

Forage Quality Improvement in Reduced-Lignin Alfalfa Monoculture and Alfalfa-Grass Binary Mixtures

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Despite its obvious importance to agriculture, alfalfa acres have declined relative to annual corn and soybean crops. The dramatic increase in corn and soybean acreage and reduction in diverse rotations including perennials like alfalfa and alfalfa-grass mixtures is likely to have negative impacts on water quality and soil loss. Development of reduced-lignin alfalfa has potential to provide a higher digestibility forage that will increase feeding value and profitability of its use in rations. Transgenic, reduced-lignin alfalfa contains up to 18% less whole plant lignin than standard cultivars. Increasing diversity in cropping systems helps to balance profitability and environmental concerns. Throughout northern and transition zone regions, alfalfa is frequently grown in binary mixture, and new grasses provide unique opportunities to increase use of alfalfa mixtures. For example, in NY over 85% of alfalfa is sown in mixtures with perennial grasses. Plots were sown at locations in NY, KY, and MN in the Spring of 2016, with all sites successfully established. Locations will be harvested twice during the seeding year. Whole plot treatments consist of two cutting managements, a) maximize yield with harvest at early flower for alfalfa, or b) maximize forage quality based on harvest at bud stage. Alfalfas are HarvXtra and WL 355 RR. Grasses selected are BAR FpF32 Meadow Fescue (Hidden Valley selection), Fojtan festulolium, and a very late maturing orchardgrass, Dividend VL. A recent related study was conducted to develop a robust NIRS method to estimate botanical composition of binary alfalfa–grass mixtures in the Northeastern USA. We observed that while calibration samples over multiple years and locations are required to predict new environments, a single calibration from multiple instruments can perform equally well across instrumentation. This will be a beneficial tool to in the current study, given the large range in locations and number of samples that will be collected. This research is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture.