University of Wisconsin · Agronomy Department
1575 Linden Drive · Madison, WI · 53706 · (608) 262-1390

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Guidelines for Managing Corn Seed Costs

Joe Lauer and Trent Stanger
Corn Agronomist and Graduate Student

Summary

- Current UW recommendations for harvest plant densities range between 26,000 and 30,000 plants/A.
- Corn seed costs are rising for premium hybrids.
- Currently, corn seed:price ratios range from 0.33 to 1.50.
- As seed costs increase and/or corn prices decrease, the economic optimum harvest plant density decreases.

Recently corn seed costs have dramatically increased due to technology fees. It is not unheard of for seed of high-performing premium hybrids to cost $160-$180 per bag, whereas 10 years ago, premium seed would cost about $80-$100 per bag. Understanding what the true value of transgenic hybrids mean to farm profitability is challenging.

The following guidelines help growers adjust their plant densities and maintain or enhance farm profitability depending upon their farm situation. Not only has the economics of seed cost been changing, but the yield response of corn to plant density has been increasing over time. But ultimately, **optimum plant density is affected by both seed cost and corn price.**

Placing a value on seed is relatively easy since the price of seed is known at the time of purchase and the amount used is known after a field is planted. The realistic value of grain will vary depending upon the producer's ability in marketing the grain. Corn grain that will be used on farm as livestock feed should be valued at the price it would cost to purchase if feedstocks run short.

Table 1 describes seed:corn price ratios for seed costs ranging from $40 to $220 per bag and corn prices ranging from $1.00 to $3.50/ bu. As seed costs increase and/or corn prices decrease the seed:corn price ratio increases. Conversely, as seed cost decreases and/or corn price increases the seed:corn price ratio decreases. Currently, most seed:corn price ratios range from 0.33 to 1.50. For example, the seed: corn price ratio at $2.00/bu corn ranges from 0.50 to 1.13 for $80 to $160 per bag of seed.

For a seed:corn price ratio of 1.0, the economic optimum plant density (EOPD) is 33,000 plants/A and grower return is at a maximum of $159/A for each $1.00 of corn price (Figure 1). If $1.00 is subtracted from the maximum grower return ($159 - $1 = $158), the range in plant density is 29,500 to 36,600 plants/A (error bars). As corn price increases, grower return increases proportionally, but the EOPD of each ratio does not change. For example, if the seed:corn price ratio is 1.0, the EOPD is 33,000 plants/A resulting in a grower return of $159/A at a $1.00 corn price. If the corn price = $2.50 then grower return = $159 x $2.50 = $398/A.

As seed costs increase and/or corn prices decrease, the optimum harvest plant density decreases, (i.e. EOPD for ratio of 1.50 = 29,800 plants/A). As seed cost decreases and/or corn price increases (ratio = 0.50) the EOPD increases to 36,200 plants per acre. If seed cost is not considered (ratio = 0.0), then the EOPD estimates yield and is 39,400 plants/A.

Table 1. Price ratio of seed:corn (i.e. $/1000 seeds ÷ $/bu corn).

Price of seed		Price of corn ($/bu)					
$/80 K bag	$/1 K seeds	$1.00	$1.50	$2.00	$2.50	$3.00	$3.50
$40	$0.50	0.50	0.33	0.25	0.20	0.17	0.14
$60	$0.75	0.75	0.50	0.38	0.30	0.25	0.21
$80	$1.00	1.00	0.67	0.50	0.40	0.33	0.29
$100	$1.25	1.25	0.83	0.63	0.50	0.42	0.36
$120	$1.50	1.50	1.00	0.75	0.60	0.50	0.43
$140	$1.75	1.75	1.17	0.88	0.70	0.58	0.50
$160	$2.00	2.00	1.33	1.00	0.80	0.67	0.57
$180	$2.25	2.25	1.50	1.13	0.90	0.75	0.64
$200	$2.50	2.50	1.67	1.25	1.00	0.83	0.71
$220	$2.75	2.75	1.83	1.38	1.10	0.92	0.79

An Example Bt-ECB Corn Seed

Lodging is a major constraint to maximizing grain yields in modern corn production. Lodging is one of the hazards of increasing plant densities to get maximum yields.

Current UW recommendations for harvest plant densities range between 26,000 and 30,000 plants/A.

Bt corn hybrids resist European corn borer (ECB) damage and lodge less. From 2002 to 2004, Bt and non-Bt corn hybrids were planted at plant densities ranging from 25,000 to 50,000 plants/A in 5000 to 6000 plants/A increments at 10 locations in Wisconsin.

The plant density maximizing yield for Bt hybrids was 42,300 plants/A, while for non-Bt hybrids was 40,000 plants/A. If plant densities were increased from 30,000 plants/A to 41,400 plants/A, yields increased 4.2%.

