INTRODUCTION

The demands for organic milk continue to rise in the United States, with supply not keeping pace with demand. In the southeast, pastures are available for extended periods of time compared to the midwest and northeast, and there is an opportunity to increase the supply of organic milk while minimizing costs spent on grains and fuel.

OBJECTIVE

The objective of this project was to use a multi-faceted approach to determine the ideal species mixtures for organic dairy production as well as document forage quality, forage yield, soil characteristics, milk production and milk quality during the grazing season.

METHODS

Small plots (1.5 x 7.5m) were established on the organic research units of the Univ. of KY, Lexington and Univ. of TN, Knoxville. Nine forage mixtures were planted in a RCBD design with four replicates in fall 2015 and harvested 2016-2018. A - red clover (RC); B – orchardgrass (OR); C - RC + OR; D - alfalfa + OR; E - RC + OR + novel tall fescue; F - RC + OR + crabgrass (CG); G - RC + annual ryegrass (SR) + CG; H - crimson clover (CC) + AR then sorghum-sudangrass + cowpea; and I - CC + AR then CG + annual lespedeza.

RESULTS

During the summer of 2016, the perennial cool season forage treatments had the highest summer crude protein (CP) (~20%) in KY with the exception of the pure orchardgrass stand. Crude protein values in TN were overall lower than KY (<13%) and the lowest CP was the high yielding SS containing mixture at 8%. Fiber values were similar for all treatments in KY (NDF=39-45), with the exception of the SS treatment at NDF=55. In Tennessee, NDF values were all above 50 and the SS value was highest at NDF=64. The alfalfa/orchardgrass ADF value was 29 in KY, but not significantly different than the other treatments that ranged from ADF=30-35. In TN, the crabgrass/annual lespedeza mixture had the lowest ADF at 34, with the other treatments ranging from ADF=38-43.

DISCUSSION

• The results from these on-farm trials were incorporated into an Excel based decision support tool that provides producers the ability to calculate estimated costs of production for organic pasture mixtures. This decision tool also allows producers to manipulate all of the input options. The tool does not take forms of revenue into consideration, but considers input and machinery costs relevant to annual yields. All calculations are done on a per unit area basis as well as at the whole-farm level. The field sizes are in acres (2.5 acres = 1 ha) and English units of yield (1 lb = 0.4 kg and 1 ton = 0.91 tonnes) to better facilitate interpretation by US producers. Individual sheets are provided for each budget, and a summary sheet is used to easily compare total costs across the mixtures.

• The economic modelling component used the small plot and on-farm data and was published in Agricultural Systems Journal by Allison et al. (2021). The model showed that the perennial cool season mixture provided the most cost efficient forage production in comparison to the annual cool/warm season mixtures mainly because of the added cost of planting annual forages twice per year. Based on 2019 organic milk price levels, the modelled farm was profitable, but price trends for organic milk and the cost of transitioning to an organic dairy production system created significant potential challenges. The model confirmed the cost-effectiveness of significant feed allocation through grazing (a minimum of 30% dry matter).

CONCLUSION

This research demonstrated that complex forage mixtures can be beneficial for organic dairy producers, but perennial cool season mixtures likely provide the most economical forage production in the transition zone of the United States.