

Herbage Accumulation and Nutritive Value of Legume- or Grass-Based Forage Systems Defoliated By Grazing or Clipping

Liliane S. da Silva*, M.K. Mullenix, L.E. Sollenberger, M.M. Kohmann, E. Stenklyft, P. Aryal, K.D. Cooley, J.C.B. Dubeux, Jr., and J.M.B. Vendramini

*Agronomy Department, University of Florida, Gainesville, FL, US. E-mail: lssilva@ufl.edu

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 Graze 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)

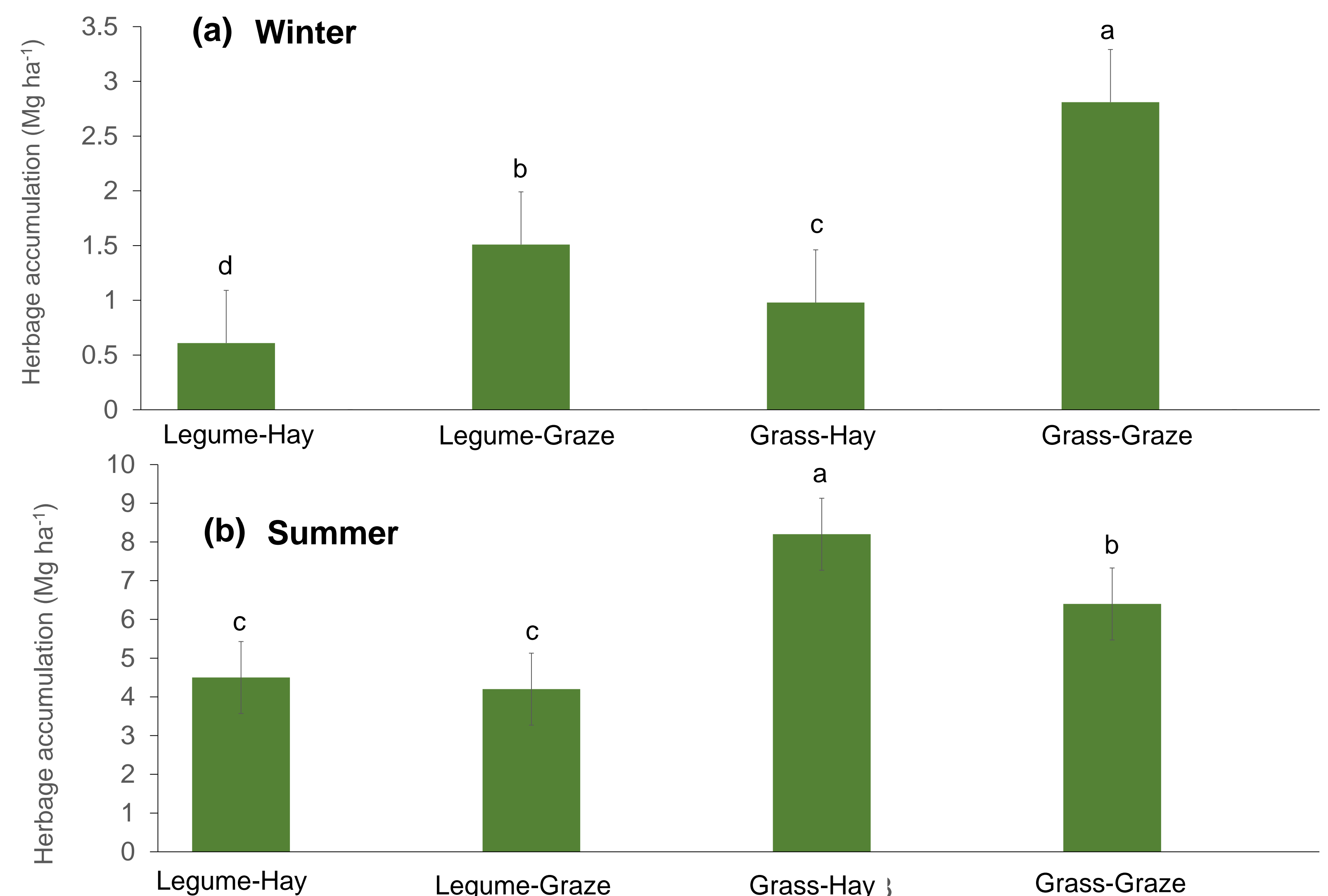


Figure 1. Herbage accumulation during (a) winter ($P = 0.0034$, $SE = 0.12$) and b) summer ($P = 0.0.024$, $SE = 0.85$) for year-round forage systems based on legumes or grasses.

