

Protecting Groundwater while Optimizing N Applications for Pasture Forage Production in Oregon. Mylen Bohle, Jay Carr, Troy Downing, Shelby Filley*, John Hart, Gene Pirelli*, Marni Porath, and Amy Ruddell. Oregon State University Extension Service. Corvallis, OR 97331.

In western Oregon the quantity of early season forage is insufficient for livestock needs. Nitrogen (N) is limiting, and early applications of N are vulnerable to loss from leaching in our wet climate. Experiments were conducted to determine whether N applied early in the growing season, a time coinciding with 200°C cumulative growing days (T-sum 200), would be retained and utilized for early season forage production (late winter, early spring). In experiment I (Douglas County, OR-1999) forage plots were treated with no N (control), 60 Lb. N/ac at T-sum 200 applied as urea (T-sum; Feb. 5), and 60 Lb. N/ac at the traditional time for fertilization (Trad; April 2). In experiment II (Benton County, OR-1999), treatments were control (no N), T-sum plus Trad (60 Lb. N/ac applied as urea at T-sum 200 plus 60 Lb. N/ac at the traditional time for fertilization; Feb. 10 and April 5) and Trad (60 Lb. N/ac at the traditional time for fertilization, April 5). In experiment I, there was a significant treatment by clipping date interaction for yield, protein concentration and N uptake. That is, early forage production was significantly increased in the T-sum treated plots compared to the other treatments. Later, Trad plots had the highest yield. Cumulative forage production was 3841, 4881 and 5945 Lb./ac for control, T-Sum 200, and Trad treatments, respectively. Protein concentration from the T-Sum treatment at the first harvest date (March 5th) was 19.7% and from the plots receiving no N, 15.3%. Similarly, on the third harvest (April 26) highest protein concentration was 20.2% for Trad (applied April 2nd) and lowest for no N (17%) and T-sum (15.9%) plots. N uptake followed similar patterns to yield and protein. Mean cumulative uptake by forage from control plots was 92 Lb. N/ac, forage from the Trad contained 169 Lb. N/ac, and forage from the T-Sum treatment contained 128 Lb. N/ac. No treatment differences were present by last harvest. With the exception of higher forage yields in 2000, results were similar to 1999. For experiment II, N application at T-sum plus Trad significantly increased forage production compared to the Trad and no N applications (5267, 2156, and 2553 Lb./ac, respectively). Protein concentration at harvest was higher in T-sum plus Trad (14.7 %) compared to Trad (12.3 %), but not different from control (13.0%). Approximately the same amount of N applied at T-Sum 200 was taken up by the additional growth, and was 70 Lb. N/ac more than the other treatments. Mean N uptake for control, Trad, and T-sum plus Trad was 53, 42 and 123 Lb. N/ac, respectively. For year 2000, early N application significantly improved early forage yield, N uptake, and protein content. Forage yield was lower in 2000 compared with 1999. In summary, application of N at T-Sum 200 generally increased early forage production and protein content. On N fertilized plots the amount of N recovered in excess of controls was similar to the amount of N applied at T-Sum 200 (early Feb. for western OR). Application of N at T-Sum 200 should be used on sites where N is clearly limiting. Early growth will be produced, utilizing the N that is supplied, and livestock producers will benefit from the early season forage without detrimental effects to the environment.