

Farmer experiences with alfalfa in the southern U.S.A.

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Abstract

Alfalfa (*Medicago sativa* L.) is a forage crop of primary importance in the United States (USA); however, adoption and use in the southern USA region has been limited. The combination of adapted alfalfa cultivars and management strategies which demonstrate extended forage growing season length, improved forage nutritive value, and reduced N fertilizer inputs have renewed interest in forage-livestock farmers to consider planting alfalfa. A series of Extension-based educational strategies have been used in the southern USA to 1) create awareness on the use of alfalfa, 2) educate farmers regarding establishment and management practices, and 3) showcase opportunities and challenges of on-farm alfalfa use in the region. Educational initiatives included on-farm demonstrations and farmer testimonials, field days, integrated lecture and field-based workshops, and web-based content delivery. Across multiple educational methods, farmers reported increased awareness and understanding of management requirements to incorporate alfalfa into their operation. However, on-farm management challenges were also noted as the primary reason of hesitance towards adopting alfalfa in the region. Targeted education to farmers with a greater level of familiarity regarding stand management requirements, such as dedicated hay growers or row crop operators, were identified as audiences where alfalfa may be more readily adopted. Continuing education areas to demonstrate value of alfalfa include an emphasis on timeline for breakeven economic returns following establishment and ecosystem benefits of using legumes in forage management systems.

Introduction

In the southern USA, forage systems are primarily based on perennial grass systems using forage species introduced over time into North America. Fluctuations in forage system input costs and global perspectives in agricultural sustainability are changing on-farm forage management dynamics in the region. The costs of pasture amendment with synthetic N fertilizer and associated public scrutiny regarding the carbon footprint of agricultural management practices has led some forage growers to pursue alternative systems in the region. The incorporation of legumes into traditionally grass-based systems is not a new concept. However, in practice, farmer experiences with legumes in warm-climate regions are more limited due to production system challenges related to establishment, persistence, and management (Muir et al., 2011). Public and private research efforts have focused on selection, establishment and management practices for legume cultivar success in the region. Breeding efforts and management systems research with adapted alfalfa cultivars in the region have demonstrated potential successes for broadening alfalfa plantings in the South. As applicable management systems are demonstrated through university-based research efforts, a multi-tiered Extension approach was used to assess perceptions and on-farm experiences with alfalfa to improve educational strategies surrounding alfalfa incorporation in the region.

Methods

On-farm assessment of producer perceptions of alfalfa use and adoption in the southern USA was part of an ongoing integrated research-Extension initiative funded through the USDA NIFA Alfalfa Forage Seed Program. Farmer experiences with alfalfa in the South have been measured through the following methods since 2017.

On-Farm Demonstrations and Farmer Testimonials

Nine farmer cooperators established alfalfa in 1) monoculture or 2) mixture with bermudagrass at farms in Georgia, Alabama, Florida and South Carolina. Forage growers either voluntarily established alfalfa or participated in a grant-funded cooperative agreement to plant alfalfa using a cost-share approach to cover one half of seed expenses for up to 10 planted acres. Farmers periodically reported to project investigators or local Extension agents regarding stand yield, quality, and persistence. Beginning in 2022, two farmer cooperators participated in video testimonials as a case-study representation of their experiences with alfalfa production in the region.

Web-Based Survey

In 2020, a web-based Qualtrics survey was conducted to identify challenges associated with alfalfa adoption by forage-livestock farmers in the region. The survey consisted of 24 questions and was open from May through December 2020. Responses were limited to farmers from the following states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and Texas. We received 211 responses, which addressed both open-ended and multiple-choice questions on planting and management considerations for alfalfa relative to the farmer operator's current system. Perceptions were obtained on a 5-point Likert-type scale ranging from (1) strongly disagree to (5) strongly agree. Before survey distribution, the validity of the content of the survey was established through peer-review from collaborators and external faculty with expertise in extension evaluation metrics. The survey was approved through the Auburn University Institutional Review Board under the protocol #20-163 EX 2003.

Extension Program Evaluation Data

Multiple forage management educational events were conducted in Alabama, Georgia, Florida and South Carolina from 2017 through 2022. A series of workshops entitled "Alfalfa in the South" were offered both in-person and online during this time period (n = 8 workshops). Additional extension workshops were delivered where alfalfa establishment and management considerations were shared through presentations or field-based demonstrations during this time period. These programs included a Bermudagrass Hay Growers Summit (n = 5), regional land-grant university research center beef-forage field days (n = 5), commodity group meetings (n = 6) and other Extension workshops (n = 4). At the end of selected events within each state, a post-program survey was conducted to measure potential change in awareness, knowledge, and adoption associated with the program content.

Results and Discussion

On-Farm Demonstrations and Farmer Testimonials

Two of the nine farmer cooperators participated in a video testimonial regarding their experiences with alfalfa production in Georgia using a compare-contrast approach. Both farm operations were in a similar geographic region of Georgia, and planted alfalfa into established, hybrid bermudagrass. Each farmer had more than 40 years of experience in the forage-livestock industry and were considered progressive farm operators who use Extension resources for on-farm decision making. One farmer shared success of incorporating alfalfa into their operation through planting adapted varieties into existing bermudagrass stands. This operator had managed alfalfa for three years at the time of the video testimonial recording (May 2022) and had recently increased his acreage of alfalfa compared to initial establishment in 2019. He noted success in making high-quality baleage or hay, which was used as part of his beef cattle preconditioning program to reduce purchased feed costs.



