



Profitable Soybean Planting Practices

Background: Soybean planting date has been shown to have a large impact on a crop's yield potential. However, information on how other management practices should be adjusted based on planting date is lacking in Michigan. We have conducted both on-farm and small-plot research from 2018 to 2021 to better understand benefits of early planting and how management decisions might change based on planting date.

Planting Date: On-farm trials were conducted to compare early-season soybean planting dates with normal soybean planting dates in 2019, 2020, and 2021. Early-season planting resulted in significantly different yields at 4 out of 9 locations in 2019 (average yield increase of 2.6 bu/a), at 5 out of 12 fields in 2020 (average yield increase of 1.2 bu/a), and at 7 out of 13 locations in 2021 (average yield increase of 3.4 bu/a) (Figure 1). One field in 2021 reported significant yield loss from ultra-early planting.

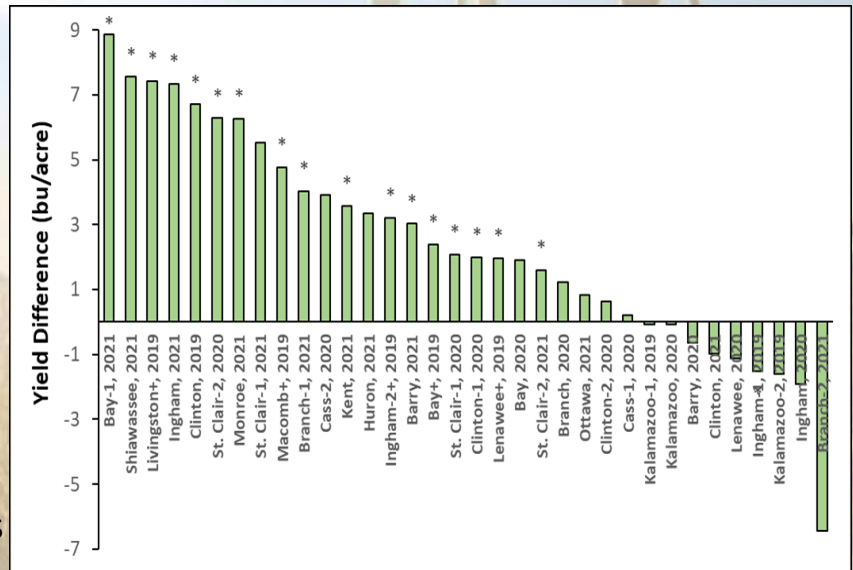


Fig 1. Yield difference (early - typical planting) across various Michigan locations during the 2019 - 2021 growing seasons. *Denotes locations with significant yield differences. +Denotes 2019 locations with fungicide/ insecticide spray at R3. Branch-2, 2021 utilized an ultra-early planting date (April 8).

Small plot research trials were conducted between 2018 and 2021 using three to four planting dates ranging from late-April to late-June. Results from these studies show that optimal soybean planting is during or before mid-May (Figure 2). Delayed planting after mid-May resulted in a yield penalty, which increased as planting was delayed. On average, soybean yield was reduced by 0.4% per day between the mid-May and early-June planting dates. Furthermore, planting after early-June resulted in an average yield reduction of 1.2% per day.

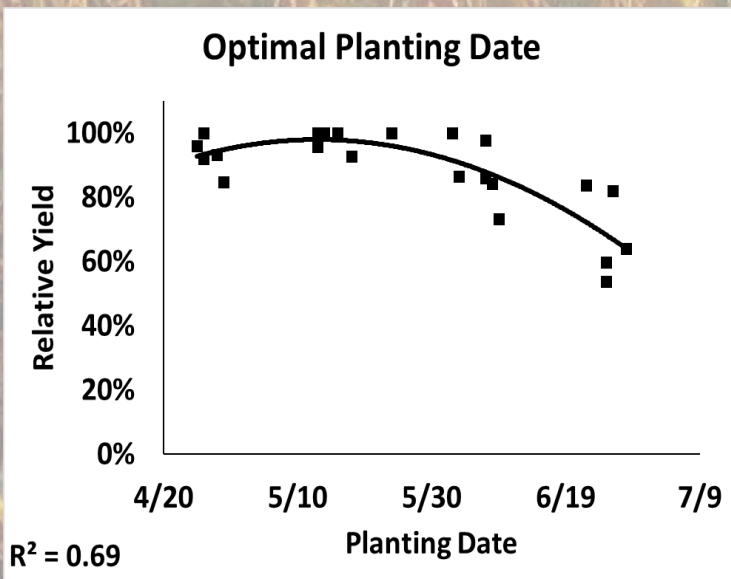


Fig 2. Response of relative soybean yield to planting date across trials from 2018- 2021. Management practices were consistent across planting dates and years.