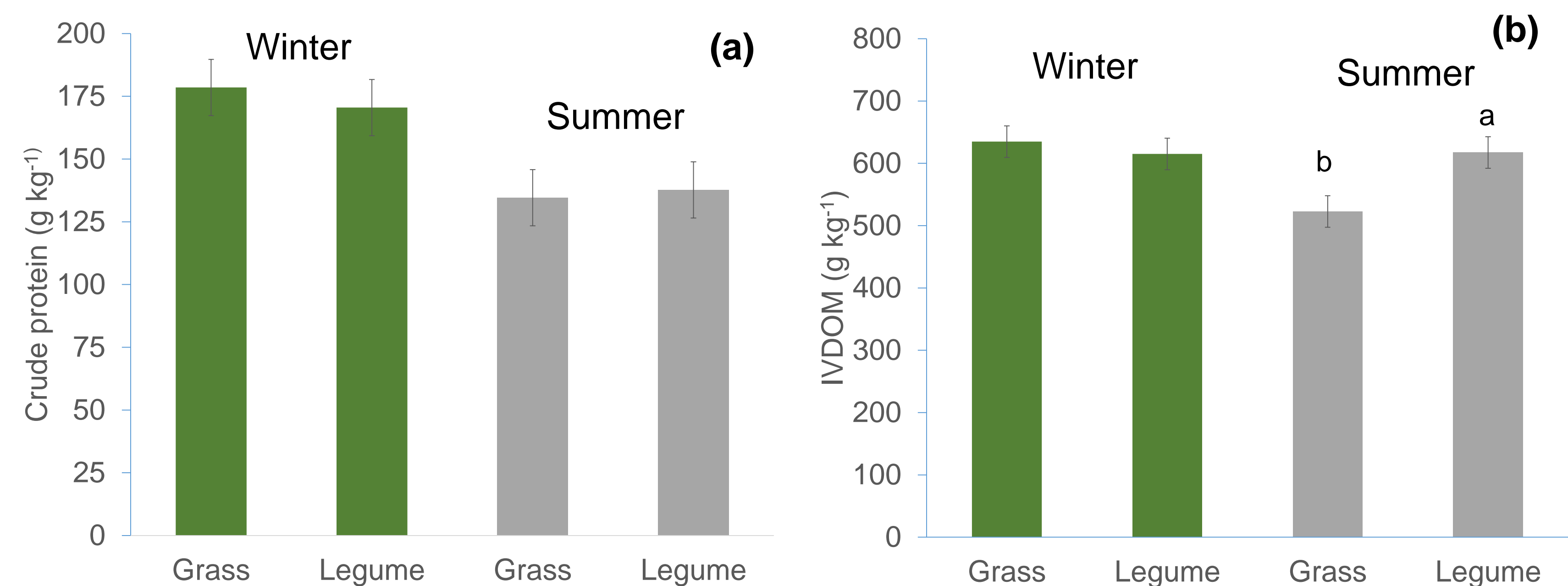


Figure 2. Herbage crude protein (a) and in vitro digestible organic matter (b) concentrations of grass- and legume-based forage systems in winter and summer.

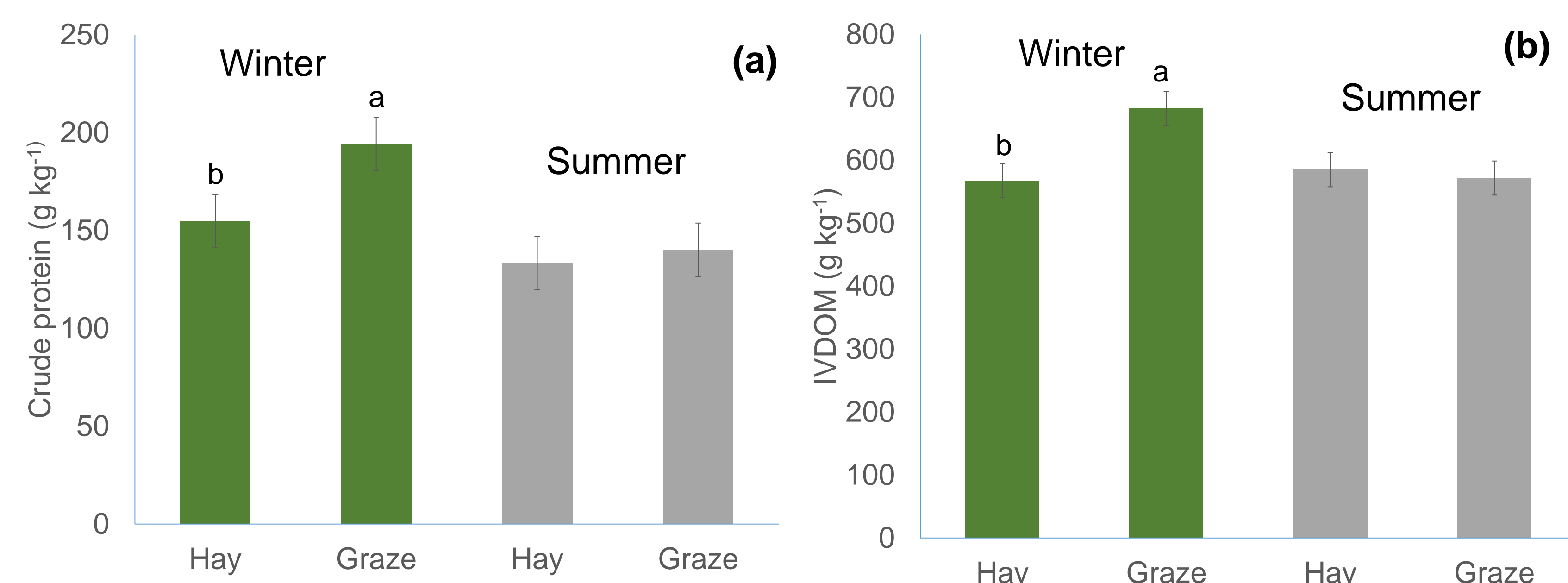


Figure 3. Herbage crude protein (a) and in vitro digestible organic matter (b) concentration as affected by defoliation management in winter and summer.

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.