



Northern NY Agricultural Development Program 2004 Project Report

Grass-Alfalfa Spring Quality Prediction

Project Leader(s):

Jerry Cherney, Forage Specialist, Department of Crop & Soil Sciences, Cornell University;
Debbie Cherney, Senior Research Associate, Department of Animal Sciences, Cornell University

Collaborator(s):

Michael Davis, Manager, Cornell Baker Research Farm at Willsboro; Peter Barney, Agronomy Educator, Cornell Cooperative Extension of St. Lawrence County; Jen Beckman, Agronomy Educator, Cornell Cooperative Extension of Lewis County; Mike Hunter, Agronomy Educator, Cornell Cooperative Extension of Jefferson County

Background:

Although mixed stands are the norm in the Northeast, they are not common in the Midwest, so there is little interest in evaluating mixed stands outside of the Northeast. Approximately 90% of all alfalfa in NYS is sown with a companion grass. Spring harvest of perennial forages at optimum NDF content insures the best possible forage for balancing lactating dairy cow rations. There is currently no consistently good method for estimating total stand NDF in mixed stands during spring growth short of an actual analysis of samples collected. Grass-legume mixtures can be advantageous from a nutrient management standpoint, requiring no N fertilizer inputs or considerably reduced inputs compared to pure grass stands. Most nutritionists agree that the best forage for lactating dairy cows is a mixture of grass and legumes, not pure legume or pure grass. Harvest management of mixed grass-legume stands is considerably more problematic than pure grass stands, and this is particularly true for spring growth. Not only is there a large range in the proportion of grass in a given stand, but the rate of change in forage quality of the stand is different for grasses and legumes. Also, it is inevitable that the proportion of grass in the mixture will increase over the life of the stand, requiring a reassessment of stands each Spring. Forage fiber digestibility declines with maturity much more in grasses than legumes, and at a much faster rate during stem elongation. During the stem elongation period of grasses there is a linear increase in total fiber (NDF). The best indicator for spring harvest of grass-legume mixtures is the NDF content of the total forage mixture.

Methods:

There are two major issues to resolve: 1) the proportion of the stand that is grass and 2) an estimation of the NDF content of the grass and the legume components. We have determined in the past for New York State that alfalfa NDF content of spring growth can be accurately estimated using plant height alone, and is equally well estimated using a combination of height + maturity stage across the USA.

No one has yet determined if alfalfa prediction equations are affected by grass percentage in a mixed stand. There is not a good method for estimating grass NDF in spring growth.

The goal of this project was to develop a simple method to accurately estimate alfalfa NDF in mixed stands and develop estimates of grass NDF based on the current alfalfa NDF content and possibly also on grass height. Our objectives were to:

- 1) determine a robust method of estimating the percentage of grass in mixed stands in NNY,
- 2) validate an equation for estimating alfalfa NDF in NNY using only plant height,
- 3) predict grass NDF based on alfalfa NDF and then estimate the total stand NDF, and
- 4) develop a simple field tool (NDF stick) for estimating NDF of mixtures.

During the spring of 2004, with the aid of extension educators in the region, we collected several hundred samples from mixed stand fields in all six NNY counties. Alfalfa and grass height were measured and samples were separated by species for chemical analysis. We measured grass standing height and the height of the tallest tiller, to the tip of the most expanded leaf, held upright. We also counted the number of visible and palpable nodes in the tallest grass tillers. We determined the maturity stage of the tallest grass tillers in the stand. Photos were taken of the fields for the purpose of developing a visual aid for estimating the grass percentage of a field (visual examples on a card have worked successfully in the past for estimating forage stand density and weed density).

Results:

All samples have been ground and analyzed for NDF in the laboratory using wet chemistry. Data is currently being analyzed statistically. Preliminary results indicate that grass height is poorly related to grass NDF content. We are analyzing the other grass parameters that we measured to see which will work best in equations for prediction of NDF. We have yet to determine whether existing alfalfa prediction equations work with alfalfa in mixtures, new equations will be developed if necessary. Equations will be developed to estimate grass NDF based solely on alfalfa NDF and on alfalfa NDF plus other grass parameters.

Conclusions/Impacts:

One conclusion to-date is that measurements of grass morphology and growth (height etc.) are not well related to forage quality. Much more analysis needs to be done and is currently underway. The ultimate goal is to develop an NDF “stick” for mixed grass-alfalfa stands, that

would be available to farmers. Final results will be presented in extension meetings in NNY in 2005. Our best prediction equations will be available on the www.forages.org website. Photos of different grass:legume ratios at different maturity stages also will be available.

Next steps:

Some grass-alfalfa samples will need to be taken in the spring of 2005 in Northern NY to validate the predictions developed from last year's samples. We will collect and separate these samples and David Parsons will analyze them. We hope to have this analysis completed by mid-summer2005.

Acknowledgments:

David Parsons has analyzed these samples along with other samples taken around New York State, as part of his M.S. program at Cornell, and David is currently doing all statistical analyses of the 2004 samples.

Person(s) to contact for more information:

Jerry H. Cherney, Department of Crop & Soil Sciences, 520 Bradfield Hall, Cornell University, Ithaca, NY 14853; 607-255-0945; JHC5@cornell.edu.

Northern New York Agricultural Development Program:

The Northern New York Agricultural Development Program provided funding for this crop production research project. The Northern New York Agricultural Development Program is a farmer-driven research and education program specific to New York state's six northernmost counties: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex.

Thirty-three farmers serve on the Program board led by Co-Chairs Jon Greenwood of Canton (315-386-3231) and Joe Giroux of Plattsburgh (518) 563-7523. For more information, contact Jon, Joe or R. David Smith at 607-255-7286 or visit www.nnyagdev.org # # #