

## **Defoliation Effects on the Structure and Dynamics of Grassland Ecosystems**

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Management of grasslands in the Northern Great Plains requires producers to consider the response of grass plants to defoliation and the effects of defoliation on the plant communities. Grass plants have developed biological processes as adaptive tolerance mechanisms in response to defoliation during the long period of coevolution with herbivores and from the evolutionary selective forces of fire and drought. These processes include the ability of grass plants to increase the rate and quantity of vegetative growth through tillering and to release into the soil elements that enhance nutrient cycling and support the increased vegetative growth of the defoliated plant. Because these processes are stimulated by defoliation applied at particular growth stages of the plant, appropriately managed livestock grazing can be used to sustain healthy grassland ecosystems.

A research project was started in 1997 at the Dickinson Research Extension Center to determine the effects of defoliation on grassland plant species composition and biomass and to determine the season of use for domesticated grass pastures and native range.

Management considerations are given to factors that limit plant growth, periods of time when defoliation causes negative effects, and relationships between phenological growth stage and nutritional quality of herbage. Considerations are also given to periods of time when beneficial effects from defoliation can stimulate the adaptive tolerance mechanisms and manipulate grass growth and development.

The intent of this project is to develop an understanding of the effects of defoliation on grasslands in order to improve grazing management strategies that stimulate beneficial biological processes effectively. Sound management practice will ensure not only sustainable, efficient agricultural production from grasslands but also the continued ability of the grasslands to produce food and fiber for the people and economic return for the renters and landowners, to furnish adequate habitat for wildlife and endangered plants and animals, to protect and stabilize the soil from wind and water erosion, to supply clean water and clean air, and to provide open spaces for recreational activities and aesthetic experiences for the citizens of our nation.

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