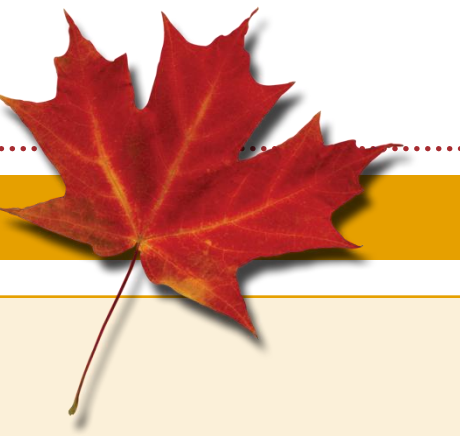




Non Structural Carbohydrate Concentrations During Wilting of PM- and AM-Cut Alfalfa

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Introduction

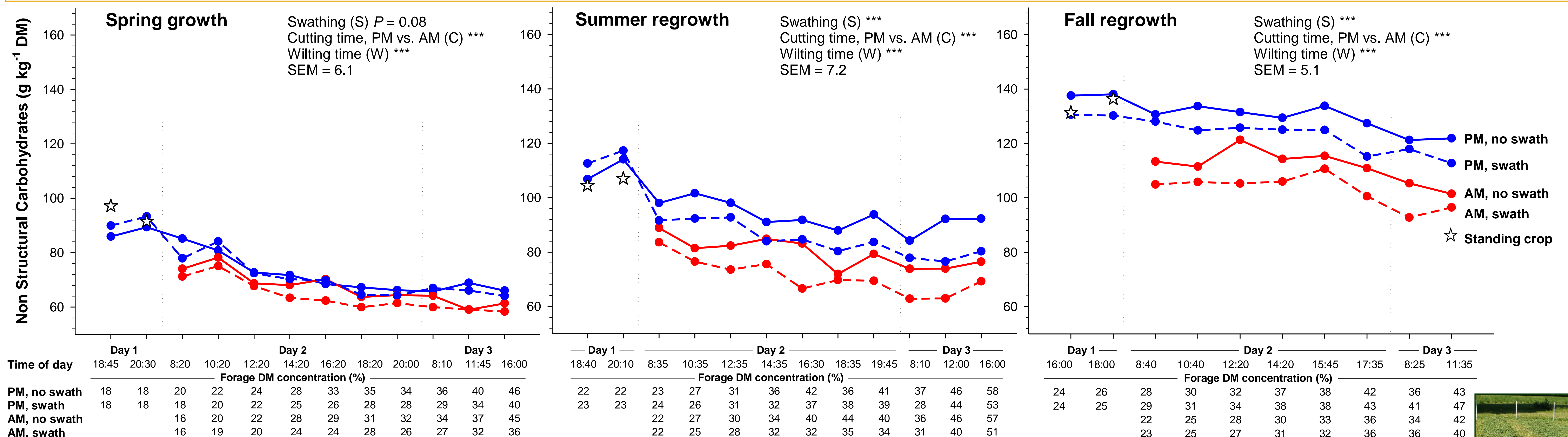
- Non structural carbohydrates (NSC) provide readily fermentable energy to rumen microbes. Increasing their concentration in alfalfa enhances *in vitro* microbial protein synthesis (Berthiaume et al., 2010), N use efficiency of dairy cows (Miller et al., 2001; Moorby et al., 2006; Brito et al., 2009), and intake and production in ruminants (Shewmaker et al., 2006; Brito et al., 2008).
- Delayed cutting during the day increases NSC concentration in forages (Pelletier et al., 2009, 2010) but little is known about what happens to NSC concentration during wilting.

Objective: To measure changes in NSC concentration during wilting of PM- and AM-cut alfalfa.

Materials & Methods

- Field-grown (46°48' N; 71°23' W) alfalfa (cv. AC Caribou) was mown with or without swathing at the early flowering stage of development either at 18h30 (PM) of a sunny day or at 8h30 the following morning (AM).
- Treatments were allocated randomly in three blocks. Forage samples were taken at cutting times, then every 2 hours from 8h30 until the end of the second day, and every 4 hours on the third day. Sampling time during wilting was considered to be repeated measurements.
- This 3-day experiment was conducted twice in spring (12-14 June; 30 June-2 July) and summer (20-22 August; 26-28 August), and once in fall (6-8 October) of 2008 (n = 223). Averages for each growth period are presented in graphs.
- Concentration of NSC (glucose + fructose + sucrose + pinitol + starch) was chemically measured in a calibration set of samples and then predicted by near infrared reflectance spectroscopy.

Results & Discussion



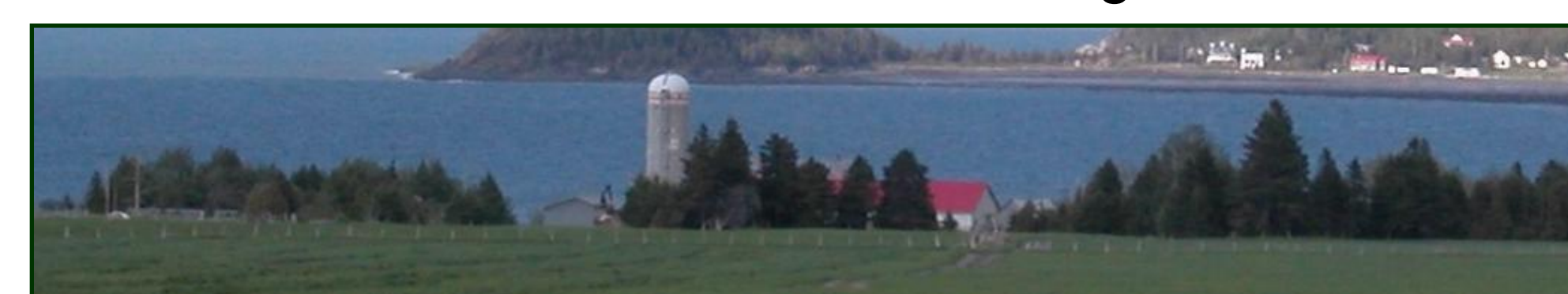
- At cutting, alfalfa NSC concentration was on average 19% greater in PM- than in AM-cut alfalfa (+17% in spring, +18% in summer, and +22% in fall).
- Concentration of NSC remained greater in PM- (blue lines) compared to AM-cut alfalfa (red lines) throughout the wilting period.
- Wilting was faster in summer and fall. At the end of the second day, forage DM concentration reached 26-34% in spring, 34-41% in summer, and 36-43% in fall (see tables).
- When wilting was fast, in summer and fall, alfalfa NSC concentrations were on average 7% greater with no swathing (solid lines) than with swathing after cutting (dashed lines).

Conclusions

- Cutting alfalfa in PM improved NSC concentration before wilting by 17, 18, and 22 % in spring, summer, and fall, respectively.
- Concentration of NSC remained greater in PM- compared to AM-cut alfalfa throughout the wilting period. The rate of decrease in alfalfa NSC concentration during wilting was lower in summer and fall when wilting was faster than in spring.
- No swathing after cutting helps preserving NSC concentration in alfalfa forage, specially when conditions allow fast wilting.
- Cutting alfalfa at the end of the afternoon (16-18h00), without swathing, maximizes NSC concentration in wilted forage when climatic and crop conditions favor rapid wilting.

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