# Current Issues in MS Soybean Production

## What population is too low and calculating plant populations.

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**Week of May 5, 2008:** The last six weeks have definitely been challenging for everyone trying to get a crop in the ground and up to a stand. The past few springs have been fairly dry and helped us to forget what it is like trying to get a crop in the ground and up in an extremely wet spring. This is not to say we cannot make a good crop in years with wet springs because we have in the past, it is just something we haven't dealt with in a few years. About the time you get frustrated with drowned out low lying spots in fields or bottom ends of fields where we have lost some crop, think about those dealing with flood waters that have killed entire wheat, corn, and/or soybean crops and that still have floodwaters covering a tremendous amount of their acreage. Unfortunately, it does help to put things in perspective for those not dealing with extreme floodwaters.

With respect to soybean plant populations and how low can we go and still make good yields, it is important to note that there are a lot of fields across the state that have good to excellent soybean stands. This is a blessing considering the weather they have been through the past six weeks. However, there are fields that have extremely low populations and will be replanted, fields with skippy stands that will be patch planted, and fields we are going to keep using the existing populations. In years past, we likely would have replanted some of these fields, but because of several key issues discussed below, we are going to go with the existing stands. There are several key issues regarding replanting options that can be discussed at great lengths. I will keep the discussion on these key issues brief.

First, even though we are planting a later crop than what we have planted in several years, we can still make a good crop planted in the month of May. This is especially true for irrigated acres. We moved to the early planting system to avoid late summer drought as well as late-season insect and disease pressure. Making an excellent crop that is planted late is possible, we just have to intensively manage pests that we have the tools to manage, do a good job of managing water on irrigated acres, and hope for late-season rains on our dryland acres.

Second and most importantly, seed availability is extremely tight and driving a lot of potential replant decisions. There may not be seed available for replanting in a lot of cases.

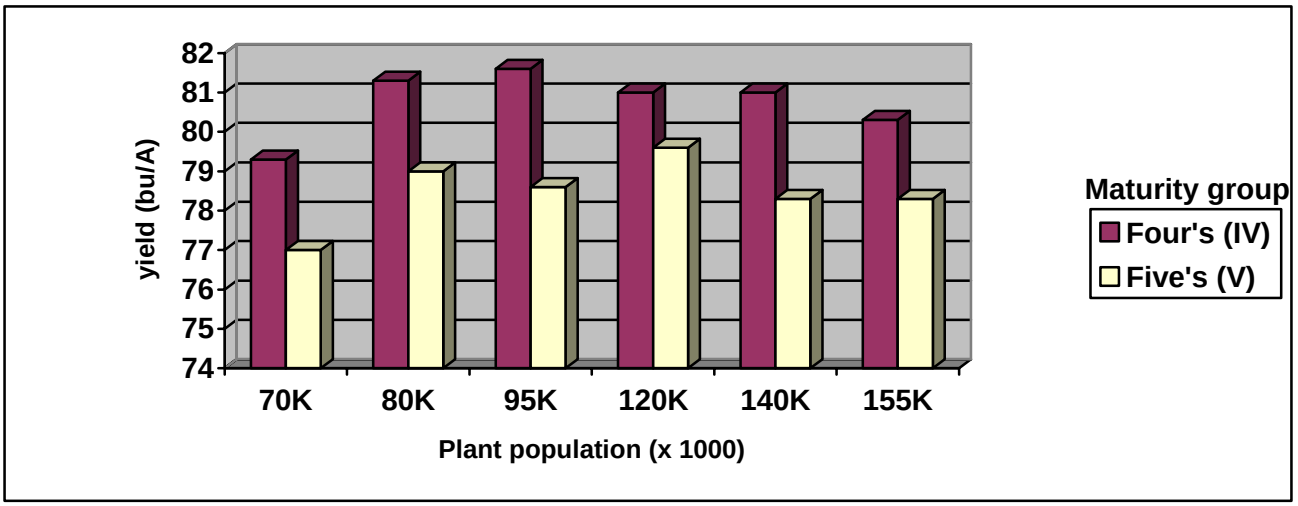
Third, the calendar date is affecting our replant decisions. Soybean planted in mid-may often will not yield as well as that planted in mid-April, especially dryland acres. Additional cost for watering replanted soybean as well as the potential losses and cost of managing late-season diseases and insects must be taken into consideration.

Fourth, the cost of seed for replanting and to kill the existing plants must be considered. Cost of seed, seed treatment, tillage or chemical used to kill existing crop, and labor should be considered and these costs can exceed $50/acre. Replanting soybean into a field and not killing what is already up either with tillage or chemicals often leads to essentially two crops that do not uniformly dry down and are difficult to manage come harvest time, and in a lot of cases the older crop actually acts like weeds that can compete with the second planted crop.

Several other issues that come into the picture and must be factored into the replanting equation are dryland vs. irrigated, row spacing, planted vs. drilled, and uniformity of existing stand, and planter capacity. Many of us are either still planting our first crop or haven't even started planting due to wet weather and/or corn replanting. In these situations planter capacity is such that we should concentrate on planting what we have left to plant and then concentrate on replanting. This will only put us later into the season when we make the replanting decisions, but getting our first planting is top priority.

