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# **Effects Of Continuous Dosage Of Penicillin For Control Of Bloat In Steers**

By

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### Summary and Conclusions

During the 1958 and 1959 pasture seasons penicillin was administered to steers grazing Ladino clover to determine how long penicillin was effective in controlling incidence and severity of bloat.

From the results of this two-year study it appeared that penicillin administered at the rate of 100 mg. per day was effective in controlling bloat for 14 to 17 days. The average daily severity of bloat increased after 17 days, however, it was not as high as the severity for non-penicillin treated controls. The average daily incidence of bloat increased to a maximum (2.0) after 21 days and fluctuated near the maximum for the next 15 days.

These results confirm previous recommendations that penicillin-salt feeding should not be started until it is needed. One should not start feeding penicillin when a bloat situation is anticipated, but should remove all salt and wait until bloat starts occurring before feeding penicillin-salt. Penicillin-salt should not be fed longer than 21 days for maximum protection from bloat.

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# EFFECTS OF CONTINUOUS DOSAGE OF PENICILLIN FOR BLOAT CONTROL IN STEERS

By H. W. ESSIG, C. B. SHAWVER and L. W. WILLIAMS

Bloat in animals grazing legumes causes an extremely large economic loss to cattle. Administration of penicillin and other antibiotics has been reported to prevent bloat for varying periods of time.

Barrentine, et al (1956) reported that either procaine or potassium penicillin (50 mg. per animal) administered either by capsule or in an aqueous suspension as a drench to yearling steers grazing Ladino clover gave protection for periods of 1.5 to 3 days. In later work reported by Barrentine (1958) penicillin-salt mixtures were observed to become less effective in preventing bloat after prolonged use and the decreased efficiency began to occur after the cattle had received penicillin continuously for 10 to 14 days.

Thomas (1956) observed no severe bloating in cattle during the period from 12 to 96 hours after each animal had been given 100 mg. of procaine penicillin. Brown, et al (1958) reported that 75 mg. of penicillin provided in a feed supplement reduced bloat when first administered to steers receiving alfalfa soilage, however, later in the season animals fed penicillin had as high an incidence and severity of bloat as did the controls.

In previous work at the Mississippi Agricultural Experiment Station Dr. Ben F. Barrentine observed that penicillin becomes less effective in preventing bloat after prolonged use. (Mississippi Farm Research July 1958).

This study was undertaken to determine the length of time that penicillin would control bloat in steers grazing Ladino clover and also to determine when or if the incidence and severity of bloat would return to as high a level as before administration of penicillin.

## Experimental Procedure

Paddocks containing almost pure stands of Ladino clover were used in this study. Steers grazed the clover for 90 minutes, morning and afternoon (7:30 A.M. and 2:30 P.M.), making it possible for each steer to bloat twice daily (possible daily incidence of 2.0 per steer). At the end of each grazing period the steers were checked for bloat and put in drylot with shade and water. Bloat was determined by visual observation. Severity was rated as not bloated (0), slightly bloated (1), moderately bloated (2), or severely bloated (3). The maximum daily severity rating was 6 per steer, assuming a steer bloated severely twice in one day.

The individual daily severity scores for all animals on a treatment were averaged to give an "average daily severity". The "average daily incidence" was determined in the same manner. The maximum "average daily incidence" was 2.0.

In trial 1, conducted during the summer of 1958, 10 steers which had been classified as bloaters were subjected to the above bloat producing procedure. They were allowed to graze Ladino clover for seven and one-half days prior to administration of penicillin so that each steer would serve as his control. Steers were given penicillin, by capsule, for a 20-day period at the rate of 100 mg. per day (400 mg. of 50% feed grade penicillin every second day). The penicillin treatment was started after the morning grazing of the eighth day of the trial. Steers were maintained on Ladino clover for four days after cessation of penicillin treatment.

