



An Alternative to Traditional Wheat Stubble Management Using Sheep to Control Pests and Improve Soil Nutrient Cycling

Pat Hatfield (Montana – Research & Education Grant)



Project Number: SW00-015

Title: An Alternative to Traditional Wheat Stubble Management Using Sheep to Control Pests and Improve Soil Nutrient Cycling

Project Coordinator: Patrick Hatfield, Professor
Ruminant Nutrition/Sheep Production
Montana State University
Bozeman, MT 59717-2900
(406) 994-7952
hatfield@montana.edu

Western SARE Grant: \$170,335

Introduction

- Wheat stem sawfly
 - Most damaging insect pest to Montana's wheat industry
 - Current methods of management are either costly, ineffective or both
- Alfalfa weevil
 - Economically most damaging insect pest of alfalfa production
 - Current methods of management may have a negative impact on yield

Objective

- Wheat stem sawfly
 - Compare the impact of sheep grazing, fall tillage, and no-input control, in a multi-farm study, on over-wintering larval populations
- Alfalfa weevil
 - Determine alfalfa yield and quality and alfalfa weevil densities in non-grazed and winter through spring grazed plots

Materials and Methods

- Wheat stem sawfly
 - Conducted at 8 commercial grain operations
 - Treatments
 - Fall grazed, spring grazed, fall and spring grazed, fall tilled, and no-input control
 - Five white-faced ewes (30 x 40 ft plot)
 - Fall and spring only grazed = 1 aum/acre
 - Fall and spring combined = 2 aum/acre
 - Three (18 inch of row) samples were taken from each plot
 - Percent mortality of over-wintering wheat stem sawfly mortality was calculated
- Alfalfa weevil
 - Conducted at commercial sheep/alfalfa operation
 - Twelve (30 x 40 ft) plots, 6 grazed, 6 non-grazed
 - Ewe lambs (n=1600) grazed January through May 2002 and 2003
 - Biomass samples were taken at the beginning and end of the study
 - Forage samples were analyzed for CP, ADF, and NDF
 - Adult and larval densities consisted of 20 sweeps with a 15-inch-diameter sweep net



Results

- Wheat stem sawfly (Figure 1)
 - Larval mortality greater ($P < 0.10$) in grazed than tilled or control treatments
 - No differences ($P > 0.55$) between tilled and control treatments
 - Larval mortality was greater ($P < 0.03$) in combination fall and spring grazed
- Alfalfa weevil
 - Yield and forage quality did not differ ($P > 0.15$, Table 1)
 - Weevil larval numbers greater ($P < 0.05$) in non-grazed than grazed during all but the 5th and 12th sampling periods of 2002 (Figure 2)

Figure 1. Percent wheat stem sawfly mortality

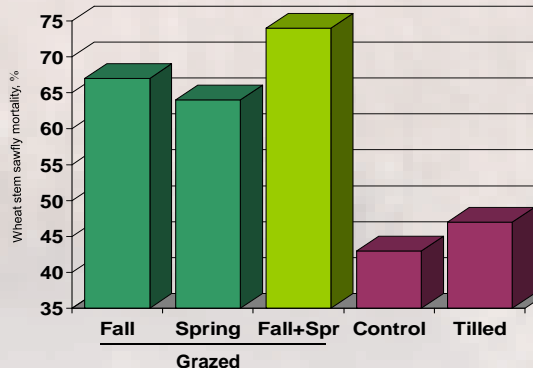


Figure 2. Alfalfa weevil larval counts in June of 2002 and 2003

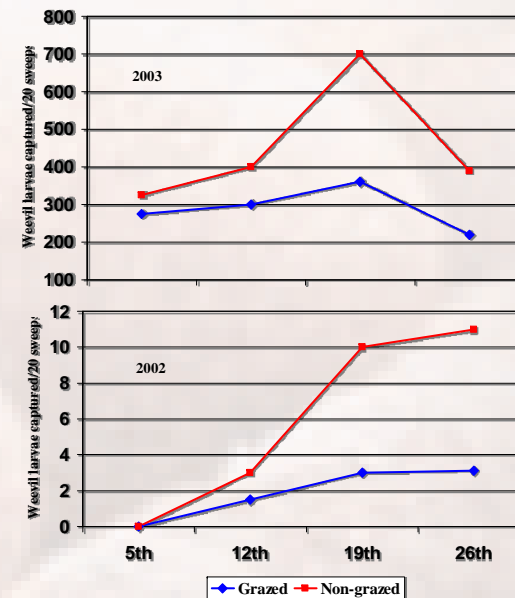


Table 1. Alfalfa yield, % CP, % ADF and % NDF in grazed and non-grazed plots

Treatment	Yield (kg/ha)	%CP	%ADF	%NDF
Grazed	5320	21.0	27.5	38.0
Non-grazed	5464	20.0	27.8	38.5

Implications

These data reflect the potential of integrating sheep into farming systems for the management of insect pests. Additionally, these data indicate that mutually beneficial partnerships between sheep and crop producers could reduce production costs for both enterprises.