Introduction

- Delayed cutting during the day increases the total non structural carbohydrate (TNC) concentration in alfalfa (Medicago sativa L.), which improves milk production (Brito et al., 2008) and N use efficiency by dairy cows (Brito et al., 2009).
- This increase in TNC concentration may vary with forage species (Pelletier et al., 2009) and growth period.
- Objective: To compare the effect of a delayed cutting during the day on TNC concentrations of eight forage species.

Materials and Methods

- Normandin, Québec, Canada (48°51’N, 72°32’W)
- 8 forage species:
  - Alfalfa (Medicago sativa L.)
  - Red clover (Trifolium pratense L.)
  - Reed canarygrass (Phalaris arundinacea L.)
  - Tall fescue (Lolium arundinaceum (Shreb.) S.J. Darbyshire)
  - Meadow bromegrass (Bromus biebersteinii Roemer & J.A. Schultes)
  - Smooth bromegrass (Bromus inermis Leyss)
  - Timothy (Phleum pratense L.)
  - Kentucky bluegrass (Poa pratensis L.)
- Two cutting times:
  - AM (0900 h)
  - PM (1530 h)
- 2 growth periods/year (spring and summer)
- 4 replications
- Harvests taken at the recommended stage of development for each species.
- Forage samples of 250 g heated in a microwave oven for 1 min to reach ≥ 70°C, then dried at 55°C for 72 h in a forced-air oven (Pelletier et al., 2010).
- Samples ground using a Wiley mill (1-mm) and analyzed for water soluble carbohydrates by HPLC and for starch by colorimetric methods (Bertrand et al., 2008).
- TNC = sucrose + glucose + fructose + pinitol + fructans + starch

Results & Discussion

A) Spring growth

B) Summer regrowth

AM vs. PM-cutting

- The TNC concentration was greater in the PM—than in the AM-cutting in all forage species and for both growth periods, except in the smooth bromegrass summer regrowth.
- Averaged across growth periods, the extent of the increase in TNC concentration with a delayed cutting during the day varied from 13% in smooth bromegrass to 68% in reed canarygrass.
- The increase in forage TNC concentration with the delayed cutting during the day has been reported previously for alfalfa, tall fescue, and timothy, but to our knowledge, it is the first time that such an increase is reported for reed canarygrass, smooth bromegrass, meadow bromegrass, Kentucky bluegrass, and red clover.

Species

- Forage TNC concentration in grasses, averaged across time of cutting and growth period, varied from 65.5 mg g⁻¹ DM for reed canarygrass to 94.0 mg g⁻¹ DM for tall fescue. In forage legumes, it averaged 70.5 mg g⁻¹ DM in alfalfa and 94.3 mg g⁻¹ DM in red clover.
- The TNC concentrations in the present study are similar to those reported in the literature for timothy, tall fescue, and red clover, but tend to be lower for reed canarygrass, smooth bromegrass, meadow bromegrass, Kentucky bluegrass, and alfalfa.

Conclusions

- Concentration of TNC of all forage species increased with a delayed cutting during the day and the extent of this increase varied among forage species from 13% in smooth bromegrass to 68% in reed canarygrass.
- Red clover and tall fescue had the greatest TNC concentration with an average of 94 mg g⁻¹ DM. Reed canarygrass was the species with the lowest TNC concentration (65.5 mg g⁻¹ DM).
- Forage TNC concentration can be increased by choosing species such as tall fescue and red clover and by cutting the forage in the afternoon.

References


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