In contrast, a second farm operator from the region planted alfalfa in 2019 into existing bermudagrass stands and reported reasons why alfalfa was not a fit for his operation. The farmer baled forage or grazed fields in a mixed-use system in the year following establishment. Persistence of alfalfa under this usage strategy was a primary reason not to expand acreage, along with high input costs associated with fertilizer management within the system relative to other adapted forages. The farmer noted that management requirements were greater than labor allowed. These experiences provided a compare-contrast approach to help farmers with decision making relative to alfalfa establishment in the region.

Web-Based Survey Data

Forage-livestock producers were asked to select one primary response for perceived opportunities and challenges associated with growing alfalfa in the southern USA. Key reasons for growing alfalfa were identified in Figure 1 as 1) greater forage nutritional value, 2) greater profit potential from high-quality forage in the form of a marketable, conserved forage product or reduced animal supplementation costs using alfalfa, and 3) "other". Other reasons included diversifying and extending the grazing season in the region and focusing on ways to better serve equine clientele.

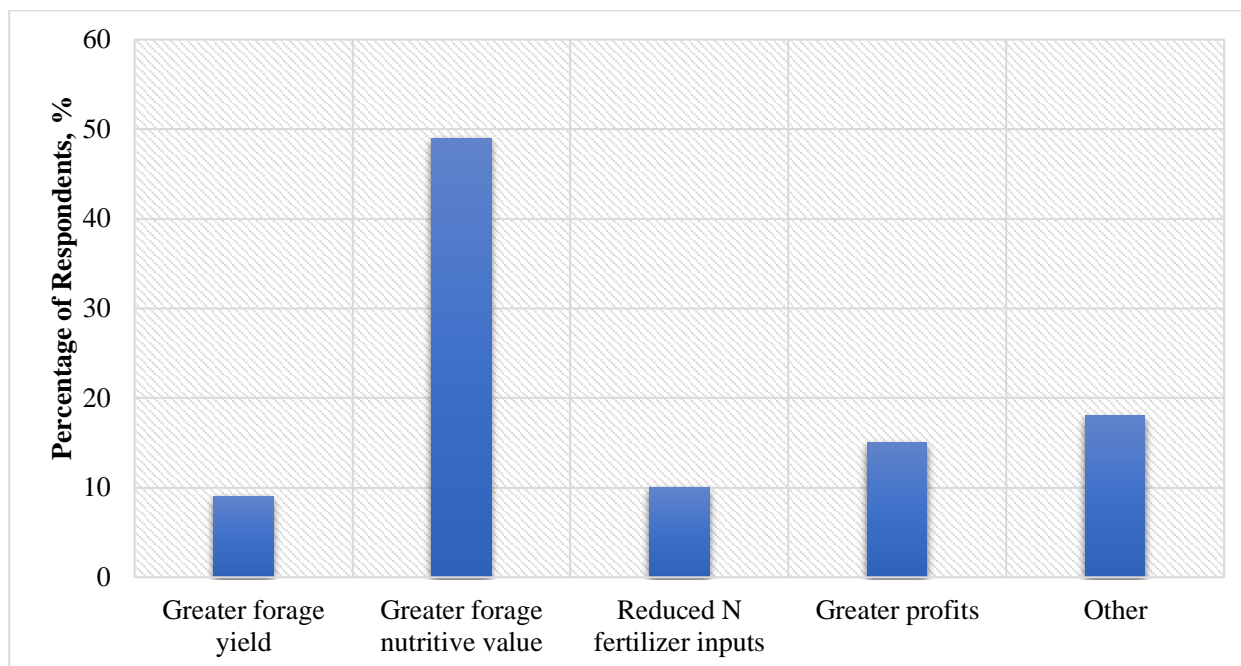


Figure 1. Challenges identified by forage-livestock producers (n = 171 respondents) regarding alfalfa establishment and management in the southern USA. Adapted from Silva et al. (2021).

For challenges with alfalfa in the region, costs of establishment, stand longevity, and ‘other’ received most responses from participants (Figure 2). Other categories of concern included climatic issues which may limit forage production, investment in equipment, labor, and limited knowledge of the crop.

