How Thick Do I Plant My Corn Silage?

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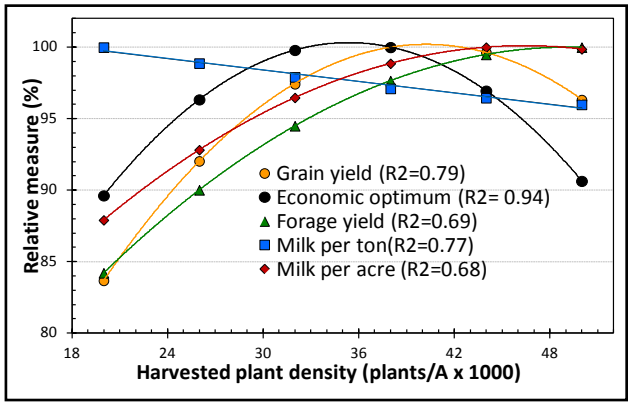
Due to low corn price prognostications, corn farmers are looking to cut costs during the 2015 growing season. Corn seed in 2015 costs 5-6 times more than corn seed in the 1980's. Breeders continue to develop corn hybrids that are tolerant of higher populations. Bareness and lodging are less of a problem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

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 derived from Arlington studies, 2005-2014.



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. 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 3¢/point/bushel. Seed costs are calculated at $250/80,000 kernels. The MYPD and EOPD were compared to plant densities that maximized forage yield, forage Milk/ton, and forage Milk/acre.

At Arlington, the grain MYPD is 38,000 plants/acre. The grain EOPD is ~6,000 plants/acre lower than the MYPD. In the studies, forage yield was 50,000 plants/acre. However, a trade-off between yield and quality exists. The best quality forage, as measured by Milk/ton, is produced at the lowest plant density, in this case 20,000 plants/acre. Milk/ton decreases linearly through the range of plant densities studied. Thus, the economic optimum plant density for forage as measured by Milk/acre is maximized at 43,000 plants/acre.

Most farmers have a sense of the grain MYPD for each field. The grain MYPD likely varies by field and hybrid. Whatever the grain MYPD is for a field, farmers should decrease plant density ~4,000-6,000 plants/acre to achieve the EOPD depending upon seed costs – as seed cost increases, plant density should be decreased more.

For maximum forage yield, the plant density is quite high. Due to the trade-off between yield and quality, the plant density that should be considered by farmers is the density that maximizes forage Milk/acre. So if you know the field will be harvested for silage and have established a grain MYPD, then ~4,000-6,000 plants/acre should be added to the grain MYPD for silage production.