I mention all of these issues not trying to discourage replanting. I know there are times when we do not have a choice and must replant a crop. These are just issues that must be considered and weighed into the decision whether to replant or not.

**What population is too low?** Keep in mind that a soybean plant has an excellent capability to compensate for a thin stand. A stand consisting of evenly spaced, healthy plants that came up about the same time and that does not have huge skips, often will produce adequate to good yields. It is often difficult to come up with a single plant population that will work for every field. Adequate populations that will produce adequate yields must be determined on a field by field basis. Below is a summary of a multi-year, multi-variety data set on seeding rates for group four and group five soybean varieties planted in late-April to early-May. This research was conducted at the Delta Branch Experiment Station, Stoneville in 2005 and 2006 on heavy clay soil. The trials were irrigated and planted in 18" rows.



Based on this research, yields for maturity group four and five varieties were essentially the same at plant populations of 80,000 plants or higher. A slight yield reduction was observed at populations of 70,000 plants/acre.

In situations where seed is available and when taking into consideration:

- the calendar date
- cost to replant
- time period lost to replanting and potential yield reduction associated with mid-May planted soybean vs mid-April planted soybean
- additional costs associated with producing a later crop

replanting soybean this year should be **considered** only when plant populations are below 75,000 plants/acre. Again, keep in mind it is difficult to come up with a definitive number with so many factors involved and so many different scenarios. If you have a uniform stand consisting of healthy plants that came up at the same time, that does not have huge skips, and are at a population of at least 75,000 plants/acre it would be more advantageous to keep what you have rather than replanting. One thing to keep in mind, the minimal plant population for drilled beans in row spacings of less than 15” should be closer to 85,000 plants/acre before replanting is considered.

These recommended minimal plant populations are lower than what we would recommend in a year in which more seed for replanting is available and considering where we are on the calendar. We should never plant seeding rates to reach these low populations in hopes that they will produce optimal yields year in and year out.

**In a year like this in which seed availability is so tight, we are going to keep fields with populations below this minimal recommendation of 75,000 to 85,000 plants/acre. We can still make adequate yields with populations below this, but yields are likely to be lower to a degree that is difficult to estimate but may very well be minimal. Including residual herbicides such as Sequence (glyphosate + Dual or a metolachlor product) or Prefix (Reflex + Dual) + glyphosate over the top of small soybean early in the season should be considered to combat increased weed pressure in thin soybean stands.**

The table below provides the number of plants per linear row foot for various row spacings at plant populations ranging from 65,000 to 95,000 plants/acre. This information can be used to determine plant populations by counting the number of plants in a given length of planted row. If you count the number of plants in a 10-foot length of row, then divide that number by 10 the resulting number will be the number of plants per linear row foot. If you count plants from more than one 10-foot length, then divide the number of plants you counted from each 10-foot length by ten and average these numbers according to the number of 10-foot lengths counted. For example: assume you counted the number of plants from five 10-foot row lengths. The numbers you counted were 98, 102, 120, 100, and 99. Divide 98/10, 102/10, 120/10, 100/10, and 99/10. This results in 9.8, 10.2, 12, 10, and 9.9. Average these five numbers: (9.8+10.2+12+10+9.9)/5= 10.38. There are 10.38 plants per foot of row in this given field.

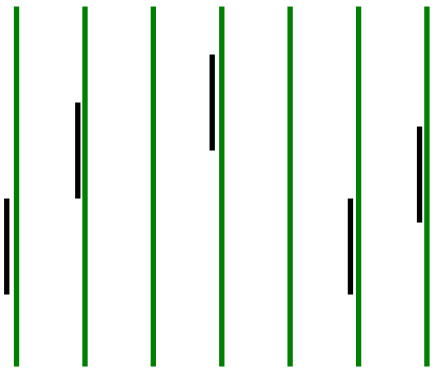
| Plant population | Soybean row spacing (inches) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 7.5 | 8 | 10 | 15 | 18 | 19 | 20 | 25 | 30 | 38 | 40 |
| plants/acre | number of plants per linear row foot | | | | | | | | | | | |
| 65,000 | 0.8 | 0.9 | 1.0 | 1.2 | 1.9 | 2.2 | 2.3 | 2.5 | 3.1 | 3.7 | 4.7 | 4.9 |
| 70,000 | 0.9 | 1.0 | 1.1 | 1.3 | 2.0 | 2.4 | 2.5 | 2.6 | 3.3 | 4.0 | 5.1 | 5.3 |
| 75,000 | 1.0 | 1.1 | 1.14 | 1.4 | 2.2 | 2.6 | 2.7 | 2.8 | 3.6 | 4.3 | 5.4 | 5.7 |
| 80,000 | 1.1 | 1.14 | 1.2 | 1.5 | 2.3 | 2.7 | 2.9 | 3.0 | 3.8 | 4.6 | 5.8 | 6.1 |
| 85,000 | 1.13 | 1.2 | 1.3 | 1.6 | 2.4 | 2.9 | 3.1 | 3.2 | 4.1 | 4.9 | 6.2 | 6.5 |
| 90,000 | 1.2 | 1.3 | 1.4 | 1.7 | 2.6 | 3.1 | 3.3 | 3.4 | 4.3 | 5.2 | 6.5 | 6.8 |
| 95,000 | 1.3 | 1.4 | 1.5 | 1.8 | 2.7 | 3.3 | 3.4 | 3.6 | 4.5 | 5.4 | 6.9 | 7.3 |

