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Authors

Lewis, Steven R.
O'Brien, John M.

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SURVEY OF RODENT AND RABBIT DAMAGE TO ALFALFA HAY IN NEVADA

STEVEN R. LEWIS, Nevada Cooperative Extension, P.O. Box 613, Eureka, Nevada 89316.

JOHN M. O'BRIEN, Nevada Department of Agriculture, P.O. Box 11100, Reno, Nevada 89510.

ABSTRACT: A survey of alfalfa hay producers was conducted to characterize vertebrate pest problems in Nevada alfalfa hay and help attract research funding. Damage to alfalfa hay by pocket gophers (*Thomomys* spp), ground squirrels (*Spermophilus* spp), black-tailed jackrabbits (*Lepus californicus*) and meadow voles (*Microtus montanus*) was assessed. Presence of vertebrate pests along with a ranking of cost-related problems they pose to alfalfa hay operations was determined. Pocket gophers were the most costly pest followed by ground squirrels, jackrabbits, and meadow voles. The number one problem caused by vertebrate pests was identified to be a decrease in hay production. Control techniques were rated as somewhat effective for all rodent and rabbit pests. The costs associated with farm management practices were ranked from highest to lowest in this order: irrigation, rodents and rabbits, weeds, insects, and fertilization.

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INTRODUCTION

Rodents and jackrabbits can be extremely damaging and costly to alfalfa operations if their populations are allowed to exist above economically significant levels (Piper 1909, Sauer 1978, Dunn et al. 1981, Luce et al. 1981). The damage costs associated with these pests are difficult to estimate and can differ on each farm. Crop losses and potential future losses caused by vertebrate pests must be assessed to determine if control is warranted (Rennison and Buckle 1988).

A survey designed to reveal alfalfa producers' perceptions of rodents and rabbit pest problems in Nevada was conducted in October of 1988. The use of surveys is a cost-effective means of gathering data on vertebrate pests (Crabb et al. 1986). The purposes of this survey were twofold: first, to identify the grower's perception of the economic significance of vertebrate pest problems; and second, to help attract research funding.

METHODS

A list of Nevada alfalfa hay producers (approximately 1,000) was compiled. Five hundred producers were randomly selected to participate in the survey. Each of the 500 participants was mailed a cover letter, a survey with identification number for follow-up purposes, a business reply envelope and a complimentary pencil. After 3 weeks, a second survey packet was sent to all nonrespondents. Two hundred seventy five surveys (55 percent) were returned. All producers who responded were thanked and sent a summary of the results. A copy of the survey form is in Appendix 1.

RESULTS

Pest Presence

Producers were asked to identify which vertebrate pest(s) are present on their farm (1/farm indicates presence).

Pocket gophers are present on 87 percent of the Nevada alfalfa hay farms. Ground squirrels and black-tailed jackrabbits are found on 51 percent of the farms. Meadow voles, also known as meadow mice, are present on 26 percent of the Nevada farms.

Pest Cost

On a scale of 0 to 5, producers were asked to rate the damage and control costs attributed to each of the four

vertebrate pests (0 = no cost, 1 = low cost through 5 = high cost).

Pocket gophers are considered by producers as the most costly pest with a mean rating of 3.0. Ground squirrels are thought to be half as costly as pocket gophers with a rating of 1.4. Jackrabbits follow closely behind ground squirrels with 1.3, and meadow voles are considered to be very near no cost with a rating of 0.4 (Table 1).

Table 1. Number of Nevada alfalfa grower responses in each rating category of the costs attributed to four vertebrate pests on their farms and the cost-rating category means.

Pest	Cost rating category ^a						Mean
	0	1	2	3	4	5	
Pocket gopher	31	31	41	56	28	84	3.0
Ground squirrel	134	35	25	34	18	26	1.4
Jackrabbit	127	45	45	25	7	23	1.3
Meadow vole	208	31	14	16	3	3	0.4

^a0 = no cost, 1 = low cost through 5 = high cost.

Problems Caused

Rodents and rabbits are costly because they impair or burden various aspects of alfalfa production. Nevada producers were asked to identify the No. 1 problem caused by vertebrate pests.

Decrease in hay yield is considered to be the biggest problem for 42 percent of the producers with damage to equipment and reduced equipment longevity for 32 percent. Increased labor and fuel costs are the biggest problem for 17 percent of the producers. Nine percent of producers feel the decrease in hay quality is the No. 1 problem caused by vertebrate pests.

Control Effectiveness

Producers were asked to identify overall combined effectiveness of the control techniques used for each vertebrate pest. Table 2 illustrates the percentage of Nevada alfalfa producers that control selected vertebrate pests and the overall effectiveness of the methods they use.

