

2018 USAFRI Research Project Objectives

Analysis of Root Carbohydrates in Alfalfa Treated with Four Harvest Intervals and Five Potassium Rates in the Southeast **University of Georgia - Tucker**

Project Award: \$15,500

Justification:

- Dairy In recent years, interest in alfalfa has increased in the southeastern United States following the release of newer varieties that are more adaptable to the harsh environment in the region. Potassium application and harvest regime are known to impact alfalfa stand life, seasonal yield, and forage quality. Current recommendations for appropriate harvest timing and fertilization are generated from research in northern climates with different varieties. A need was identified to examine the effects of harvest regime and potassium application in the Southeast. A study is being conducted at the University of Georgia, Tifton Campus to evaluate these variables. This year will be the conclusion of the original evaluation, thus providing a unique opportunity to expand the data potential of this work; ending the evaluation with a destructive harvest to evaluate root tissue.

Root carbohydrates are a snapshot of plant reserves headed into winter and provide for a successful stand in the following spring (Brown et al. 1990). Much of the literature today focuses on northern climates, with an importance on maintaining root reserves for the colder winters. However, there is evidence that warm and humid climate of the southeast hastens maturity and increases cutting frequency, further depleting root carbohydrates (Brown et al. 1990). We know that potassium fertility and harvest frequency can affect stand persistence. Root carbohydrates are therefore likely affected by the changes in fertilization and maturity at cutting. Mays and Evans (1973) found that their total available carbohydrate results in the South were markedly different from northern publications, increasing the need for additional data about root carbohydrate behavior in the region. This proposal seeks to define the differences in root carbohydrate amount between these treatments and show the effect that these treatments might have on long term stand vitality. This proposal will compliment a 2-year study that includes forage yield, quality and stand persistence data. This proposal will strengthen the project as it will increase the accuracy and breadth of stand density analysis, provide a clearer picture of what is occurring within the above and below ground plant material, and boost manuscript publication success. Support from NAFA for this proposal will increase knowledge of long-term stand management and clarify its effects on stand vitality via root carbohydrate depletion, provide more complete analysis of plant material, and add to the body of knowledge available to peers and producers through manuscript publication and extension material development.

Objectives:

- The objective of this project is to provide a more complete analysis of above and below ground alfalfa plant material under varied management in the Southeast. Specifically this project would (1) quantify root carbohydrates in alfalfa harvested at bud, 10%, 30% and 50% bloom and fertilized at 0, 60, 90, 120, and 150 pounds per acre for two years; (2) provide a better understanding of root vitality in alfalfa grown in the deep south; and (3) better define harvest and fertilization recommendations to producers considering pure alfalfa stand establishment in the Southeast.

