Introduction

Compared with N-fertilized grass, inclusion of legumes can decrease off-farm inputs and C footprint and increase forage nutritive value (NV), but herbage accumulation (HA) may be reduced.

Objective

To determine HA and NV of year-round N-fertilized grass or legume-based forage systems defoliated either by grazing or haying during two years.

Materials and Methods

- **Location:** Citra, FL from Jan. 2016 through Sept. 2017
- **Treatments** were **Legume** (`Florigraze` rhizoma peanut in summer and rye-annual ryegrass-crimson clover-red clover in winter) and **Grass** (`Tifton-85` bermudagrass in summer and rye-annual ryegrass during winter) systems defoliated by grazing (Graze) or for hay (Hay).
- 3 replicates of a split-plot experiment in a RCBD with system as the main plot and defoliation as subplot. Grass plots received 50 and 30 kg N ha\(^{-1}\) after each summer and winter defoliation.
- Grazed pastures were rotationally stocked, defoliated every 4-6 wk to 10-20 cm stubble, depending on species and season. Hay harvests were at similar intervals to a 10-cm stubble.

Results

- HA was greater for Grass than Legume systems in summer and when Grass was grazed in winter (Fig. 1)
- Crude protein (CP) did not differ due to system in either season because of relatively high N inputs to Grass (Fig. 2a), but CP of Grass was greater than Hay during winter (Fig. 3a).
- In vitro digestible organic matter (IVDOM) was greater for Legume than Grass (617 vs 523 g kg\(^{-1}\)) in summer, but during winter no differences were observed between systems (Fig. 2b). IVDOM was greater for Graze than Hay during winter but not during summer (Fig. 3b)

Conclusions

- Legume systems increased herbage digestibility in summer relative to N-fertilized Grass systems, however total annual HA was less for Legume than Grass (5.4 vs. 9.2 Mg ha\(^{-1}\)), reducing livestock carrying capacity.
- Greater HA of Grass achieved with ~ 300 kg N fertilizer yr\(^{-1}\), thus input costs, greenhouse gas emissions, and leaching potential were likely much greater.

Acknowledgments

This work is supported by USDA NIFA grant no. 2016-67019-24990 from the USDA National Institute of Food and Agriculture.

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