In trial 2, conducted during the summer of 1959, eight steers which were

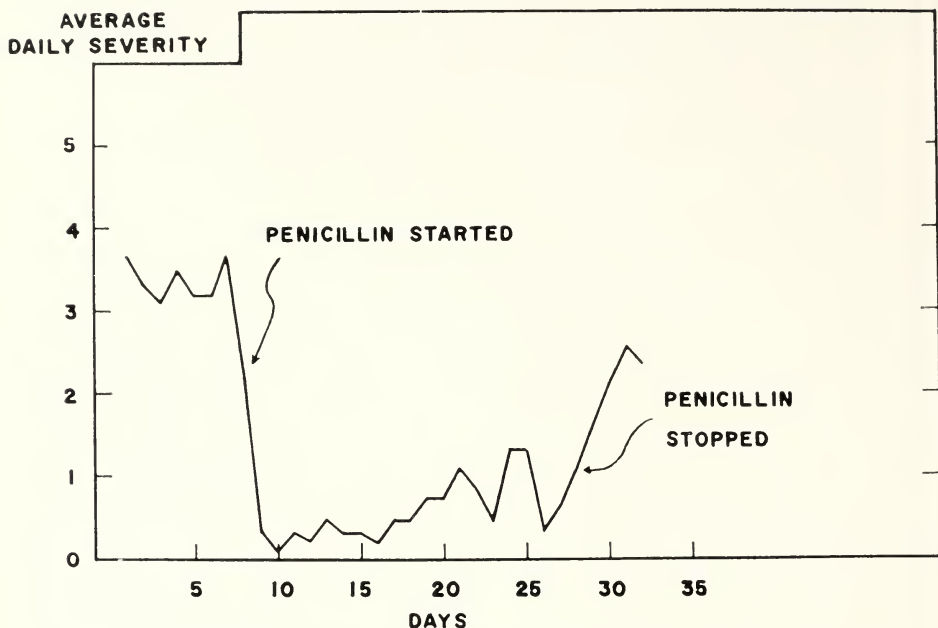


Figure 1. Trial 1. Average daily severity on a per steer basis for 32 days.

bloating readily were divided into two groups. One group of four steers served as controls (non-treated) and the other group was given penicillin, by capsule, for a 36-day period at the rate of 100 mg. per day (400 mg. of 50% feed grade penicillin every second day). Penicillin treatment was not started until the study had been in progress for four and one-half days. This four and one-half day period served as a control period as well as a period for assuring that all steers bloated readily.

**Results and Discussion**

Trial 1. Severity and incidence of bloat for the summer of 1958 are shown in Table 1. For a 7.5 day pretreatment control period there was an incidence of 84

and a severity index of 59. When the animals were administered penicillin at a rate of 100 mg. per day, the incidence index decreased to 15 and the severity index decreased to 9, indicating that penicillin decreased both incidence and severity for 20 days. When penicillin administration was terminated, the incidence and severity again increased to a level approximately three times as high as when penicillin was administered.

Figures 1 and 2 show the average daily severity which dropped from approximately 3.3 to 0.3 for the 20 days during which penicillin was administered. Figure 1 shows that there was a slight increase in average daily severity during the last

Table 1.—Trial 1 (1958) severity and incidence of bloat

Period	Incidence				Severity		
	Days	Possible	Observed	Index <sup>1</sup>	Possible	Observed	Index <sup>1</sup>
Control	7.5	150	126	84	450	265	59
Penicillin treated	20	400	61	15	1200	105	9
Postpenicillin treated	5	100	48	48	300	108	36

<sup>1</sup>Index expressed as percent.

