North Dakota State University * Dickinson Research Extension Center
1133 State Avenue, Dickinson, ND 58601 Voice: (701) 483-2348 FAX: (701) 483-2005

TWICE-OVER ROTATION GRAZING MANAGEMENT SYSTEM WITH COMPLEMENTARY SPRING AND FALL DOMESTICATED GRASS PASTURES

Llewellyn L. Manske PhD Associate Range Scientist

Grass plants have developed biological processes as adaptive tolerance mechanisms in resistance to defoliation during the long period of coevolution with herbivores. Defoliation by grazing can be used to stimulate these resistance mechanisms and beneficially manipulate grass growth and development when timed to occur during the appropriate phenological growth stages of grass plants. The twice-over rotation grazing management system applies defoliation to the grassland ecosystem during these phenological growth stages. In addition to the importance of timing defoliation to activate adaptive tolerance mechanisms, three inherent problems need to be considered when grazing management practices are implemented in the Northern Great Plains: 1) plant growth is limited by several factors, 2) ungrazed grasses are low in nutritional quality during the later portion of the grazing season, and 3) grazing at certain spring and fall dates causes negative biological effects. Developed for the Northern Great Plains, the twice-over rotation grazing management system on native range with complementary domesticated grass spring and fall pastures addresses these major problems and applies defoliation when grass plants are responsive to stimulation of grazing resistance mechanisms.

A spring pasture of crested wheatgrass or other early-growing cool-season grass is used during the month of May. A 3- or 4-pasture native range rotation system is used from early June until mid October, with each pasture grazed for 2 periods. The first period is grazed for 15 or 11 days in each pasture of a 3- or 4-pasture system, respectively, during the 45-day period when grasses can be stimulated to tiller, from the third-leaf stage to the flowering stage (1 June to 15 July). The second period is grazed for 30 or 22 days in each pasture of a 3- or 4-pasture system, respectively, after mid July and before mid October. A fall pasture of Altai wildrye or other type of wildrye is grazed with cows and calves from mid October until weaning in early or mid November and grazed by dry cows from mid November until mid or late December. The twice-over rotation grazing management system with complementary

domesticated grass pastures has a grazing season of over 7.5 months, with the available forage above, at, or only slightly below the requirements for a lactating cow for nearly the entire grazing season. This system requires fewer than 12 acres per cow-calf pair for the entire 7.5 month grazing season on grassland that when grazed for 6.0 months seasonlong requires 24 acres per cow-calf pair.

The cow and calf weight performance, grass plant performance, and wildlife habitat of this system are improved over those of other systems tested in the Northern Great Plains. Improvements attributed to the twice-over rotation grazing management system are: 1) increased secondary tiller development of grasses, 2) increased activity levels of the symbiotic soil organisms in the rhizosphere, 3) increased plant basal cover (plant density), 4) increased aboveground herbage biomass, 5) improved nutritional quality of available forage, 6) reduced bare soil areas not covered by vegetation canopy, 7) reduced size of bare soil areas, 8) increased stocking rate levels, 9) improved individual animal performance, 10) increased total accumulated weight gain, 11) reduced acreage required to carry cow-calf pair for a season, 12) improved economic net return per cow-calf pair, 13) improved economic net return per acre, 14) improved habitat for prairie grouse, ducks, and ground nesting birds, and 15) decreased numbers of grasshoppers.

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