	Avg.
1.5	43.6	46.3	46.3	45.4
1.9	46.7	49.1	48.8	48.2
2.1	48.1	48.7	47.7	48.2
2.5	48.8	48.8	51.1	49.6
Avg.	46.8	48.3	48.5	47.9

LSD (0.1) Variety Maturity = 2.4

LSD (0.1) Seeding Rate = 1.0

LSD (0.1) Variety x Seeding Rate = 1.6

These data indicate that increasing the seeding rate of the two earliest maturing varieties significantly increased yield (2.8 and 2.1 Bu/Ac respectively). The yield increases for the two later varieties were not statistically different. Therefore, based on eight trials, increasing the seeding rate of short-season varieties could increase their yield to near that of later-maturing varieties, allowing for an extended harvest window with no yield penalty. The earlier harvest would also allow timely wheat planting for increased winter hardiness and grain yields.



The Ohio State University Agronomy Team wishes to thank the Ohio Soybean Council for supporting this important research project.