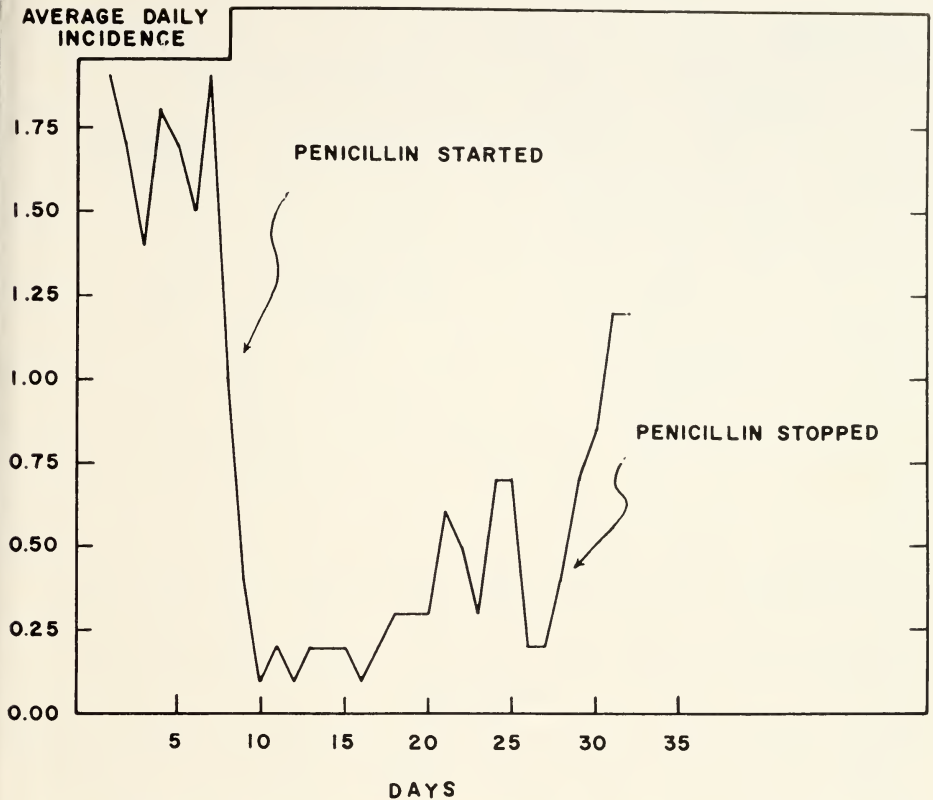


Figure 2. Trial 1. Average daily incidence on a per steer basis for 32 days.

one-third of the penicillin treatment period. This increase, however, was extremely slight and variable. Figure 2 shows that when penicillin treatment was started the average daily incidence of bloat decreased from approximately 1.75 to 0.3, however, there was a higher average daily incidence during the last one-third of the treatment than during the first two-thirds.

The increase of incidence and severity during the latter portion of the treatment indicated that penicillin was losing some of its effectiveness in controlling bloat.

**Trial 2.** Since it was apparent from trial 1 that after 14 days penicillin appeared to become less effective Trial 2 was initiated to determine when penicillin lost its effectiveness. These results, shown in table 2, indicate that some degree of

protection was furnished by penicillin throughout the 36-day treatment period.

One steer in the penicillin treated group died after 19.5 days, whereas all of the nontreated steers had died by the 20th day. Therefore, the penicillin treatment period was divided into two periods (19.5 day and 16.5 day), and it was apparent that penicillin treatment was more effective during the first 19.5 days in controlling incidence and severity than in the last 16.5 days. Even though the index for the last 16.5 days was high, it was not as high as for the initial 19-day period for non-treated steers, indicating that penicillin was giving a slight degree of protection.

Figures 3 and 4 indicate that penicillin afforded satisfactory control of both in-

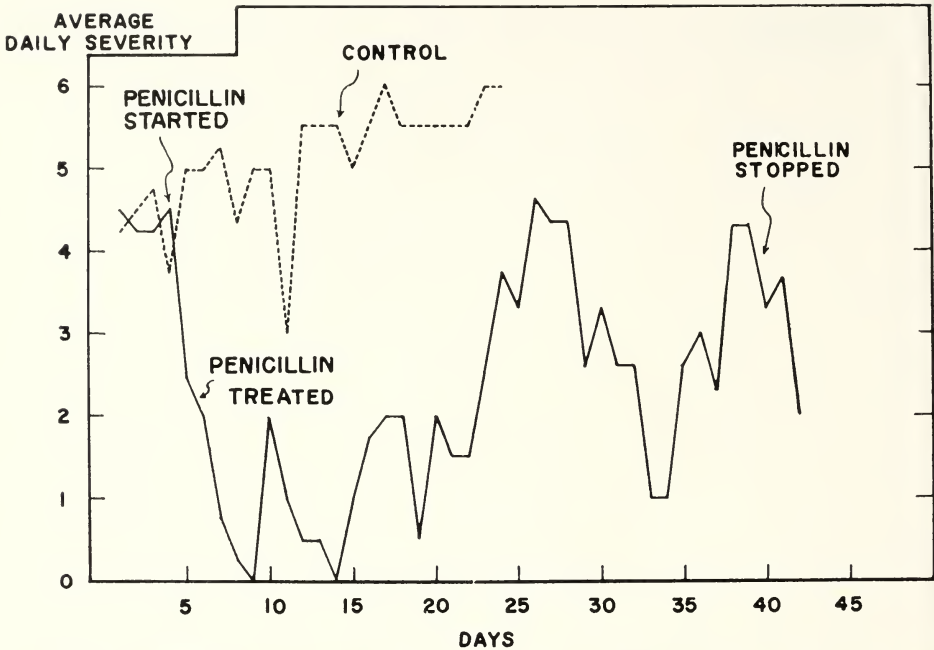


Figure 3. Trial 2. Average daily severity on a per steer basis for treated and control steers.

