Plant population, row spacing and yield potential (II.A. and II.B.)

What is the optimal planting population? Does planting more plants lead to more yield?

Spacing is a factor in growth and development of all plants. As soybeans are planted in rows, there needs to be adequate spacing between seeds to allow for germination, growth and flowering, and seed development. If the rows are too far apart, weeds may grow between the rows, stealing light from the growing beans. If the plant rows are too close, competition may increase and the beans may be stealing light and nutrients from each other. As the population of seeds per acre increases, the seeds within a row will also be closer together, again increasing competition.

Calculate the percent survival and potential yield of each population rate in the table below.

Use the following to calculate potential yield:

1. If each plant produces about 50 beans, how many soybeans will an acre produce?

_____(number of plants per acre from *final population* rows in table below) x 50 beans =

_____ soybeans in an acre.

2. About 1500 soybeans weigh one pound. How many pounds of soybeans will an acre produce?

_____ (number of soybeans) divided by 1500 = _____ pounds of soybeans.

3. If one bushel of soybeans weighs 60 pounds, how many bushels will an acre produce?

_____ (pounds of beans) divided by 60 = _____ bushels of soybeans.

Planted (seeds/acre)	75,000	125,000	175,000	225,000
Final population in 15” row	71,500	107,800	146,500	174,400
Percent survival				
Potential yield				
Final population in 30” row	62,700	95,900	122,000	153,900
Percent survival				
Potential yield				

Data from: https://www.extension.purdue.edu/extmedia/ay/ay-217-w.pdf

Visit https://www.pioneer.com/home/site/us/products/soybean/high-yield/seeding-rate/ to see additional factors that affect yield.

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Smart Farming: Using data to make decisions

4. Look at the resource entitled: Yield Environment and Seeding Rate. Look at the High, Medium and Low Yield Environments.

   a. Are the yield numbers similar to the ones you calculated in the chart above? No

   b. Explain why not.

5. What does this data describe?

6. Will planting at the highest rate result in the highest yield? Why or why not?

According to: https://cfaes.osu.edu/news/articles/ohio-corn-and-soybean-yield-predictions-optimistic, Ohio's average yield of soybeans in bushels per acre is predicted to be 53 bu/ac in 2017.

7. What might account for the difference in bushels compared to the calculations you completed?

The decision about planting population cannot be made on the basis of yield alone. Why? Because every farmer, just like all business operators, are limited by the costs of inputs and the potential value of the outputs. If the decision is to plant 225,000 beans per acre because that gives the largest number of bushels per acre potential, a farmer would need to consider how much that costs and what is the return on her investment. The current market price will determine the potential earnings.

These are the five fields that we are concerned with. What is the cost of seed at the optimal seeding rate?

If a bag of bean seeds weighs on average 50 lbs and a bag costs on average $55, what will be the cost of seed for the field, based on the rate you choose? Choose 2 different seeding rates to compare.

Field	Acreage	Seeding rate	Cost of seed	Potential earnings
6	35	1)		
		2)		
7	202	1)		
		2)		
8A	130	1)		
		2)		
11	102	1)		
		2)		
12B	71.5	1)		
		2)		

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Example: If a field is 55 acres and the seeding rate you choose is 75,000 seeds/acre in a 15 inch row, how many bags will it take to seed the field? Find the current market price of soybeans for step 4.

50lbs/bag x 1500 seeds/lb = 75,000 seeds, so one bag will seed one acre.

It will take 55 bags at $55/bag.

1) 55 ac x $55 = $3025 for seed

2) Potential yield from rate (above in table): 40 bu/ac

3) 40bu/ac x 55ac = 2200 bushels total

4) $9.50/bu x 2200 = $20,900 income (see: https://www.agweb.com/crops/soybeans/ for current price)

5) Profit = $20,900 - $3500

Reflection

What other costs need to be included to see if this is a profitable seeding rate?

- Other expenses include: equipment use (fuel, maintenance), costs of the equipment itself (combine, tractor, planter, sprayer; or cost to have someone come to plant, spray, and harvest), labor costs for farmer's time or pay to operator, herbicide, insecticide, etc.
- See link for full enterprise budgets for Molly Caren: https://aede.osu.edu/research/osu-farm-management/enterprise-budgets