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Forage quality is one pillar of success on dairy farms. The importance of this variable for animal health, productivity and profitability cannot be stressed enough. Good forage quality can lead to better outcomes in so many aspects of the dairy, that the connection can be lost, but combating negative energy balance in early lactation, avoiding acidosis, increasing milk production, improving milk components, and accelerating reproductive performance are just a few things that better forage quality can help accomplish.

NDF or neutral detergent fiber is a type of fiber that forage plants accumulate as they mature. NDF is not all bad, since ruminants can digest much of it, and the rumen requires this fiber to remain healthy, but forage that is too high in NDF is less energy dense, and often poor in quality in other ways, such as the traditional percentage crude protein. The stage of plant maturity correlates well with NDF. Grasses and legumes such as alfalfa begin declining in quality as soon as they “head” or blossom. Grasses can increase in NDF by as much as 1% per day after they have headed out.

Of all the costs to producing milk, feed cost represents the largest and often has the greatest influence over profitability. Feed cost on most dairies falls into two categories, crops (land investments, planting, nutrients, harvesting, and storage), and purchased concentrates. To make a very simplified example, suppose two dairies produce “forage” and buy “concentrate” and there are only these two ingredients in their lactating cow rations. The cows on both farms make 80 lbs and therefore must eat 49lbs of dry matter.

Cows can only consume 1.1% of their body weight in NDF before they feel full, so a 1300lb cow maxes out at 14.85lbs NDF. Now assume one farm put up 45% NDF forage,

$$14.85\text{lbs NDF} \div 0.45\text{lbs NDF per lb forage} = 33\text{lbs forage}$$

this farm can feed 33lbs of forage (dry matter basis) and must purchase 16lbs of concentrate to meet their cows needs of 49lbs DMI and make 80lbs of milk.

The other farm put up 40% NDF forage by harvesting at a plant maturity that resulted in higher forage quality,

$$14.85\text{lbs NDF} \div 0.40\text{lbs NDF per lb forage} = 37.1\text{lbs forage}$$

this farm can feed 37.1lbs of their higher quality forage and purchases only 11.9 lbs of concentrate to make the same 80lbs of milk.

Suppose grain costs \$0.19 per pound of dry matter, the second farm may spend \$0.78 less per cow per day to make the same milk. On a 300-cow dairy, that is an advantage of \$85,410 for one year in feed cost alone. Other outcomes such as improved feed efficiency, higher components, and decreased transition cow problems would very likely be seen on the dairy with better forage quality as well and account for an even higher level of economic performance.