Variety Maturity Selection:

- Benefits of early-season soybean planting can be improved (with > 3 bu/ac advantage) by using a variety with a later maturity group designation (Fig. 3).
- Furthermore, when planting was delayed beyond early-June, using an early-maturity variety not only provided small yield advantage but also resulted in soybean seed with low moisture content at the time of harvest.
- Using a later maturing variety (longer maturity group designation) can further build upon the benefits of early-season planting, including yield improvements.

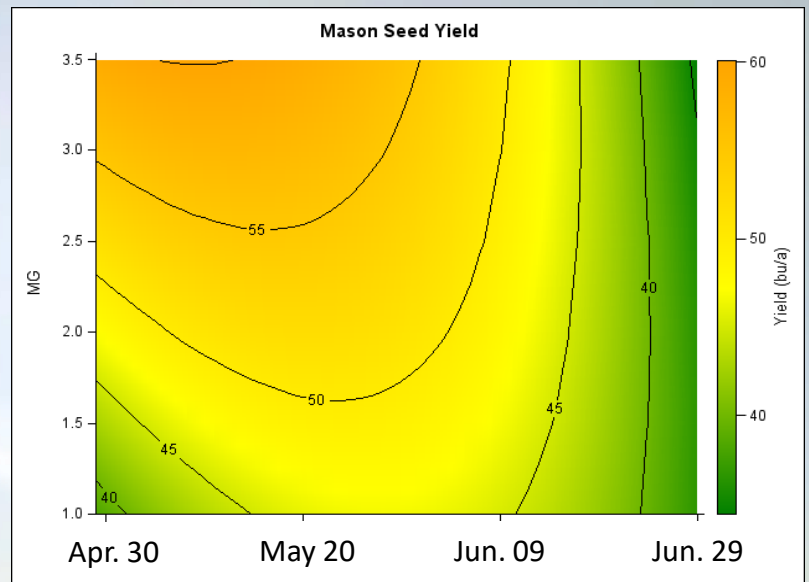


Fig 3. The effect of soybean planting date and maturity group selection on yield during the 2018 and 2019 growing seasons at Mason, MI.

Optimal Seeding Rate:

- Seeding rate that maximizes net income is lower compared to the seeding rate that maximizes yield, and optimal seeding rates are dependent on planting date (Fig. 4).
- Even with higher current soybean prices, seeding rates that maximize income increase only by around 10,000 seeds compared to the \$9.00/bu price point, except for late-June planting.
- Furthermore, increasing soybean seeding rates as planting is delayed into mid-June can help mitigate losses of yield and net returns associated with delayed planting.

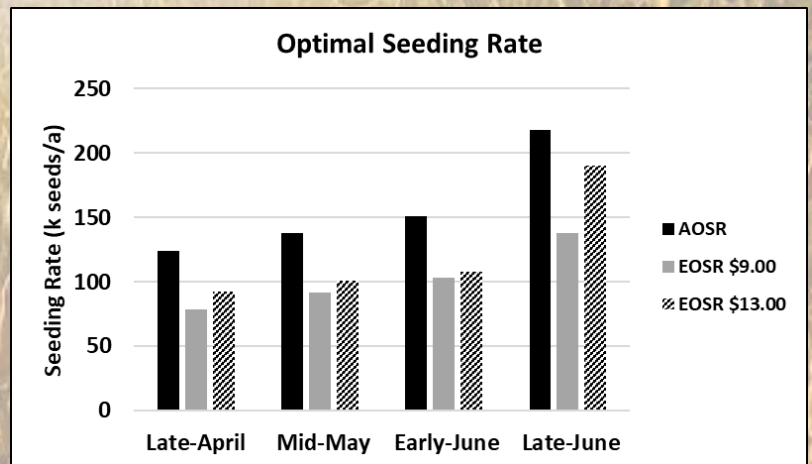
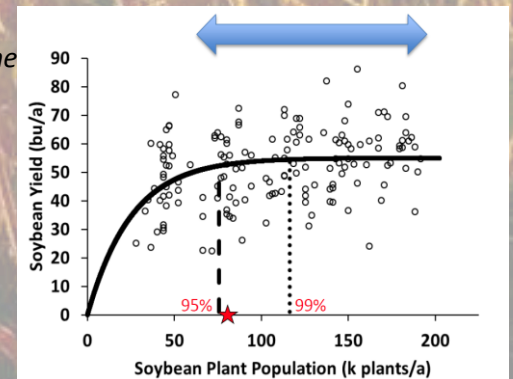


Fig 4. Soybean seeding rates that resulted in the maximum yield (black bars), profit at a selling price of \$9.00 (gray bars), and profit at a selling price of \$13.00 (striped bars) for four planting dates during the 2018 and 2019 growing seasons.



Other Considerations

- Seed treatments: most beneficial when pests are present, especially during early-season planting.
- Row spacing*: 15" vs 30", impact of planting date/seed rate?
- Fertility/inoculant*: do benefits depend on planting date?
- Planting method*: effects of using drill vs planter vs broadcasting seed? Seed priming?

* Indicates ongoing projects

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