

How Thick Do I Plant My Corn Silage?

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Due to low corn price prognostications, corn farmers are looking to cut costs during the 2015 growing season. Corn seed in 2015 costs 5 to 6 times more than corn seed in the 1980s. Plant breeders continue to develop corn hybrids that are tolerant of higher populations. Bareness and lodging are less of a problem with modern hybrids. So the plant density that produces maximum yield has steadily increased over time somewhere between 300 and 500 plants per acre per year. So how thick should corn be planted next year?

Data from studies conducted between 2005 and 2014 were used to calculate the maximum yield plant density (MYPD) and the economic optimum plant density (EOPD) for grain. These studies include “paired” plots where silage is harvested from half of the plot and grain is harvested later from the other half of the plot. The EOPD is calculated using a partial budget analysis where handling, hauling, storage, trucking, and drying costs are subtracted from the USDA corn price between 2005 and 2014. Drying costs are calculated at \$0.03 per point per bushel. Seed costs are calculated at \$250 per 80,000 kernels. The MYPD and EOPD were compared to the plant densities that maximized forage yield, forage Milk per Ton and forage Milk per Acre.

At Arlington the grain MYPD is 38,000 plants per acre. The grain EOPD is about 6000 plants per acre lower than the MYPD. In these studies forage yield was 50,000 plants per acre. However, a trade-off between forage yield and forage quality exists. The best quality forage, as measured by Milk per Ton, is produced at the lowest plant density, in this case 20,000 plants per acre. Milk per Ton decreases in a linear fashion through the range of plant densities studied. Thus, the economic optimum plant density for forage as measured by Milk per Acre is maximized at 43,000 plants per acre.

Most farmers have a sense of the grain MYPD for each field. The grain MYPD likely varies from field to field and hybrid to hybrid. Whatever the grain MYPD is for a field, farmers should decrease plant density about 4000 to 6000 plants per acre to achieve the EOPD depending upon seed costs – as seed cost increases plant density should be decreased more.

For forage yield the plant density that produces maximum yield is quite high, but due to the trade-off between yield and quality the plant density that should be considered by farmers is the plant density that maximized forage Milk per Acre. So if the farmer knows the field will be harvested for silage and they have established a grain MYPD, then about 4000 to 6000 plants per acre should be added to the grain MYPD for silage production.

Figure 1. Relationship between corn plant density and grain maximum yield plant density (MYPD), grain economic optimum plant density (EOPD), forage yield, forage Milk/Ton, and forage Milk/Acre. Data are derived from studies conducted at Arlington from 2005 to 2014.