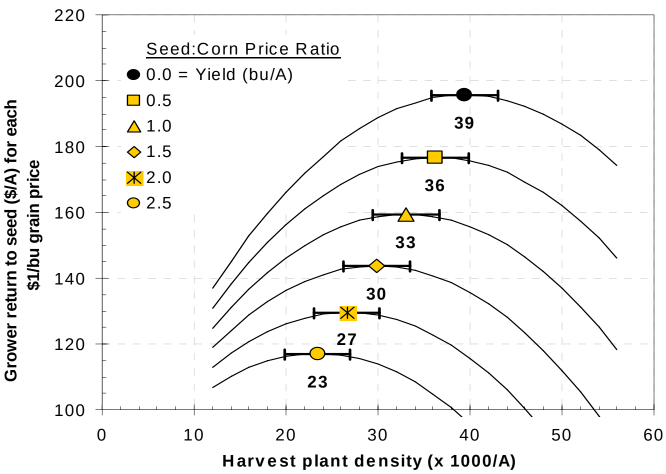

Figure 1. Profitable harvest plant densities for seed:corn price ratios of 0.0, 0.5, 1.0, 1.5, 2.0, and 2.5. Symbols represent the economic optimum return to plant density (EOPD) and error bars are the low and high ends of the range of profitability (within $1/A of EOPD) at each seed:corn price ratio.

At the same plant density, Bt corn hybrids yield more than non-Bt corn but seed costs of Bt corn are often greater than non-Bt seed. The seed:corn price ratio is higher for Bt corn.

For Bt and non-Bt corn where the seed:corn price ratios are the same, as seed costs increase and/or corn prices decrease the economic optimum plant density (EOPD) decreases (Figure 2). For example, the EOPD for a ratio of 1.50 = 29,600 plants/A for Bt corn and 27,300 plants/A for non-Bt corn. As seed cost decreases and/or corn price increases (ratio = 0.50) the EOPD increases to 38,100 plants/A for Bt corn and 35,800 plants/A for non-Bt corn.

Corn management systems must be justified on the basis of economic returns, rather than on crop yield alone. Overall, Bt corn hybrids in this study yielded 6.6% greater and had 22% less lodging than non-Bt hybrids. However, the yield and lodging benefits for Bt hybrids were offset by the higher seed and harvest costs associated with Bt corn, adding no economic benefit. This study determined the EOPD to be 33,900 plants/A (regardless of hybrid trait) or 3900 plants/A more than the current recommendation in Wisconsin. Even though no economic benefit was measured for Bt corn due to higher seed costs, other benefits such as safety (pesticide handling), insurance (potential for ECB outbreaks), and "peace of mind" might be important for growers to consider when using Bt corn.

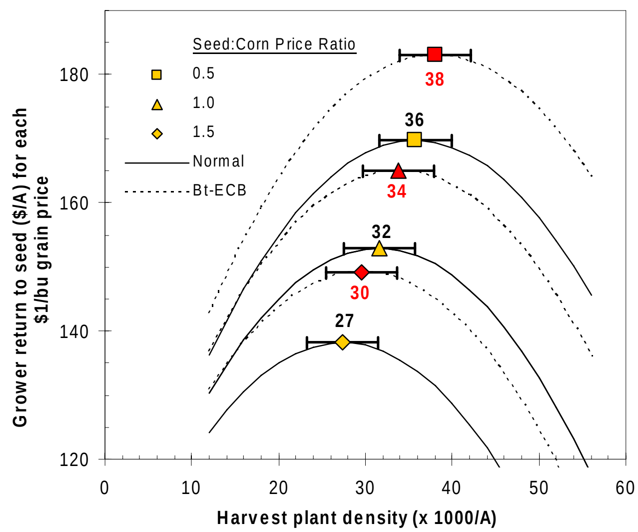

Figure 2. Profitable harvest plant densities of Bt and non-Bt corn hybrids for seed:corn price ratios of 0.5, 1.0, and 1.5. Symbols represent the economic optimum return to plant density (EOPD) and error bars are the low and high ends of the range of profitability (within $1/A of EOPD) at each seed:corn price ratio.

Guidelines for choosing an appropriate plant density for corn

1. Currently, seed:corn price ratios range from 0.33 to 1.50.
2. The EOPD for seed:corn price ratios between 0.5 and 1.5 is 29,800 to 36,200 plants/A. The plant density of 32,700 plants/A is within $1.00 of the EOPD for ratios between 0.5 and 1.5.
3. Grain yield continues to increase through plant densities of 39,400 plants/A.
4. In general, silage yield continues to increase as plant density increases. However, a trade-off exists as measured by Milk2000 where quality decreases with increasing population. Thus, the EOPD is the same for corn grown for silage or grain. Corn silage is often more valuable than grain and so the EOPD follows more closely seed:corn price ratios less than 1.0.