

# BETWEEN THE ROWS

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CHOOSING THE RIGHT PLANT POPULATION

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## Background

Two of the first, and most important, decisions a corn grower must make is choosing the best hybrid for each specific farm and field, and determining the population to plant each hybrid to maximize productivity.

Over the past several decades, increased plant population has been one of the key factors responsible for increased corn production. Data indicates that corn populations have increased by about 400 plants per acre (ppa) per year. Advancements through corn breeding have developed corn hybrids that maintain consistent ear size, even at higher plant densities. Yield increases are due to more ears per acre, not more kernels per ear.

Recent research from university and seed industry sources show that populations in the range of 34,000 to 38,000 ppa produce the highest yields in productive fields.

Optimum plant population depends on many factors such as hybrid, soil moisture, fertility, and general productivity level of the soil. It's a balance between maximizing the use of available light, nutrients and soil moisture without causing excessive competition that might impact yield or standability.

The optimum plant population varies by field, so corn growers should work with their Wyffels Seed Representative to find the right hybrid and plant population for every field. This Between the Rows will provide you information to make a more informed decision.

## Optimum Plant Population

New corn hybrids from Wyffels are developed and evaluated in high population environments of 38,000-40,000 ppa in a 30 inch row spacing. These conditions help Wyffels corn breeders understand a hybrid's overall stress tolerance to high populations without sacrificing yield and standability.

Wyffels also evaluates how hybrids respond to a range of populations to determine the optimum plant population for each hybrid. In 2015, hybrids were tested at populations ranging from 20,000 to 50,000 ppa in Wyffels replicated research sites. The results of the trial are shown in Figure 1. This test showed a yield response to increased plant population up to the maximum yield at a final stand of 40,200 ppa.

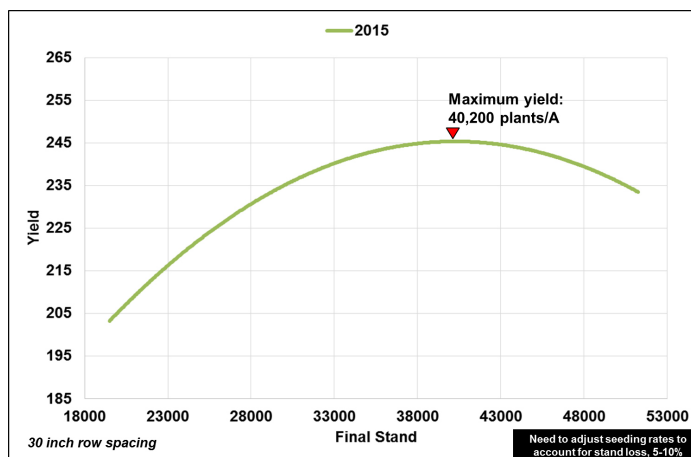


Figure 1. Hybrid response to plant population, data averaged over 13 hybrids in 2015 Wyffels Hybrids Research.

As with any management decision, corn growers must seek the optimum economic return. Optimum economic return for plant population depends on seed cost and grain price. Table 1 below shows the optimum economic plant population given different price scenarios.

Table 1. Optimum economic plant population under different scenarios

Seed Cost \$/unit	Grain price \$/Bu				
	\$ 2.50	\$ 3.00	\$ 3.50	\$ 4.00	\$ 5.00
\$ 150	36,409	37,047	37,503	37,845	38,323
\$ 200	35,132	35,983	36,591	37,047	37,685
\$ 250	33,856	34,920	35,679	36,249	37,047
\$ 300	32,580	33,856	34,768	35,451	36,409
\$ 350	31,303	32,792	33,856	34,654	35,771

One important point to understand is that the economic penalty for planting below the optimum population is greater than the penalty for planting slightly above the optimum population. As an example, reducing plant population from 36,000 ppa to 32,000 ppa would lead to a yield reduction of 4.4 bu/A. So, using \$3.75/bu grain price and seed cost of \$300/bag, even after the reduction in seed costs is accounted for, lowering the population 4,000 ppa would cost \$1.50/A. The slope of the line, or yield penalty, exponentially increases as the population is reduced. So, while determining the optimum economic population for every field can be difficult it's better to be slightly over that optimum population than below.

