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Corn Replant Decisions

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Making a replant decision for a less than desirable stand of corn can be difficult and should be based on a determination of crop income, not on the emotion of the moment. Every year, there are some fields that for whatever reason need to be considered for replanting. The reasons fields require a replant decision are varied: weather (too dry, too wet, too cool, wind-sand blasting), soil conditions, saturated soils, crusting, insects, diseases, herbicide/fertilizer injury, improper seeding practices, animal feeding – all can conspire to reduce stands below desired levels. Stands can be reduced prior to emergence or after emergence. **Facts need to be the basis of a replant decision, not perceptions** – there needs to be determination that the yield (and income) after replanting will equal or exceed the income received if the existing stand was allowed to remain.

Specific information needs to be gathered during crop damage assessment to guide one into making a proper replant decision:

1. The cause of the reduced stand must be diagnosed
2. The intended plant stand, or the original target population
3. The existing plant stand, and the uniformity of the surviving stand
4. Yield potential of existing stand if not replanted
5. The original planting date, and the expected replant date
6. Yield potential of the replanted crop
7. Expected replanting costs and market price of crop

Cause of the Reduced Stand must be Diagnosed

Replanting without knowing the cause, or reason, for the initial reduced stand, may lead to a re-occurrence of the same result, unless the cause is identified and corrected.

Intended Plant Stand, or the Original Target Population

The intended plant stand is usually not equal to the seeding rate. In most cases the seeding rate is higher than the targeted stand because plant survival is usually less than 100%. A good rule of thumb is to multiply your seeding rate by .9 (90%); this accounts for germination (95%) and for survival rate (95%).

Existing Plant Stand and Uniformity of the Surviving Stand

This can be determined by counting live plants in 1/1000th acre samples in various locations across the field. Do not count weak plants, or plants that are damaged beyond a reasonable potential for recovery. Several counts need to be taken in various areas of the field and then averaged together. Rule of thumb: 4 to 6 counts per 20 acres would be sufficient. The adjacent chart can be used to determine plant population based on varying row widths. Count the plants in the suggested length for your row width, and multiply by 1,000 to equal plant stand.

Row Width	Length of row to equal 1/1000th of an acre
40”	13 feet, 1 inch
38”	13 feet, 9 inches
36”	14 feet, 6 inches
30”	17 feet, 5 inches
20”	26 feet, 2 inches
15”	34 feet, 10 inches

While making these counts, make notes about the uniformity of the stand as well. Yield reductions not only occur from overall stand loss, but also from uneven plant distribution within the row. Gaps within row of 2-3 feet have been shown to reduce yields by 2%; while gaps between 3-4 feet can reduce yields by 5% - when compared to uniform stands. The more numerous, and longer, the gaps within row, the greater the possible yield reduction.

Uneven emergence of the existing stand can also add to yield loss. In addition to counting stands and making notes on stand uniformity within the row, one should also note emergence uniformity. Research has shown that if half or more of the plants in a field are two leaf stages or more behind in development compared to the earlier emerged plants a 10% yield loss can occur.

Yield Potential of Existing Stand If Not Replanted and Yield Potential of the Replanted Crop

When one knows the planting date, the replanting date, the existing stand, and the expected new stand after replanting, the chart below can be used to determine yield potential of the existing stand, and the yield potential of the new stand. Grain yields for varying dates and populations are expressed as a percentage of "normal" yields obtained at optimum planting date and population.

Central Corn Belt grain yields for corn planted at various dates and populations rates, expressed as a percentage of optimum planting date and population (assuming uniform distribution with the row)

	Population (stand)													
Planting Date	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000
	----- ----- Percentage of Optimum Yield ----- -----													
4/10	62	68	73	78	82	85	88	91	92	93	94	94	93	91
4/15	65	71	76	81	85	88	91	94	95	96	97	96	96	94
4/20	67	73	78	83	87	90	93	96	97	98	99	98	98	96
4/25	68	74	79	84	88	92	94	97	98	99	100	100	99	97
4/30	68	74	79	84	88	92	95	97	99	100	100	100	99	97
5/5	67	73	79	83	87	91	94	96	98	99	99	99	98	97
5/10	65	71	77	82	86	89	92	94	96	97	97	97	96	95
5/15	63	69	74	79	83	87	89	92	93	94	95	95	94	92
5/20	59	65	74	75	80	83	86	88	90	91	91	91	90	89
5/25	55	61	66	71	75	79	81	84	85	86	87	87	86	84
5/30	49	55	61	65	70	73	76	78	80	81	81	81	80	79
6/4	43	49	54	59	63	67	70	72	74	75	75	75	74	73
6/ 9	36	42	47	52	56	60	62	65	66	67	68	68	67	65

NOTE: When using the above chart, remember that uniformity of stand plays a part in yield. Add a 5% yield loss penalty if your field notes indicate several gaps of 4-6 feet, and a 2% penalty for gaps of 2-3 feet. Determine if the uneven emergence penalty of 10% needs to be added also.