Table 2. The percentage of Nevada alfalfa hay growers that control four vertebrate pests and the effectiveness of the control methods they employ.

	Control practiced	Not effective	Somewhat effective	Effective
Pocket gopher	80%	11%	53%	14%
Ground squirrel	48%	4%	34%	8%
Meadow vole	14%	2%	8%	2%
Jackrabbit	38%	10%	22%	4%

When control measures are used, most producers (66%) feel they are somewhat effective. The most sought after pest is the pocket gopher and the least is the meadow vole. A little less than half the alfalfa producers practice some means of ground squirrel and jackrabbit control.

Most Effective Control Technique

Alfalfa producers have identified the following control techniques to be the most successful: trapping for pocket gophers, poison baiting for ground squirrels, shooting for jackrabbits, and cultural methods for meadow voles. These and other control techniques are presented in order of decreasing effectiveness for each vertebrate pest in Table 3.

Table 3. Number of Nevada alfalfa hay grower responses as to the most effective technique to control specific vertebrate pests.

Pest	Technique (no. of responses)		
	Most named	2nd	3rd named
Pocket gopher	trapping(138)	poison bait(56)	cultural(14)
Ground squirrel	poison bait(62)	shooting(36)	cultural(18)
Jackrabbit	shooting(84)	trapping(16)	cultural(12)
Meadow vole	cultural(16)	poison bait(12)	trapping(6)

Management Practice Cost Comparison

In an attempt to get a feel for vertebrate pest costs, producers were asked to compare them to the costs of other management practices. Producers rated five management practices on a scale of 0 to 5 (0 = no cost, 1 = low cost through 5 = high cost).

Producers rated the cost of five management practices in the following order: irrigation (3.67), rodents and rabbits (2.52), weeds (2.28), insects (2.17), and fertilization (2.03). Rodent and rabbit damage along with control costs is considered to be the second-highest management practice cost to alfalfa operations.

DISCUSSION

This study, through the assistance of Nevada alfalfa hay producers, compared the magnitude of rodent and rabbit damage in Nevada alfalfa fields to other costs of operation. While the economic significance of these vertebrate pests was not quantified, it appears high. Alfalfa producers perceive the vertebrate pest control and damage costs to be less costly than irrigation, but more expensive than weed management, insect management, or fertilization. The information gathered by this project will serve to substantiate the need for additional, more intensive research in vertebrate pest control.

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Appendix 1. SURVEY OF RODENT AND RABBIT DAMAGE TO ALFALFA HAY IN NEVADA

1. Which of the following pests are present in your alfalfa fields?

- a. Pocket gophers _____
- b. Ground squirrels _____
- c. Meadow voles _____
- d. Jackrabbits _____

2. Please rate the following pests in order of cost-related problems they pose to your alfalfa hay operation.

(0 = no cost, 1 = low cost, 5 = high cost)

- a) Pocket gophers 0 1 2 3 4 5
- b) Ground squirrels 0 1 2 3 4 5
- c) Meadow voles 0 1 2 3 4 5
- d) Jackrabbits 0 1 2 3 4 5

3. Which of the following is the worst problem caused by these pests. (Please check only one)

- a) Decrease hay quality _____
- b) Decrease hay quantity _____
- c) Damage equipment and reduce equipment longevity _____
- d) Increase labor and fuel costs _____

4. Please rate the costs associated with each of the following management practices as they exist in your farming operation.

(0 = no cost, 1 = low cost, 5 = high cost)

- a) Irrigation 0 1 2 3 4 5
- b) Fertilization 0 1 2 3 4 5
- c) Weeds 0 1 2 3 4 5
- d) Rodents & rabbits 0 1 2 3 4 5
- e) Insects 0 1 2 3 4 5

5. How effective is your rodent and rabbit control?

	Effective	Somewhat Effective	Not Effective	No control Practiced
a) Pocket gophers	_____	_____	_____	_____
b) Ground squirrels	_____	_____	_____	_____
c) Meadow voles	_____	_____	_____	_____
d) Jackrabbits	_____	_____	_____	_____

6. Please identify the most effective control technique practiced for these pests. (Please check only one technique per pest)

	Trapping	Shooting	Poison Bating	Fumigation	Cultural Practice
a) Pocket gophers	_____	_____	_____	_____	_____
b) Ground squirrels	_____	_____	_____	_____	_____
c) Meadow voles	_____	_____	_____	_____	_____
d) Jackrabbits	_____	_____	_____	_____	_____

7. How many acres of alfalfa do you have in production? _____ acres

COMMENTS:

Please mail in the enclosed self-addressed envelope. No postage is necessary. Thank you for your help.

