

Corn Agronomy – Looking ahead to 2016: Plant density decisions

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April 15, 2016

I have been receiving many questions this year regarding the “correct” plant density for corn. Growers are concerned about 2016 production economics and one input they are looking at is seeding costs related to plant density in the field. The optimum plant density is influenced by both seed cost and grain price. As seed costs increase and/or grain price decreases the “correct” plant density shifts lower.

Every year since 1982, plant densities have been increasing by about 300 plants/A. Seed costs during the 1980s were about \$20/A and plant densities were a little over 20,000 plants/A. Today seed costs are over \$100/A with USDA-NASS plant densities around 30,000 plants/A. Today a typical 80,000 (80K) count bag of seed costs \$300/bag, so each 1000 plant/A adjustment means \$3.75/A.

The best way to approach the decision to determine the “correct” plant density for a field is to **find the plant density where the maximum yield (MYPD) occurs**. Figure 1 shows 10-yr of data from Arlington experiments that tested corn grain and silage response to harvested plant density. In this example, the grain MYPD occurs at about 39K. **The economic optimum (EOPD) is about 4K to 5K less than the MYPD**. However, you can be within 95% of MY at about 29K indicating how “broad shouldered” the plant density response is (a 10K swing = \$37.50/A at \$300/80K bag). When the cost of production and ultimate economics are not favorable like this year, you may want to think hard about going after MY, but make sure you are above 29K.

On the silage side it is more difficult to find the EOPD. I have always approached the silage EOPD from the Milk per Acre measure, but that does not take into account seed costs. So in the attached example, Milk per Acre is maximized at 45K. I would think that you need to subtract 4K to 5K to get at the silage EOPD. It will fluctuate widely with milk price and given the outlook for this year you may want to lower the plant density 8K to 10K. Again you are still within 95% of maximum Milk per Acre above 29K.

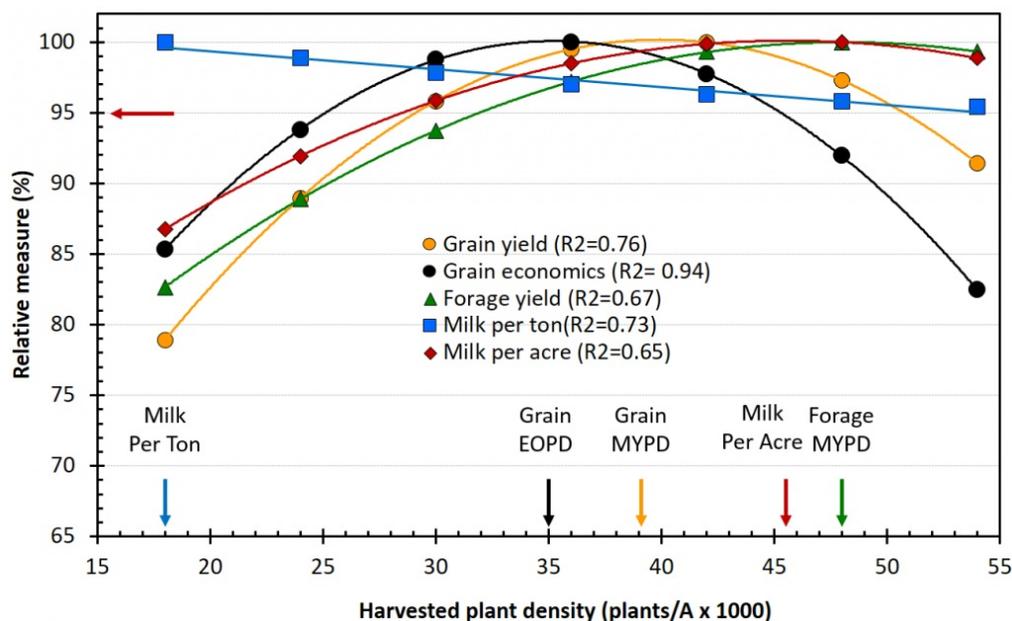


Figure 1. Relationship between corn plant density and grain yield, economic optimum, forage yield, Milk/Ton, and

Milk/Acre. Data are derived from Arlington during 2005 to 2014.

Every hybrid and every field likely has different MYPD and EOPD values. Breeders are constantly improving standability of corn hybrids, so the MYPD has been increasing every year by about 400 plants/A. In addition, environment and management style will influence these values (i.e. drought versus a normal year). This relationship indicates the ability of the corn plant to compensate for discrepancies in plant density, but it is highly influenced by grain/silage/milk prices and input costs. It also says a few things about the implications of variable rate seeding.