EFFECT OF POLOXALENE ON PERFORMANCE AND FORAGE INTAKE OF WHEAT PASTURE STOCKER CATTLE

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Story in Brief

Twenty-six fall-weaned Angus and Hereford x Angus heifers (mean initial weight 480 lb) grazed a common winter wheat pasture for 100 d during the 1984-85 grazing season. Heifers were fed daily in individual stalls about 1.9 lb of supplement with or without poloxalene. Daily poloxalene intake during the trial was 0 or 1.6 g/100 lb of body weight. Heifers were observed for bloat daily between 1000 and 1200 h. Intake and digestibility of wheat forage were measured once (March 4 to 13) during the trial. Daily gains of heifers were not affected by poloxalene. Digestibility of wheat forage was not affected by poloxalene, however intake of forage DM and OM was increased by poloxalene. Incidence of bloat during the trial was low. Eighteen animal days of bloat were observed for control heifers, whereas only 2 animal days of bloat were observed for heifers fed poloxalene.

(Key Words: Wheat Pasture, Poloxalene, Stocker Cattle, Bloat.)

Introduction

Frothy bloat is a major cause of death of wheat pasture stocker cattle (Clay, 1973). Death losses due to bloat are believed to be about 2.5% of total stockers and have been as high as 20% on some pastures. Studies reported by Bartley et al. (1975) and Clay (1976) have shown that daily feeding of poloxalene at levels of 1 to 2 grams/100 lb body weight significantly reduced the incidence and severity of bloat in wheat pasture stockers. Weight gains of wheat pasture stockers were increased in two of three field trials conducted by Clay (1976) were poloxalene-containing supplements were fed. Control cattle were not fed any supplement so the effect of poloxalene *per se* on weight gains was not measured. Daily gain is a very key figure that affects the profitability of stocker enterprises. Therefore, economic considerations of using poloxalene in wheat pasture stocker programs are greatly influenced by potential effects of poloxalene on cattle performance. The objective of this study was to examine the effect of poloxalene on weight gains and forage intake, and obtain additional information as to the effect of poloxalene on frothy bloat of stocker cattle grazing winter wheat pasture.

Materials and Methods

Twenty-six fall weaned Angus and Hereford x Angus heifers (480 ± 20 lb mean initial weight) were randomly allotted by initial weight and breed to two treatments that consisted of 0 or approximately 2 grams

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poloxalene/100 lb body weight/day. The heifers grazed a common winter wheat pasture for a pre-trial adaptation period of 3 weeks and a 100-day experimental period (1/4/85-4/12/85). The heifers were weighed upon arrival, at the start of the trial, mid-term, and at the conclusion of the trial. All weights were measured following a 15-17 h shrink without feed or water, and daily gains were calculated for two 50-day grazing periods and for the entire 100-day trial.

The wheat pasture (Variety TAM 105) consisted of 36 acres and was divided by electric fencing into 4 paddocks. During the experimental period, the heifers were rotated as a single group among the four paddocks with the objective of always having a relative immature forage for the cattle to graze. The pasture was fertilized with 105 lb/acre of anhydrous ammonia at planting. Hand-clipped forage samples were collected approximately every 2 weeks throughout the trial and dried at 60 C in a forced-air oven. Samples were analyzed for crude protein and neutral detergent fiber concentrations.

The heifers were individually fed daily 1.98 and 1.76[b] lb of supplement, with and without poloxalene, during grazing periods 1 and 2, respectively. The supplement consisted of (as-fed): 75% ground corn, 10% cottonseed hulls, 8% ground alfalfa hay, 7% molasses, plus the appropriate level of poloxalene. Samples of supplements were collected twice weekly and composited within treatments by period for poloxalene analysis by SmithKline Animal Health Products. Theoretical and actual[c] poloxalene intakes during each grazing period were calculated.