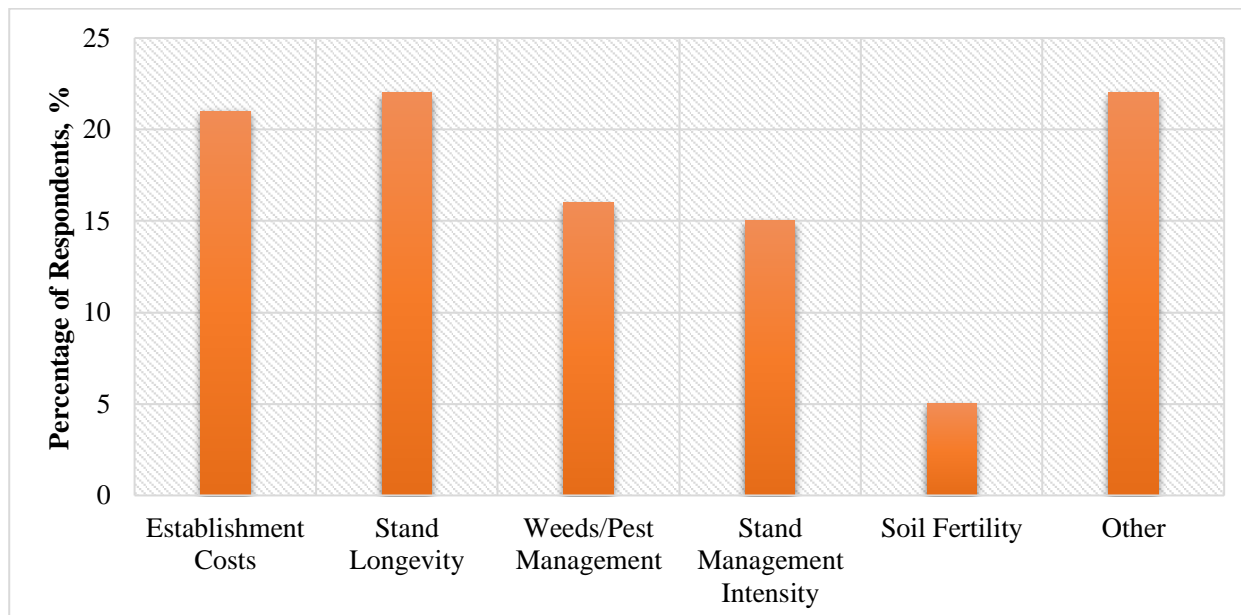


Figure 2. Challenges identified by forage-livestock producers (n = 165 respondents) regarding alfalfa establishment and management in the southern USA. Adapted from Silva et al. (2021).

Based on responses, crop management knowledge, adapted varieties and demonstration of management methods to illustrate stand viability in the region were identified as areas needing more educational efforts for enhancing alfalfa adoption in the region. Additionally, reduction of N fertilizer inputs was only identified as a key factor for alfalfa incorporation in southern farming operations by 10% of respondents. As fertilizer input costs continue to increase in price and changing public perceptions surrounding greenhouse gas emissions continue to emerge, emphasis on alternative management practices that could reduce N fertilization may continue to rise in priority.

Extension Program Evaluation Data

The ‘Alfalfa in the South’ Workshop Series was a one-day workshop that consisted of lectures, in-field demonstrations, or online delivery of content, depending on the year in which the program was delivered. The program continues to be an annual event, and typically rotates among the states of project cooperators. The program highlights farmer experiences with alfalfa and research on systems management strategies for alfalfa in the region. In a summary of workshops offered from 2018 through 2019 (Tucker et al., 2019), 80% of farmers who participated in these workshops reported increased knowledge and awareness on the topic of alfalfa production after attending. Participants had a wide range of intent for using this information in on-farm applications following the program. Examples included written feedback that the discussion around alfalfa encouraged them to evaluate input costs associated with animal nutrition more closely, resulting in an intent to plant alfalfa on their farm within the next 12 months. Evaluation data from these programs illustrates the effectiveness of sharing farmer experiences with the crop of interest, while the programmatic delivery style primarily functioned as an awareness tool for farmers in attendance.

Participants from the Wiregrass Research and Extension Center Beef-Forage Field Day who reported an interest in alfalfa production systems indicated that they owned or operated a diversified row crop/livestock operation in the region. These growers were more interested in planting monoculture alfalfa rather than integrating into grass-based systems. This information identifies a target audience that has not been traditionally reached through forage-livestock based programs. Row crop farmer interest aligns with our survey data of farmer perceptions, where lack of familiarity with soil fertility, weeds/pest management, and stand management intensity may be less of a barrier for this audience.

At the 2021 and 2022 Bermudagrass Hay Growers Summit in Alabama, farmers indicated a shifting interest in the incorporation of legumes into hay production systems. This coincides with increased N fertilizer input costs in these systems. Farmers subsequently indicated that alfalfa incorporation may provide a pathway for diversifying bermudagrass stand viability, while decreasing N inputs into this system. Additionally, with greater adoption of forage baleage technology, more questions regarding preservative use and assumed feasibility of growing and processing alfalfa on farm emerged as a topic of interest following the 2022 meeting.

Conclusions and/or Implications

Efforts to demonstrate alfalfa feasibility among farmers in the southern USA region requires an integrated, targeted approach to education. Field demonstrations were especially effective with innovative forage-livestock producers in illustrating system feasibility on a per farm basis. Targeted education towards hay production system and row crop operators may be the next step as a match for overcoming barriers related to alfalfa stand management perceptions. In some cases, labor and equipment may be limiting factors for production in forage-livestock operations. Continued development of decision tools that demonstrate economic viability considering these input costs and applications across various forage-livestock system management scenarios will be important to overcome these perceptions.

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