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Dietary preference of angora goats grazing leafy spurge-infested rangeland

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Introduction

Leafy spurge infests approximately 1.2 million acres in North Dakota accounting for over \$137 million per year depreciation losses and \$75 million in forgone business activity (Thompson *et al.* 1990). Due to its aggressive spread and tremendous survival, integrated methods of control are being used to complement the traditional chemical means. One of those methods is grazing by goats. Goats consume leafy spurge without the apparent negative effects experienced by cattle and horses. Cattlemen, however, are concerned with the dietary overlap of goats with cattle and the competition for forage selected by cattle.

Materials and methods

The study was conducted on the Sheyenne National Grasslands. The Grasslands are managed by the U.S. Forest Service for multiple purposes in southeastern North Dakota. Angora goats were introduced into areas heavily infested with leafy spurge which are co-grazed by cattle. Two herds of 1300 Angora goats were rotated through allotments in 1992. Diets were collected following a video tape evaluation and analyzed for nutrient composition. Fecal samples were collected at the same time and sent to the Composition Analysis Laboratory in Fort Collins, Colo. for microhistological analysis. Available forage in these allotments was measured prior to the Angora goats introduction. Fifteen 0.1 m² quadrats were randomly sampled in each of the general cover types. A Preference Index was developed using the formula (Durham and Kothmann 1977):

$$\text{Relative Preference} = \frac{\% \text{ in diet} - \% \text{ available}}{\% \text{ in diet} + \% \text{ available}} \times 10$$

A relative preference of 0 indicates selection in accordance with plant availability. A positive value indicates preference for a plant while a negative number indicates nonpreference or avoidance.

Results and discussion

Leafy spurge and Kentucky bluegrass were the most available species in all allotments at all times of the grazing season. The fecal analysis determined that leafy spurge was a predominate part of the diet. Warm season grasses made up a significant portion of the diet in June (20%) and early August (30%). The goats' fecal analysis showed this to be primarily sand dropseed which was found only when the Angora goats grazed in one allotment at these times. The Angora goats' feces also contained large amounts of shrub and tree material at all times of the year. The relative preference index (Table 1) showed a positive preference for leafy spurge and shrubs-trees at all times of the growing season except during late June sampling. The allotment grazed at this time had such a heavy spurge infestation that selection was equal to availability.

Table 1. Relative preference index¹ for forage selected by Angora goats.

Forage class	Date				
	6-8	6-13	6-27	1-28	8-2
Leafy spurge	2	4	0	4	3
Forbs	-8	-4	7	-5	-5
Shrubs	8	7	8	7	5
Kentucky bluegrass	-10	-10	-10	-10	-10
OCS ²	-6	3	-9	-8	-8
WS ²	7	0	-2	4	-3
OGL ²	-4	-1	-6	-5	-9

¹ 0 = selection in accordance with availability

> 0 = preference for plant class

< 0 = nonpreference or avoidance of plant class

² OCS = other cool season grasses, WS = warm season grasses, OGL = other grass-like plants.

With few exceptions, the vegetation classes most preferred by cattle were not preferred by the Angora goats. Certain species of warm and cool season grasses were preferred by the goats at different times of the grazing season relating to their occurrence in the different grazing allotments.

The nutritional composition of the diet selected by the goats is shown in Table 2. Although the quality of the diets declined with advancing plant maturities, the nutritional requirements of nursing does was met throughout the growing season.

Table 2. Nutritional composition of leafy spurge based diets selected by Angora goats¹.

Nutrient	V	F	Stage of Growth ²			
			EM	2	LMM	R
DM ³	92	92	93	95	95	87
Ash	7.5	8.0	8.3	9.4	8.7	7.2
CP	19.2	17.6	17.9	18.8	17.8	13.2
IVDMD	76	73	70	63	68	73
Phos	0.38	0.37	0.36	0.35	0.33	0.27
ADIN	0.20	0.21	0.25	0.44	0.31	0.21
ADF	22.1	24.4	22.8	30.2	23.6	19.2
NDF	28.8	32.1	32.6	43.5	33.6	26.6
ADL	5.3	5.9	6.3	8.4	7.4	5.4

¹ Mean-1991, 1992

² V=vegetative, F=flowering, EM=early mature, 2=second grazing at flowering, R=late season regrowth

³ DM=dry matter, CP=crude protein, ADIN=acid detergent insoluble nitrogen, IVDMD=in vitro dry matter digestibility, ADF=acid detergent fiber, NDF=neutral detergent fiber, ADL=acid detergent lignin, Phos=phosphorus.

Summary

Angora goats prefer leafy spurge along with shrubs and trees in southeastern North Dakota rangelands infested with leafy spurge. Their dietary overlap with cattle appears to be minimal making them a good biological control medium in rangelands grazed by cattle.

Literature Cited

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