**How to calculate plant populations:** There are several ways to calculate plant populations and there is no one best method. The most important objective behind estimating plant populations is that the estimate is a good representation of the entire field. Plant populations can vary tremendously across a field due to soil type, soil roughness, and drainage aspects of the field. Populations in fields with shallow slopes are likely to be higher in the upper portion of the field and lower towards the bottom of the field due to the substantial and numerous rainfall events received this spring. Whole field populations should be estimated by taking into account areas of the field having good populations as well as drowned out depressions or skippy stand areas of the field. If a lot of thin spots exist in the field, patch planting these low population areas should be considered.

**Steps to calculating the plant population in a soybean field.**

1) Determine the row spacing.
2) Count number of plants from a 10 foot length of row either in 5 or 10 places throughout the field. See recommendations below.
    a. For uniform stands, counting the number of soybean plants from five 10-foot lengths is sufficient (see diagram below)
    b. For skippy stands, counting the number of soybean plants from ten 10-foot lengths is sufficient. (see diagram below)
    c. Take counts from field areas that represent the entire field.
    d. If the stand is thin in some areas and adequate in others, take half of the counts from the thin areas and half from adequate areas.

For uniform stands: | = soybean row



Add the total number of plants counted across all five 10-foot lengths. Then divide that number by 5.

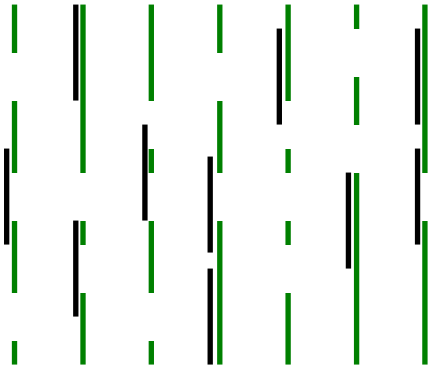
For ex.: Assume 10, 9, 8, 9, and 10 plants were counted from the five 10-foot lengths.

10+9+8+9+10 = 46

46/5= 9.2.

There are 9.2 plants per foot of row in this field.

For skippy stands:



Add the total number of plants counted across all ten 10-foot lengths. Then divide than number by 10.

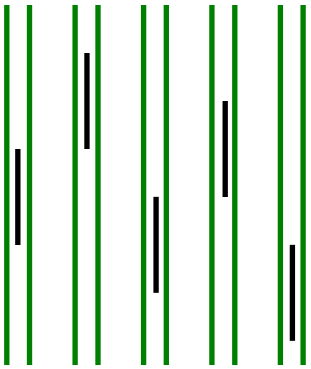
For ex.: Assume 7, 10, 7, 5, 8, 10, 7, 9, 9, and 6 plants were counted from the ten 10-foot lengths.

7+10+7+5+8+10+7+9+9+ and 6 = 72

72/10= 7.2.

There are 7.2 plants per foot of row in this field.

For uniform twin-row patterns:



Add the numbers from the two rows of each twin-row set.

For ex.:
4+5 = 9
5+5 = 10
6+ 4 = 10
4+4 = 8
5+4 = 9

9+10+10+8+9 = 46

46/5 = 9.2 plants per foot of row.

3) Find your given row spacing in the table below and see the square foot area per foot of linear row for that given row pattern.

| Row spacing (inches) | Sq. foot area per linear foot of row |
|---|---|
| 7 | 0.583 |
| 7.5 | 0.625 |
| 8 | 0.666 |
| 9 | 0.75 |
| 10 | 0.833 |
| 15 | 1.25 |
| 18 | 1.5 |
| 19 | 1.583 |
| 20 | 1.667 |
| 25 | 2.083 |
| 30 | 2.5 |
| 38 | 3.167 |
| 40 | 3.333 |
| 38 (twin)* | 3.167 |
| 40 (twin)* | 3.333 |

*regardless of distance between rows in twin-row sets.

4) Calculate the plant population using steps below:

   a. Divide the number of total plants you counted by the number of 10-foot lengths you counted from.

      For ex.: assume you counted a total of 92 plants from ten 10-foot lengths. Therefore you divide 92/10, which results in 9.2 plants per foot of row.

   b. Divide the number of plants per foot of row you calculated (see step a. just above) by the square foot estimate provided in above table for your given row spacing.

      For ex.: assume you estimated 9.2 plants per foot of row and the row spacing is 38 inches.
      Step 1. Divide 9.2/3.167,which equals 2.904.
      Step 2. Multiply 2.904 by 43,560*. This equals 126,539 plants/acre.

      *There is 43,560 sq. feet in an acre.

I hope this information provides useful information on how to determine soybean plant populations and replanting options.

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