Expected Replanting Costs and Market Price of Crop

Replanting costs need to be considered when making a sound economical replant decision. Depending on the cause of stand loss, and the seed company, expenses for replant seed could range from free to full cost. Don't neglect the added cost of any traits. Herbicide costs must be considered, as should insecticide costs. The costs of fuel and equipment depreciation play a part as well. And don't forget the labor costs. An often overlooked replant cost is that of possible higher moistures at harvest, requiring additional drying costs.

Closing Comments

Before putting it all together in the worksheet shown on the last page, a few comments are perhaps in order. Replanting itself does not guarantee adequate harvest population, nor does it guarantee higher yields. Early in the growing season replant decisions are made on plant stand and plant distribution in the field. When deciding to replant later in the season, from frost or hail damage, consideration must be paid to the added yield loss effects of damaged leaf tissue and defoliation. At these later stages one must estimate the leaf area lost and the leaf area still attached, but no longer green. Fortunately, knee-high corn and shorter is very tolerant to defoliation, and yield loss is minimal until corn has passed this stage.

Some may be tempted to "solve" a reduced stand situation by "thickening" the surviving stand by directly interseeding additional seeds. This can result in more complications than resolutions. The larger (earlier emerged) plants will out-compete the later seedlings for water, space, and nutrients. Bottom line here – if the original stand is adequate, leave it alone and accept it. If replant is warranted, destroy the original stand and start over.

Regarding a hybrid change or switching to soybeans: To accommodate timely fall harvest, some replant situations may require an earlier maturing hybrid. Planting date and hybrid studies have shown that if planting is delayed past normally accepted planting dates, switching to an earlier maturing hybrid may be desirable. Switching to soybeans is not generally an economical choice unless planting is abnormally delayed later into the spring/summer. **These situations call for different "cut-off" dates depending on your growing region. Your LG Seed Technical Team Agronomist can assist in specific guidelines for your region.**

Putting It All Together

CORN REPLANT WORKSHEET

A.	Estimated population of existing stand (plants/acre)	_____ A.
B.	Expected "normal yield (bushels per acre)	_____ B.
C.	Effect of existing stand on yield potential (percentage) *(Don't forget to include yield loss due to uniformity of stand)*	_____ C.
D.	Estimated yield from existing stand (bushels per acre) *(Multiply line B by line C, divide by 100)*	_____ D.
E.	Estimated value of the crop ($ per bushel)	_____ E.
F.	Estimated income per acre of the existing stand ($ per acre) *(Multiply line E by line D)*	_____ F.
G.	Possible extra herbicide costs needed for existing stand ($ per acre)	_____ G.
H.	Expected NET income from existing stand ($ per acre) *(Line F – line G)*	_____ H.
I.	Cost of replanting (estimated) ($ per acre) *1) Seed* *2) Fuel, machinery, labor, etc.* *3) Herbicides/Insecticides* *4) Other possible costs*	_____ I.
J.	Effect of replanting date on yield (percentage)	_____ J.
K.	Estimated yield from replanted stand (bushels per acre) *(Multiply line B by line J, divide by 100)*	_____ K.
L.	Estimated income per acre of the replanted stand ($ per acre) *(Multiply line E by line K)*	_____ L.
M.	Expected NET income from replanted stand ($ per acre) *(Line L – line I)*	_____ M.
N.	**Profit or Loss from replanting ($ per acre)** ***(Subtract line H from line M)***	_____ **N.**

Profit/loss should then determine the economic feasibility of a replant decision.

Sources and Additional information

https://www.agry.purdue.edu/ext/corn/news/timeless/ReplantDecisions.html
https://extension2.missouri.edu/g4091
https://www.canr.msu.edu/news/making_replant_decisions_for_corn_and_soybeans
http://corn.agronomy.wisc.edu/AA/A035.aspx
https://www.mississippi-crops.com/2019/04/22/new-methods-to-assess-corn-stands-and-make-replant-decisions/