This study demonstrates how hybrids respond to increased populations in a highly productive environment. However, that response does vary by environment, so in lower productivity environments the optimum plant population would be slightly less. To help corn growers determine optimum plant population for Wyffels products, Wyffels corn breeders provide recommended seeding rates for each hybrid in low, medium and high productivity levels found in Table 2.

It's important to note that these recommendations are for seeding rate, not final stand. This is adjusted to account for an average stand loss of 5%, which is common due to a variety of environmental factors. This is often overlooked, so the adjustment is made to provide an easy reference during planting to ensure the desired final stand is achieved.

Low productivity environments include areas, or fields, that historically yield much less than other areas regardless of management. These areas regularly yield in the lower 25%. High productivity environments are areas that consistently yield in the upper 25% of yield maps.

**Management recommendations**

Hybrids used today are developed, tested and perform best at high plant populations.

Growers can take advantage of the productivity of these hybrids by planting recommended populations for each specific hybrid and field condition. In the current agriculture economic climate growers will be tempted to cut costs, but cutting plant populations too much can limit yield and profit potential.

It's more important than ever to maximize production. Don't let plant population be the limiting factor of your yield potential. Control this aspect of corn production management and you'll be rewarded with high yields.

Table 2. Recommended seeding rate at various productivity levels

HYBRID	PRODUCTIVITY LEVEL		
	High	Moderate	Low
W1528RIB	36-40	35-38	34-37
W1556RIB NEW	37-40	35-38	33-36
W1698RIB	36-38	35-37	34-36
W1786RIB	36-39	35-38	34-36
W1806RIB	37-40	35-38	34-36
W1818RIB	36-39	35-38	34-36
W1846RIB NEW	38-40	36-38	33-36
W1850	35-37	34-36	33-35
W1966RIB NEW	37-40	35-37	34-36
W2086RIB NEW	38-40	36-38	35-37
W2196RIB NEW	37-40	35-37	34-36
W2276RIB	36-40	35-38	34-36
W2308RIB	36-40	34-38	34-36
W2488RIB	36-38	34-37	33-37
W2616RIB NEW	37-40	35-37	34-36
W3076RIB NEW	37-40	35-37	34-36
W3228RIB NEW	38-40	36-38	35-37
W3358RIB	36-40	35-38	34-36
W3998RIB	37-40	35-38	34-36
W4796RIB	38-40	36-38	35-37
W4968RIB	36-39	34-38	33-36
W5138RIB	35-38	34-36	32-35
W5448RIB	37-40	35-38	33-35
W5786RIB	36-39	33-37	32-35
W6198RIB NEW	37-40	35-38	35-37
W6487RIB	36-39	33-37	32-35
W6626RIB	35-38	33-36	32-34
W6818RIB	35-38	33-36	32-34
W6917RIB	37-40	35-38	33-35
W6946DGRIB NEW	38-40	36-38	35-37
W6997wxRIB	33-37	30-35	28-33
W7108RIB	37-40	35-38	35-37
W7158RIB	35-38	33-36	32-34
W7246RIB	37-40	35-38	33-35
W7448RIB	35-38	33-36	32-34
W7456RIB	37-40	35-38	33-35
W7506DGRIB	37-40	35-38	33-35
W7696RIB	37-40	35-38	33-35
W7736RIB	37-40	35-38	32-35
W7806RIB	35-37	33-35	30-33
W7888RIB	37-40	33-37	32-35
W8266RIB NEW	37-40	33-37	32-35
W8376RIB	35-38	33-36	32-34
W8550	37-40	35-38	32-35
W8918RIB NEW	37-40	35-38	33-35

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