cidence and severity for 17 days. After 17 days control was quite variable. Average daily incidence reached the maximum (2.0) 21 days after beginning treatment and remained for three days. Eight days after the maximum was attained the daily incidence dropped to 0.67 from which the average daily incidence again returned to the maximum (2.0) in 4 days. The

average daily severity fluctuated as did incidence; however, for the treated steers it never reached as high a level as the non-treated control steers. This indicated that penicillin afforded some protection from severity even though the incidence returned to a level comparable to that observed for the controls for the 19 days which they survived the test.

Table 2.—Trial 2 (1959) severity and incidence of bloat.

Period	Incidence				Severity		
	Days	Possible	Observed	Index <sup>1</sup>	Possible	Observed	Index <sup>1</sup>
Penicillin							
Pre test	4.5	36	36	100	108	80	74
Total treated	36.0	249	123	49	747	245	33
Period a	19.5 <sup>2</sup>	156	50	32	468	102	22
Period b	16.5 <sup>3</sup>	93	73	78	279	143	51
Post treated	2.5	15	11	73	45	24	53
No penicillin							
Pre test	4.5	36	35	97	108	79	73
Controls	.... <sup>4</sup>	92	91	99	276	239	87

<sup>1</sup>Index expressed as percent.

<sup>2</sup>1st 19.5 days on penicillin at which time 1 steer died.

<sup>3</sup>Period of 20 through 36 days on penicillin.

<sup>4</sup>Steers died as follows: 1 on 3rd; 1 on 6th; 1 on 19th and 1 on 20th days.

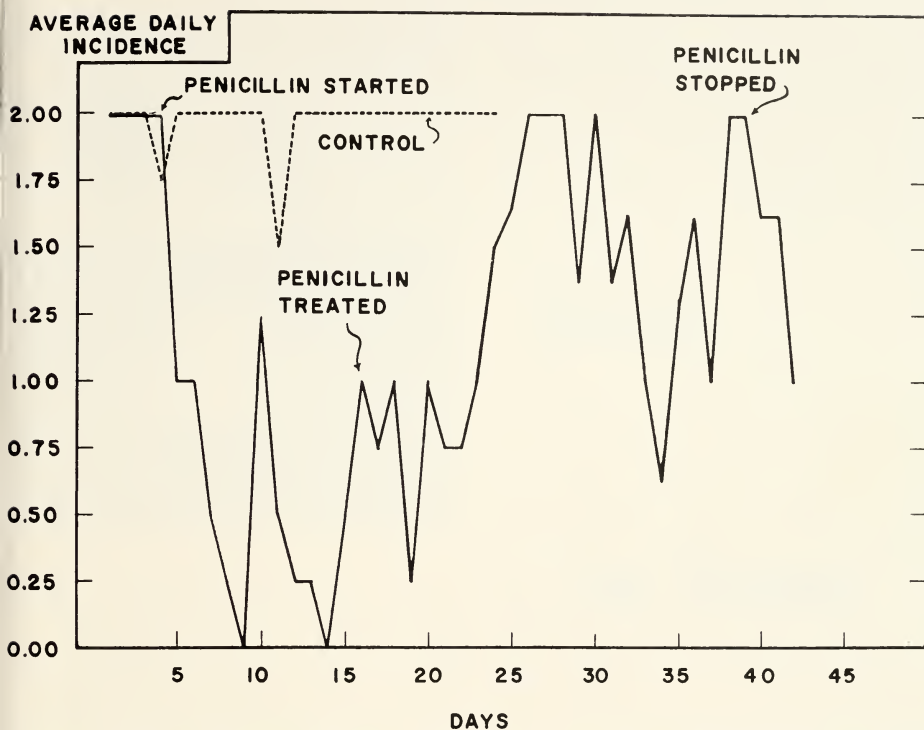


Figure 4. Trial 2. Average daily incidence on a per steer basis for treated and control steers.

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