Wheat forage intake and digestibility of dry matter (DMD) and organic matter (OMD) were measured once during the study (March 4 to 13). Heifers were bolused with a gelatin capsule containing 4 g chromic oxide powder twice daily (0800 and 1600 h) during a 6-day preliminary and 4-day fecal collection period. Fecal samples were taken from the rectum at time of bolusing and dried in a forced air oven at 60 C. Dried fecal samples were composited by animal and analyzed for chromium concentration by atomic absorption spectrophotometry. Fecal outputs were calculated by the chromium dilution technique. Forage DMD and OMD were determined using indigestible neutral detergent fiber (INDF) as an internal indigestible marker.

All heifers were observed for bloat daily between 1000 and 1200 h and assigned a bloat score as follows:

Bloat Score	Description
0	No indication of bloat
1	Slight distention of left side
2	Marked distention of left side
3	Distention of left and right sides

Analysis of variance of the weight gain and forage intake data was conducted using the General Linear Model Procedure of the Statistical Analysis System for a completely randomized design. Treatment was the only source of variation included in the model.

[b]Theoretical poloxalene concentration of supplement was increased from 5.0 to 7.0 grams/lb.

[c]Calculated from "analyzed" poloxalene concentrations of the supplements.

Results and Discussion

All observations of two heifers of the poloxalene treatment group were deleted from the data because of poor supplement intakes. Mean poloxalene intakes of the remaining heifers are shown in Table 1. Theoretical poloxalene intakes were about 1.9 g/100 lb body weight in both periods of the study. Actual poloxalene intakes were 1.57 and 1.70 g/100 lb body weight during periods 1 and 2, respectively.

Wheat forage protein and NDF concentrations are plotted in Figure 1. Protein concentrations ranged from 20 to 28% of DM, and NDF concentrations ranged from 48 to 59% of DM.

Weight gains of the heifers are shown in Table 2. Poloxalene did not affect ($P>.10$) daily gains of heifers during either grazing period, or during the 100-day trial.

Forage intakes of the heifers are shown in Table 3. Digestibility of forage DM and OM was not affected by poloxalene supplementation ($P>.10$). However, intakes of forage DM and OM were greater ($P<.05$) for heifers receiving poloxalene, possibly due to a reduction in the severity of bloat and(or) intraruminal pressure. Forage intakes of heifers fed poloxalene were increased enough that weight gains should have been increased. Forage intake was measured during the period of lush spring growth of wheat and during the period of highest incidence of bloat (i.e., February 25 to March 24). If the improvement in forage intake by poloxalene is related to and(or) dependent on the occurrence of bloat, forage intake may have been increased for only a relatively short period of the total trial and may not have been increased over a long enough period to affect weight gains. This aspect of the data needs further study.

The incidence of bloat during the trial is shown in Table 4. Overall, the incidence of bloat was low. Eighteen total bloat scores of 1 were recorded for heifers of the control group, and 2 bloat scores of 1 were recorded for heifers fed poloxalene. No bloat scores of 2 or 3 were observed during the study. Six of the twenty bloat scores were recorded during the first week of the study (January 4 to 11, 1985) and 12 of the bloat scores were recorded from March 1 to 24, 1985. The wheat forage of these two periods was, respectively, immature and making rapid spring growth.

Table 1. Poloxalene Intakes (grams/100 lb body weight) of Heifers During the Two Grazing Periods on Wheat Pasture.

Item	Treatment	
	Control	Poloxalene
Number of heifers	13	11
Theoretical		
Jan 4 to Feb 22	0	1.88
Feb 23 to Apr 11	0	1.95
Actual[a]		
Jan 4 to Feb 22	0	1.57
Feb 23 to Apr 11	0	1.70

[a]Actual poloxalene intakes were calculated from analyzed poloxalene concentrations of supplements.

