Secondary Components and Efficiency of Forage Legumes

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INTRODUCTION

- Livestock production is responsible for around 14.5% of all greenhouse gas emissions. Among those, methane (CH_4) is responsible for up to 40% of greenhouse gas (GHG) emissions (Eugène et al., 2021).
- Forage legumes with condensed tannins may reduce GHG emissions in ruminant systems as well as improve protein efficiency and reduce bloat.

OBJECTIVE

- Our objective was to measure bioactive condensed tannins within the forage legumes grown during the warm season at Stephenville, TX (32.2371584,-98.189312).

METHODS

- A randomized block design field trial was established in April 2023 through 2024 on Windthorst fine sandy loam.
- Three blocks, 36 plots (2X2 m), inner 1 m^2 sampled
- Herbage yields and nutritive values were measured but we only report protein-precipitating polyphenolics (PPP).
- Species included:

Latin binomial	Common name
Strophostyles leiosperma	Slick seed fuzzy bean (annual)
Lespedeza stuevei	Tall bush-clover (perennial)
Lablab purpureus	Lablab (annual)
Trigonella foenum-graecum	Fenugreek
Desmodium paniculatum	Panicled-leaf tick-trefoil (perennial)
Lespedeza cuneata	Sericia lespedeza (perennial)
Glycine max	Soybean (indeterminate annual)
Vigna unguiculata	Cowpea (indeterminate annual)
Desmanthus illinoensis	Illinois Bundleflower (perennial)
Amaranthus retroflexus	Red root pigweed (non-legume)
Dalea purpuria	Purple prairie clover (perennial)
Crotalaria juncea	Sunn Hemp (annual)
Dalea aurea	Golden dalea (perennial)

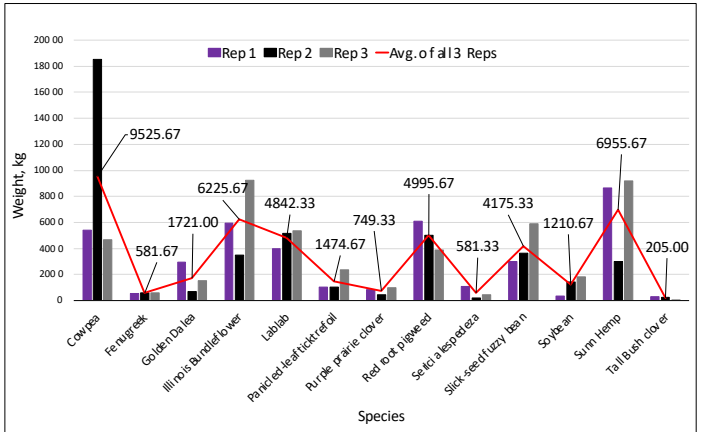

Figure 1. The average weight and cutting weight in kilograms of forage legumes tested for efficiency in Central Texas.

Table 1. Average protein-precipitating polyphenolics (bioactive condensed tannins) (*P* = 0.05). All other entries did not contain PPP.

Species	PPP %	Standard deviation	Multiple mean separation
Sericia Lespedeza	32.3%	±3.24	a
Tall Bush Clover	13.2%	±2.47	b
Illinois Bundleflower	11.4%	±1.47	b
Tick Clover	10.9%	±2.13	bc
Purple Prairie Clover	5.0%	±1.59	cd
Golden Dalea	0.52%	±0.08	d

Table 2. Average protein-precipitating polyphenolics yields (*P* = 0.05). All other entries did not contain PPP

Species	PPP Yield kg/ha	Standard deviation	Multiple mean separation
Illinois Bundleflower	693.86	±254.71	a
Sericia Lespedeza	178.79	±129.46	b
Tick Clover	171.54	±123.24	b
Purple Prairie Clover	40.84	±23.94	c
Tall Bush Clover	29.16	±19.11	c
Golden Dalea	8.91	±5.28	b

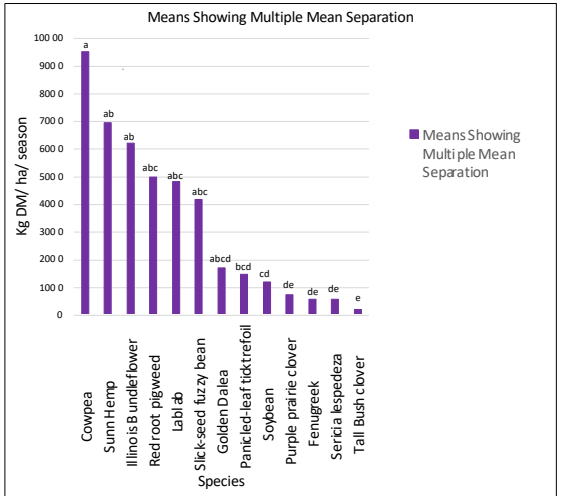

Figure 2. Average mean weight in kilograms of forage legumes (*P*=0.05).

RESULTS

- Cowpea was the most productive entry (Figure 1) with an average of 9525.67 kg DM/ha/season.
- PPP content was highest for Sericia lespedeza (Table 1).

CONCLUSIONS

- Illinois bundleflower was the most productive entry (6225.67 kg DM/ha/season) containing moderate PPP content.

ACKNOWLEDGEMENTS

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