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Determining Plant Stands

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As the crop begins to emerge many growers will be walking their fields to get an idea of the potential stand in their crops. To make these walks worthwhile, each year we receive the question on how best to determine the stand or decide if the crop we are dealing with should be replanted. There is no reason to replant unless the stand is poor enough that additional yield can be realized from replanting to offset the additional cost involved.

There is no real simple formula to aid in replant decisions. Each situation has to be dealt with individually. The first step is to determine the stand that is remaining in the particular field. Check out the cause for the reduction in plants. What is the desired target population? What was the original planting date and the date any replanting would take place? Look at the uniformity of plant size, health and the plant distribution following the damage. Consider the herbicide and fertility program that may have already been applied.

In most cases where there are reduced stands, there may be no need to replant corn or soybeans given the time and cost involved versus the expected benefit.

In order to assess whether or not to replant, a step-by-step procedure for estimating economic benefits from replanting needs to be followed:

1. Establish the cause of the sparse stand.
2. Determine the density and condition of the stand.
3. Estimate the yield potential of the existing stand if left alone.
4. Estimate the expected gross revenue from the sparse stand.
5. Calculate the cost to replant.
6. Estimate the yield potential and gross revenue from a replanted stand.
7. Determine whether or not the decision to replant will pay dividends.

An accurate assessment of the remaining live plant population is necessary to determine potential yield of the sparse stand. As you count plants, you must decide if the plant is healthy or at least capable of recovery. Do not count weak plants or those plants which are questionable for recovery. (To estimate stands after hail or animal damage, it is important to note which parts of the plant are damaged and how they affect the potential for regrowth. Leaf removal, for example, is far less serious than bruising of the lower stem.)

After considering the condition of the remaining plants and the field, assess the presence of large gaps in stands, and the amount of weed pressure.

Corn

Corn replanted late in May will generally have a higher harvest moisture that can lead to additional grain drying costs. When walking the field in question, take a close look at the growing point of the plant by splitting it lengthwise. If tissue is firm and not dark in colour it likely will survive.

It has been estimated that yields will only be reduced 2% if the stand has several gaps that are 12 to 36 inches wide. If these gaps are larger, say 4 to 6 feet expect a 5 to 6% reduction in yield compared against a uniform stand. Therefore the more gaps between plants within the row, the greater the potential yield reduction.

Determine Accurate Seeding Rates per Acre and Checking Plant Populations The following table will help you check your seeding rates or determine your stand count. The table shows the actual length of row needed for one/one thousandth (1/1000) of an acre. Make several counts of the kernels or plants over the given distance depending on your row width. Average the results to obtain a representative sample, then multiply the average by 1000 and you'll have a good estimate of stand count or planting rate per acre. To determine the number of feet required to measure for 1/1000 of an acre: (12 X 43.56) / Row Width (inches)

Distance in Feet to Determine Acreage

38-inch row width = 13 feet, 9 inches
36-inch row width = 14 feet, 6 inches
30-inch row width = 17 feet, 5 inches

20-inch row width = 26 feet, 2 inches
15-inch row width = 34 feet, 10 inches
10-inch row width = 52 feet, 3 inches
7-inch row width = 74 feet, 9 inches

EXAMPLE: If you average 26 plants over several 17'5" sections of 30" rows, you have an approximate stand of 26,000 plants per acre. (26 x 1,000 = 26,000).

Table 3-17
Expected Grain Yield Due to Various Planting Dates and Populations

	Plant Populations								
Planting Date	25,000/ha 10,000/ac	31,000/ha 12,500/ac	37,000/ha 15,000/ac	43,000/ha 17,500/ac	49,000/ha 20,000/ac	56,000/ha 22,500/ac	62,000/ha 25,000/ac	68,000/ha 27,500/ac	74,000/ha 30,000/ac
April 20	62	70	78	82	86	90	92	94	94
April 25	65	73	79	84	89	92	95	97	97
April 30	67	74	81	86	91	94	97	98	99
May 4	68	75	82	87	92	95	98	99	100
May 9	68	75	82	87	92	95	98	99	100
May 14	67	75	81	86	91	94	97	99	98
May 19	65	73	79	85	89	93	95	97	97
May 24	63	70	76	82	86	90	92	94	95
May 29	59	68	73	78	83	86	89	90	91
June 3	54	62	68	74	78	82	84	86	86
June 8	49	56	63	68	73	76	79	80	81

