Temperature-Based Fertilization for Early Forage Production in Southwestern Oregon, Using the T-Sum 200 Method

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Production of forage early in the growing season is a cost-effective livestock grazing management strategy (2). West of the Cascade Mountains, forage production is typically low in late fall and early spring (2). Nitrogen fertilizer applications are typically made just prior to peak growth, which occurs in April or May (2). However, additional forage is not necessary during peak growth but earlier in the grazing season. Increases in forage production earlier in the grazing season would extend the season and reduce supplemental feeding.

Studies conducted in southwestern British Columbia, Canada (1) found that adjusting the timing of N application according to T-Sum 200 was effective in maximizing early pasture forage production, and was an effective estimator for N application. The T-Sum 200 value is determined by accumulating the average daily air temperature above 0 °C from 1 January in each year without subtracting mean values below freezing (3). Calculation details for T-Sum 200 are available from the Oregon State University Integrated Plant Protection Center (4).

T-Sum 200 is based on the assumption that winter temperatures arrest plant growth. In southwestern Oregon, the approximate T-Sum 200 dates occur in late January or early February. This is the date at which plant growth typically begins.

Our objective was to determine effectiveness of N fertilization at T-Sum 200 compared to traditional N application timing in coastal southwestern Oregon. The field trial was conducted near Coos Bay, Oregon. The research site was at sea level with an average annual rainfall of 60 inches, occurring primarily between October and March. Trials were conducted on an improved, sub-irrigated pasture dominated by perennial ryegrass (Lolium perenne L.), annual ryegrass (L. multiflorum), and white clover (Trifolium repens) during the growing seasons of 1999 and 2000. Three treatments were evaluated in a randomized complete block design: N at 60 lb/acre as urea (46-0-0) was applied at T-Sum 200 (19 February 1999 and 4 February 2000), and at a later, traditional application timing (26 April 1999 and 13 April 2000). The third treatment was a zero-N control.

When pasture height reached 8 to 10 inches, plots were clipped to 3 to 4 inches to simulate grazing. Plots were sampled multiple times during the growing seasons and adjusted to a per-acre basis. After each sample collection, plots were grazed to remove remaining forage in accordance with the manager’s strip-grazing schedule. Samples were analyzed for dry matter (DM) yield and N concentration. Differences among treatments were analyzed using analysis of variance at the 95% confidence level in S-Plus 7.0 (Insightful Corporation, Seattle, WA).