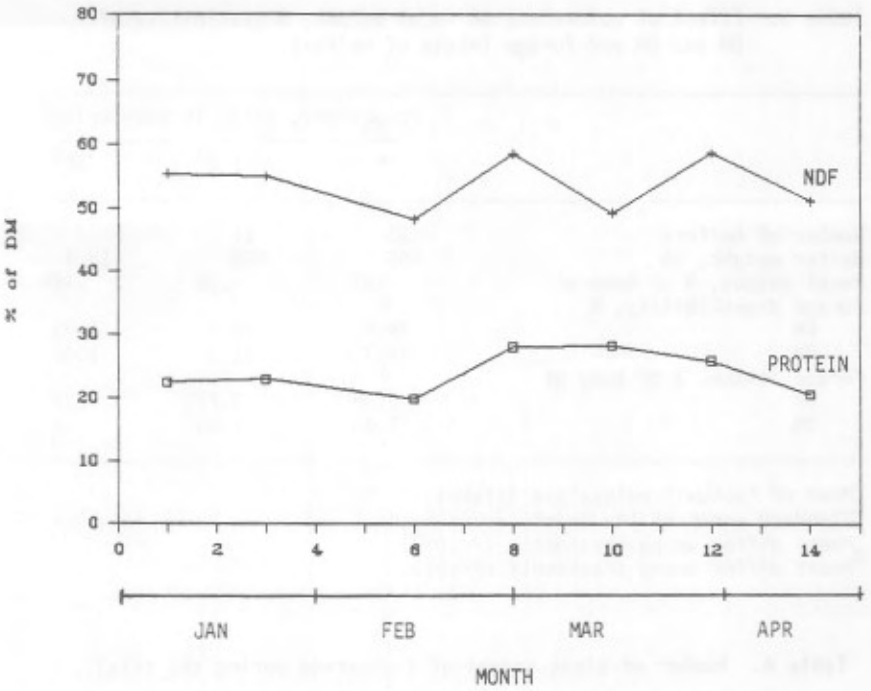

Figure 1. Protein and neutral detergent fiber concentrations (% of DM) of wheat forage samples.

Table 2. Effect of poloxalene on daily gains of heifers[a].

		Poloxalene, g/100 lb body weight		
		0	1.6[b]	SE[c]
Number of heifers		13	11	
Initial weight, lb		475	486	20.1
Daily gains, lb	Days			
1/4/85 - 2/22/85	50	1.84	1.86	.11
2/22/85 - 4/12/85	50	2.16	2.18	.14
Total	100	2.00	2.02	.10

[a]Daily gains were not different (P>.10) among treatments.
[b]Mean of "Actual" poloxalene intakes.
[c]Standard Error of the least square means.

Table 3. Effect of poloxalene on fecal output, digestibility of DM and OM and forage intake of heifers.

	Poloxalene, g/100 lb body weight		
	0	1.6[a]	SE[b]
Number of heifers	13	11	
Heifer weight, lb	596	596	18.9
Fecal output, % of body wt	.57	.72	.145
Forage digestibility, %			
DM	79.4	79.9	1.05
OM	71.7	74.3	1.41
Forage intake, % of body wt			
DM	2.98	3.77[c]	.25
OM	1.46	1.98[d]	.13

[a]Mean of "actual" poloxalene intakes.
[b]Standard error of the least square means.
[c]Means differ among treatments (P<.05).
[d]Means differ among treatments (P<.01).

Table 4. Number of bloat scores of 1 observed during the trial.

	Poloxalene, g/100 lb body wt	
	0	1.6[a]
Number of heifers	13	11
Month		
January[b]	5	1
February	2	0
March	11	1
April[c]	0	0

[a]Mean of "actual" poloxalene intakes.
[b]Beginning January 4, 1985.
[c]Ending April 11, 1985.

Literature Cited

Bartley, E.E., et. al. 1975. Bloat in Cattle. XVII. Wheat pasture bloat and its prevention with poloxalene. J. Anim. Sci. 41:752.
Clay, B.R. 1973. Stocker cattle losses on small grain pastures. J. Okla. Vet. Med. Assn. 25:15.
Clay, B.R. 1976. Proceedings Oklahoma Cattle Feeders' Seminar. p A-1.