

PERFORMANCE OF RAT-TAIL CALVES¹

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Summary

The rat-tail syndrome occurs in a small percentage of calves produced by crossing Continental breeds of cattle with Angus or Holstein. These calves are characterized by short, curly, malformed, sometimes sparse body hair and an abnormal tail switch.

The performance of 43 rat-tail calves was compared to that of 570 normal calves of the same breeding and contemporary groups. All rat-tail calves were sired by Simmental bulls and were from cows with various percentages of Angus breeding. As the percentage of Angus increased, the frequency of rat-tail calves increased.

The rat-tail condition had no effect on birth weight, weaning weight, or gain from birth to weaning. However, the rat-tail calves had significantly lower rates of gain from weaning to yearling (during the winter months) than the normal calves, resulting in 43 lb lighter yearling weights. The gains of steers from yearling to slaughter were not significantly different, but the rat-tail steers were 78 lb lighter ($P = .01$) and 13 days older ($P = .15$) at slaughter than the normal steers.

(Key Words: Rat-tail, Cattle, Performance, Genetics.)

Introduction

After the introduction of the Continental breeds of cattle in the 1960s and 70s, a congenital condition commonly referred to as "rat-tail" was reported when those breeds were crossed with Angus or Holstein.

The condition is characterized by short, curly, malformed, sometimes sparse body hair and an abnormal tail switch. Their hair morphology was studied by Ayers, Leipold, Schalles and Cole (J. Vet. Med., 1989), who found enlarged, irregularly distributed, and clumped melanin granules in the hair shaft of affected animals. The hair shafts were asymmetrical, short, curled, and small. The scale surface was rough and pitted, with areas where scales failed to form.

The condition is very infrequent or non-existent in pure breeds but occurs in crosses, indicating that at least two loci are involved in its inheritance. Breeders have reported various effects on performance, from none to severe. The condition affects calf appearance, and in some markets these animals are discriminated against, thus affecting their economic value. Our objective was to determine the effect of the rat-tail condition on calf performance.

Experimental Procedures

During the winter of 1991, 43 rat-tail calves were visually identified among 1169

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crossbred calves at the Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, NE. Factors considered included the length, texture, curliness, and amount of hair, and the presence of a tail switch. White hair of rat-tail animals appears to be unaffected, so when the tail was white and normal but the animal had the other characteristics, it was classified as rat-tail. An attempt was made to evaluate these animals as a buyer might.

The basic color (red, black, yellow, grey, or white) of the calves was also recorded. All rat-tail calves were sired by Simmental bulls from cows with various percentages of Angus breeding. None of the other sire breeds that were evaluated (Charolais, Gelbvieh, Pinzgauer, Longhorn, Piedmontise, and Salers) produced rat-tail calves from Angus-cross cows.

Calves were born between March 8 and May 29, 1990. They nursed their dams until weaning in September or October at an average age of 169 days. All calves of a line (the same breeding) were weaned at the same time. Calves were then separated by sex, and fed a growing ration in dry lot until January. They were then weighed and re-grouped by weight and sex, and placed on a finishing ration.

Yearling weights were taken in late April and early May at an average age of 366 days. Females selected for breeding were removed at this time. Steers remained on a finishing ration and were slaughtered in groups when visually judged to have sufficient finish. Because selected heifers were removed from the study as yearlings, only steers were included in the post-yearling performance phase of the study.

Only lines that produced at least one rat-tail calf with complete data were used in the analysis of performance data. The rat-tail calves were compared to normal calves of the same line. The least squares model included

the fixed effects of sex, rat-tail classification, line, and age of dam group (2, 3, 4, 5 to 10, and over 10 years) and age of the calf as a covariate. Rat-tail by line and rat-tail by sex interactions were nonsignificant and were removed from the final analysis.

Results and Discussion

All rat-tail calves were sired by Simmental bulls and were from dams that had some Angus breeding (Table 1). All rat-tail calves had the dominant gene for black, but the color was modified to gray or charcoal. Twenty-three percent of the rat-tail calves were gray. As the percentage Angus in the dam increased, the percentage of rat-tail calves increased. Dam color was not available; however, a higher frequency of the black gene would be expected with a higher percentage of Angus breeding.

There were no significant differences in birth or 205-day weights between rat-tail and normal calves (Table 2). However, rat-tail calves had lower ($P = .01$) average daily gains from weaning to yearling (during the winter months), resulting in 43 lb lighter average 365-day weights ($P = .03$). Perhaps the hair of rat-tail calves did not provide enough normal insulation to avoid excessive heat loss during cold weather. There was no significant difference in average daily gains of rat-tail and normal steers between yearling and slaughter. However, the rat-tail steers were 78 lb lighter ($P = .01$) and 13 days older ($P = .15$) at slaughter.

The mode of inheritance of the rat-tail condition is not known. Another project is currently under way to determine how the condition is inherited and to find appropriate procedures to reduce or avoid its occurrence.

Table 1. Number of Calves Produced by Dam Line^a

Cow breed ^b composition	Total calves	No. rat-tail	Percent rat-tail
AN	104	14	
Total 100% AN cows			13.5
AN - HH	43	3	
HH - AN	41	5	
GV - AN	14	1	
PZ - AN	20	1	
CH - AN	11	0	
SH - AN	13	1	
GA - AN	15	0	
TL - AN	22	2	
NE - AN	23	2	
PI - AN	21	1	
SA - AN	21	0	
Total half AN cows	244	16	6.6
MARC 3	312	13	
Total quarter AN cows			4.2

^aAll calves were sired by Simmental bulls.

^bAN = Angus, HH = Hereford, GV = Gelbvieh, PZ = Pinzgauer, CH = Charolais, SH = Shorthorn, GA = Galloway, TL = Longhorn, NE = Nellore, PI = Piedmontese, SA = Salers, MARC 3 = 1/4 each PZ, HH, AN, Red Poll.

Table 2. Performance of Normal and Rat-Tail Calves

Trait	No.	Normal	Rat-tail	P ^a
Birth wt, lb	610	93.6	95.6	.46
205d wt, lb	610	547	535	.33
365d wt, lb	610	982	939	.03
Slaughter wt ^b , lb	301	1324	1246	.01
Slaughter age ^b , days	301	467	480	.15
Daily gain:				
Birth - weaning, lb	610	2.21	2.14	.24
Weaning - yearling, lb	610	2.72	2.54	.01
Yearling - slaughter ^b , lb	301	2.71	2.47	.12

^aProbability of a rat-tail effect.

^bOnly steers were included.