Prescribed Sheep Grazing to Suppress Spotted Knapweed on Foothill Rangeland

Author(s): Brian D. Thrift, Jeffrey C. Mosley, Tracy K. Brewer, Brent L. Roeder, Bret E. Olson, and Rodney W. Kott
Source: Rangeland Ecology & Management, 61(1):18-25. 2008.
Published By: Society for Range Management
DOI: http://dx.doi.org/10.2111/05-199R2.1
URL: http://www.bioone.org/doi/full/10.2111/05-199R2.1

Prescribed Sheep Grazing to Suppress Spotted Knapweed on Foothill Rangeland

Brian D. Thrift,[1] Jeffrey C. Mosley,[2] Tracy K. Brewer,[3] Brent L. Roeder,[4] Bret E. Olson,[5] and Rodney W. Kott[6]

Authors are [1]Rangeland Management Specialist, Bureau of Land Management, Dillon, MT 59725, USA; [2]Professor, [3]Assistant Research Professor, [4]Research Associate, [5]Professor, and [6]Professor, Department of Animal and Range Sciences, Montana State University, Bozeman, MT 59717, USA.

Abstract

Spotted knapweed (*Centaurea biebersteinii* DC.) is a perennial, invasive forb that infests millions of hectares of private and public rangelands in western North America. Previous research indicates that domestic sheep (*Ovis aries*) readily graze spotted knapweed, but landscape-scale prescriptive grazing of spotted knapweed has not been studied. We quantified the diets and forage utilization of a ewe–lamb band (about 800 ewes and 1 120 lambs) that prescriptively grazed spotted knapweed–infested foothill rangeland in western Montana in the summers of 2003 and 2004. In mid-June or mid-July, sheep grazed light and moderate infestations of spotted knapweed (13% and 36% of vegetative composition, respectively). Nutritive quality of sheep diets was similar to sheep grazing uninfested rangeland, and sheep exhibited few forage preferences or avoidances. Sheep diets averaged 64% spotted knapweed in the moderate infestation and 26% in the light infestation. Sheep in the light infestation ate fewer graminoids in June than July (17% vs. 55% of their diet, respectively; $P = 0.04$), whereas sheep in the moderate infestation ate fewer graminoids in July (45% in June vs. 20% in July; $P = 0.09$). In the moderate infestation, relative utilization of spotted knapweed was greater in July than June (50% vs. 35%, respectively; $P = 0.04$), but averaged 46% in the light infestation. Previous research suggests that these levels of relative utilization may make herbicide application uneconomical. Relative utilization of graminoids was light in both infestations (15% in June or 31% in July). Our results indicate that sheep can prescriptively graze light or moderate spotted knapweed infestations in either June or July. Sheep consumption and relative utilization of graminoids will be less if light infestations are grazed in June rather than July. In moderate infestations, sheep will eat fewer graminoids and utilize spotted knapweed more heavily when grazed in July rather than June.

Resumen

El ''Spotted knapweed'' (*Centaurea biebersteinii* DC.) es una hierba perenne invasora que infesta millones de hectáreas de pastizales públicos y privados del oeste de Norte América. Investigación previa indica que los ovinos domésticos (*Ovis aries*) apacientan fácilmente el ''Spotted knapweed'', pero el apacentamiento prescrito de esta especie a nivel de paisaje no ha sido estudiado. Cuantificamos las dietas y utilización del forraje de un hato de ovejas y corderos (800 ovejas y 1 200 corderos) que apacentaron en forma prescrita, durante los veranos del 2003 y 2004, un pastizal de piedemonte infestado de ''Spotted knapweed'' en del oeste de Montana. A mediados de junio y mediados de julio los ovinos apacentaron infestaciones ligeras y moderadamente de ''Spotted knapweed'' (13% y 36% de la composición botánica, respectivamente). La calidad nutritiva de dieta de los ovinos fue similar apacentando pastizales infestados y no infestados, y los animales presentaron pocas preferencias de forrajes o rechazos. Las dietas promediaron 64% de ''Spotted knapweed'' en la infestación moderada y 26% en la infestación ligera. Los ovinos en la infestación ligera comieron menos gramíneas en junio que en julio (17 vs. 55% de su dieta, respectivamente; $P = 0.04$), mientras que los ovinos en la infestación moderada consumieron menos gramíneas en julio (45% en junio vs. 20% julio; $P = 0.09$). En la infestación moderada, la utilización relativa del ''Spotted knapweed'' fue mayor en julio que en junio (50% vs. 35%, respectivamente; $P = 0.04$), pero promedio 46% en la infestación ligera. La investigación previa sugiere que estos niveles de utilización relativa pueden hacer que la aplicación de herbicidas no sea económica. La utilización relativa de las gramíneas fue ligera en ambos niveles de infestación (15% en junio o 31% en julio). Nuestros resultados indican que los ovinos pueden apacentar en forma prescrita infestaciones ligeras o moderadas de ''Spotted knapweed'' tanto en junio como en julio. El consumo de los ovinos y la utilización relativa de las gramíneas será menor si las infestaciones ligeras se apacientan en junio en lugar de julio. En infestaciones moderadas, los ovinos comerán menos gramíneas y utilizaran más el ''Spotted knapweed'' si se apacientan en julio que en junio.

Key Words: *Centaurea*, Montana, *Ovis aries*, prescribed livestock grazing, targeted livestock grazing, weeds

INTRODUCTION

Spotted knapweed (*Centaurea biebersteinii* DC.) is an invasive, perennial forb introduced to the Pacific Northwest from Eurasia during the late 1800s (Watson and Renney 1974). Spotted knapweed is an aggressive competitor that can form large monocultures, not only in disturbed areas, but also on pristine rangeland (Tyser and Key 1988; Lacey et al. 1990). These monocultures reduce species richness (Tyser and Key

Research was funded by the USDA Initiative for Future Agriculture and Food Systems, the Joe Skeen Institute for Rangeland Restoration, the Montana Sheep Institute, and the Montana Agricultural Experiment Station.

At the time of research, Thrift was Graduate Research Assistant, Dept of Animal and Range Sciences, Montana State University, Bozeman, MT 59717, USA.

Correspondence: Dr Jeff Mosley, Dept of Animal and Range Sciences, Montana State University, Bozeman MT 59717, USA. Email: jmosley@montana.edu

Manuscript received 16 November 2005; manuscript accepted 12 October 2007.