Alfalfa acreage has been in a downhill trend since 1999 relative to corn silage acres, while corn silage has expanded its place in modern dairy rations. Efforts are being made to return alfalfa to its position as the “Queen of Forage,” and one strategy is to reduce alfalfa’s lignin content and thereby increase its digestibility, or energy content.

Understanding the relationship between the lignin content of a forage and its digestibility is simple. Lignin, of course, is the “woody” part of forage, and no livestock can digest wood. But we all know of forages that fed better than they tested as well as other forages that did exactly the opposite. This confounding situation is daunting to both the consulting nutritionist and the livestock owner. Table 1 shows seven alfalfas with the same neutral detergent fiber (NDF) and the same lignin values, but with very different digestibility (NDFd48 and NDFd240). What could explain the variation in digestibility?

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| Table 1Variation in Digestibility Among Alfalfas with the Same Lignin and NDF Content |
|  | **NDF** | **Lignin** | **NDFd48** | **NDFd240** |
| Alfalfa 1 | 40.49 | 5.46 | 58.42 | 67.71 |
| Alfalfa 2 | 40.25 | 5.40 | 49.01 | 55.48 |
| Alfalfa 3 | 40.29 | 5.51 | 46.05 | 58.91 |
| Alfalfa 4 | 40.37 | 5.50 | 55.68 | 71.08 |
| Alfalfa 5 | 40.25 | 5.46 | 42.51 | 52.12 |
| Alfalfa 6 | 40.38 | 5.49 | 39.40 | 52.60 |
| Alfalfa 7 | 40.45 | 5.43 | 47.97 | 55.19 |
| Means | 40.35 | 5.46 | 48.43 | 59.01 |
| *Source: Dr. John Goeser, Rock River Labs.*  |

**Lignin Percentage Isn’t the Digestibility Gold Standard**

Factors other than the percentage of lignin in a forage play a big role in digestibility. Much of the effect of lower digestibility is caused by ester bonds or ether bonds. The lignin bonds with the other fractions of the NDF—cellulose and, especially, hemicellulose—rendering these normally digestible fractions *less digestible* (in the case of ether bonds) or even completely *indigestible* (in the case of ester bonds). And these bonds—which are more prominent in conventional corn silage (with the exception of high-sugar Master’s Choice corn silage) and alfalfa, and less prominent in BMR corn silage and warm- and cool-season grasses—are not revealed by a simple lignin test.

***Factors other than the percentage of lignin
in a forage play a big role in digestibility.***

Compounding this situation is the fact that lignin assays are not very precise. And finally, the percentage of lignin does not have a fixed relationship to the truly indigestible fiber (represented by uNDFD240).

**Low-Lignin Solutions**

Two major alfalfa breeders in the last several years have claimed to have the answers. One has a GMO solution that genetically engineers the plant to down-regulate the production of lignin. This solution is irretrievably stacked with the RoundUp Ready® (RR) trait because the reduction in lignin is much less than the standard deviation of naturally occurring alfalfa.

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| *Alfalfa has a mean lignin of 6.1% and a standard deviation of about ± 1.6%. The promised lignin reduction is 10% to 15% of the total lignin, or 0.6% to 0.9% less lignin. The only test that can be run to identify the alfalfa source is for the RR gene, since the lignin reduction is a gene manipulation, not a gene insertion, and the down-regulation fits well within the genetic population of standard alfalfa.* |

The second company’s solution is a natural selection achieved by cross-breeding lower-lignin alfalfa plants. They promise a 8% to 10% reduction in the total lignin.

But while ambitious, both efforts seem to miss the mark of ensuring high digestibility.

**Byron Seeds’ High-Digestibility Solution**

 If we ultimately want high digestibility and lignin is not the ultimate indicator, why not select for what we want? Realizing the above-described errors of other approaches, that is the direction that Byron Seeds’ plant breeders choose to take, selecting alfalfa that is naturally more digestible and letting the lignin total fall where it may. The result—after more than 12 years of selection—is Byron’s KingFisher 425HD alfalfa, which will be available for spring seeding in 2016.

***If we ultimately want high digestibility,
why not select for what we want?***

In the Byron Seeds approach, the lignin in the alfalfas that are crossbred is relatively unchanged; but the amounts of the more digestible fractions of the NDF that are compromised by the binding processes described earlier are reduced. This is the real key to genetics of high digestibility.

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| **About Byron Seeds’ KF425HD****Available for seeding:** Spring 2016 **Fall dormancy:** 4.5**Winter hardiness:** 2.0 **Experience:** Successfully grown in Wisconsin, Minnesota and Canada |