Adapted from University of Illinois, E.D. Nafziger 1994. Journal of Production Agriculture. Original data from Illinois Was shifted 10 days later to reflect optimal planting dates in Ontario

Example: A field is planted on May 4 with an expected plant population of 62,000 plants/ha (25,000 plants/ac). By the end of the month, the stand is reduced to 31,000 plants/ha (12,500 plants /ac) but uniform in size and plant distribution. The table would suggest that the expected yield for a final plant stand of 31,000 planted on May 4 would be 75% (a 50% reduction from the targeted population). By planting on May 29 at the same population (62,000), a yield of 89% can be expected. In this case, the cost of replanting may be recovered and therefore justified. If your planting date or plant stands don't match the listed values, you must interpolate.
Source: Publication 811, Agronomy Guide For Field Crops; Pride Seeds Agronomy

Soybeans

The soybean plant's trigger mechanism for flowering is closely related to the photoperiod in a day (the length of daylight and darkness in a day). Typically soybeans shift from vegetation to flowering after the night length starts to increase in late June. Higher than normal temperatures in June can trigger flowering sooner, but soybeans are not as dependent on temperatures or accumulated temperatures (Growing Degree Days) as corn is. Consequently maturity selection for later plantings in soybeans is different than corn. Soybeans have an amazing ability to compensate for thin stands. The plants can fill interplant spaces up to 12 inches within and between rows without yield loss. Weeds become the biggest problem in this situation. Reduced stands must remain healthy and free from weeds in order to receive the full potential of the remaining crop.

Determine Soybean Plant Population with the Hoop Method

The hoop method of determining soybean plant population is an accurate method to use for solid seeded soybean fields. By using the table below, the number of plants per acre can be determined by measuring the diameter of the hoop, counting the number of plants that are found within the hoop and multiplying that by the predetermined factor listed. Assess several locations in your field to determine the average number of plants found in the hoop.

Inside Diameter of Hoop in Centimetres (inches)	Square Area in Metre^{2} (ft2)	Factor by Which to Multiply the Number of Plants Within the Hoop to Equal:	
		Plants per Hectare	Plants per Acre
91 (36)	0.65 (7.0)	15,385	6,165
84 (33)	0.55 (6.0)	18,182	7,334
76 (30)	0.45 (4.9)	22,222	8,874
69 (27)	0.37 (4.0)	27,027	10,956
61 (24)	0.29 (3.2)	34,483	13,865

Example: Using a hoop with a diameter of 36 inches, if you are finding an average of 30 plants in the hoop over several locations in the field, the population is approximately 185,000 plants per acre (6,165 x 30).

Table 4-11
Expected Yield of Soybeans in Optimum and Reduced Stands*

	Expected Final	Plants Per Hectare			
% of Full Stand	Yield as % of Optimum	18-cm rows (7-in.)	36-cm rows (14-in.)	53-cm rows (21-in.)	76-cm rows (30-in.)
100	100	553,300	402,600	392,700	405,100
80	100	442,100	323,600	313,700	323,600
60	100	331,000	242,100	237,100	244,500
40	87	222,300	160,600	158,100	163,000
20	62	111,200	81,500	79,000	81,500

1 hectare = 2.47 acre
*Conducted at Huron and Kemptville, Ontario, Research Stations, University of Guelph.
Source: Publication 811, Agronomy Guide For Field Crops Pride Seeds Agronomy

The decision to replant will be based on what you expect the grain to be worth at harvest. Current market price will probably not be the market price at harvest. Try to determine the futures market (less local basis) to estimate the price at harvest time. The predicted market price can greatly influence replant decisions - make an honest prediction. Determine income by multiplying predicted yield by the market price.

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