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THE EFFECT OF SEASON AND RELOCATION ON REPRODUCTIVE COMPETENCE
IN BRAHMAN COMPARED TO HEREFORD BULLS

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SUMMARY

The demand for Brahman crossbred cattle has increased in the past few years, both for the feedlot and as replacements in the cow herd. This has expanded the climatic area in which Brahman cattle are expected to function. This research has shown that Brahman bulls can survive and function in northern states if they are relocated in the late spring or early summer. The bulls were relocated in the late spring, thus allowing them to adapt to the climate and day length of the northern environment. The Brahman bulls that were moved to the northern states had similar mature body and testicular sizes as those that remained in Texas, but the relocated Brahman bulls required approximately 6 months longer to reach this point. The Brahman bulls in the north maintained fertility throughout the entire study period. The semen quality of relocated Brahman bulls was lower than both Nebraska and Montana Hereford bulls at the same northern location, and semen quality was affected by location in both Brahman and Hereford bulls.

OBJECTIVE

This research was designed to determine the effect of season and relocation on reproductive and growth traits in Brahman compared to Hereford bulls.

PROCEDURES

Eighteen Brahman bulls from Texas and Louisiana, 15 Hereford bulls from Nebraska and 15 Hereford bulls from Montana were equally distributed among 3 experimental locations: 1) Texas, 2) Nebraska, and 3) Montana. All bulls were relocated within a 4 day period in May, 1984, and all bulls were pubertal at this time. At 28 day intervals the following measurements were taken on each bull: weight, hip height, scrotal circumference and paired testicular volume. At approximately 90 day intervals, semen was collected by electroejaculation and evaluated for percentage live sperm,

concentration and motility (Table 1). Data were collected for 22 months after relocation.

RESULTS

Brahman bulls in Texas gained weight more rapidly during the first 16 months after relocation than in Nebraska or Montana ($P < .0001$), however Brahman bulls exhibited similar weights at all locations at the end of the study (Figure 1). The lag time may be due to adaptation to the new environment, although it was not evident in those Hereford bulls moved to Texas. There was some evidence of heat stress in Herefords in Texas; therefore, sun shades were constructed. All bulls at the northern locations were provided with shelter during the cold season of the year. At the end of the study there were only 2 Brahman bulls alive in Montana. The 4 bulls that died did so due to disease problems and metabolic acidosis, and not the cold environment. Montana Herefords and Nebraska Herefords gained weight at a slower rate in Nebraska than in Montana or Texas during the first 16 months of the study ($P < .0001$), which may be due to the different management practices at the 3 locations. By the end of the study however; all Hereford bulls at all locations weighed the same (approximately 1500 lbs). Brahman bulls were taller in Texas than in Montana or Nebraska during the first winter, but not by the second ($P < .0001$; Figure 2). This indicated that there was normal growth of the long bones, although it was suppressed during the first winter. Brahman bulls were taller than Montana and Nebraska Herefords at all locations ($P < .0001$; 56.8 in. vs 51.9 in. vs 52.6 in., respectively). Brahman bulls in Texas exhibited a more rapid increase in scrotal circumference (SC) than in Montana or Nebraska ($P < .005$; Figure 3), and SC was suppressed in Nebraska and Montana Herefords at the Nebraska location during the first winter ($P < .0001$). Paired testicular volume of Brahman bulls was suppressed during the first winter in Montana and Nebraska, but not during the second winter when compared to Texas ($P < .003$; Figure 4).

Sperm concentration was affected by breed but not by location ($P < .0001$). Montana Hereford bulls had a greater sperm concentration than both Brahmans and Nebraska Herefords (Table 2). Montana Hereford bulls had higher motility scores than Nebraska Herefords and Brahmans

($P < .019$), and bulls in Texas had higher motility scores than bulls in Montana (Table 3). Brahman bulls had decreased motility scores during the first winter at all locations and during the second winter at Nebraska and Montana only (Figure 5) when compared to the spring, summer and fall of the year. Nebraska Herefords and Montana Herefords had more live sperm in an ejaculate than did the Brahman bulls, and bulls in Nebraska and Texas had more live sperm in an ejaculate than bulls in Montana ($P < .0001$; Table 4).

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TABLE 1. GROSS SEMEN MOTILITY SCORES

<u>SCORE</u>	<u>DESCRIPTION</u>
5	MANY, RAPID SWIRLS PRESENT
4	INTERMEDIATE SWIRLS PRESENT
3	SLOW SWIRLS PRESENT
2	NO SWIRLS PRESENT, BUT MANY SPERM MOTILE
1	NO SWIRLS; SPERM SHOW WEAK, LABORED MOVEMENT
0	NO MOVEMENT PRESENT

TABLE 2. SPERM CONCENTRATION OF BRAHMAN AND HEREFORD BULLS

BREEDTYPE	SPERM CONCENTRATION ^a (10 ⁶ CELLS/ML)
Montana Hereford	543.9 ± 26.3 ^b
Brahman	376.2 ± 30.3 ^c
Nebraska Hereford	432.7 ± 26.3 ^c

^aLeast squares mean ± standard error

^{b,c}Values with different superscript are different (P<.003)

TABLE 3. MOTILITY SCORES OF BRAHMAN AND HEREFORD BULLS AT 3 LOCATIONS

BREED TYPE	SCORE ^a	LOCATION	SCORE ^a
Montana Hereford	3.9 ± .1 ^b	Montana	2.9 ± .1 ^e
Brahman	2.6 ± .1 ^c	Texas	3.6 ± .1 ^f
Nebraska Hereford	3.4 ± .1 ^d	Nebraska	3.4 ± .1 ^f

^aLeast square means ± standard error

^{b,c,d}Values with different superscripts are different (P<.0001)

^{e,f}Values with different superscripts are different (P<.009)

TABLE 4. PERCENT LIVE SPERM OF BRAHMAN AND HEREFORD BULLS AT 3 LOCATIONS

BREED TYPE	% ^a	LOCATION	% ^a
Montana Hereford	58.8 ± 2.0 ^b	Montana	48.6 ± 2.1 ^d
Brahman	44.4 ± 2.1 ^c	Texas	56.7 ± 2.1 ^e
Nebraska Hereford	61.8 ± 1.8 ^b	Nebraska	59.6 ± 1.8 ^e

^aLeast squares mean ± standard error

^{b,c}Values with different superscripts are different (P<.0001)

^{d,e}Values with different superscripts are different (P<.007)

FIGURE 1. WEIGHT (WT) OF BRAHMAN BULLS

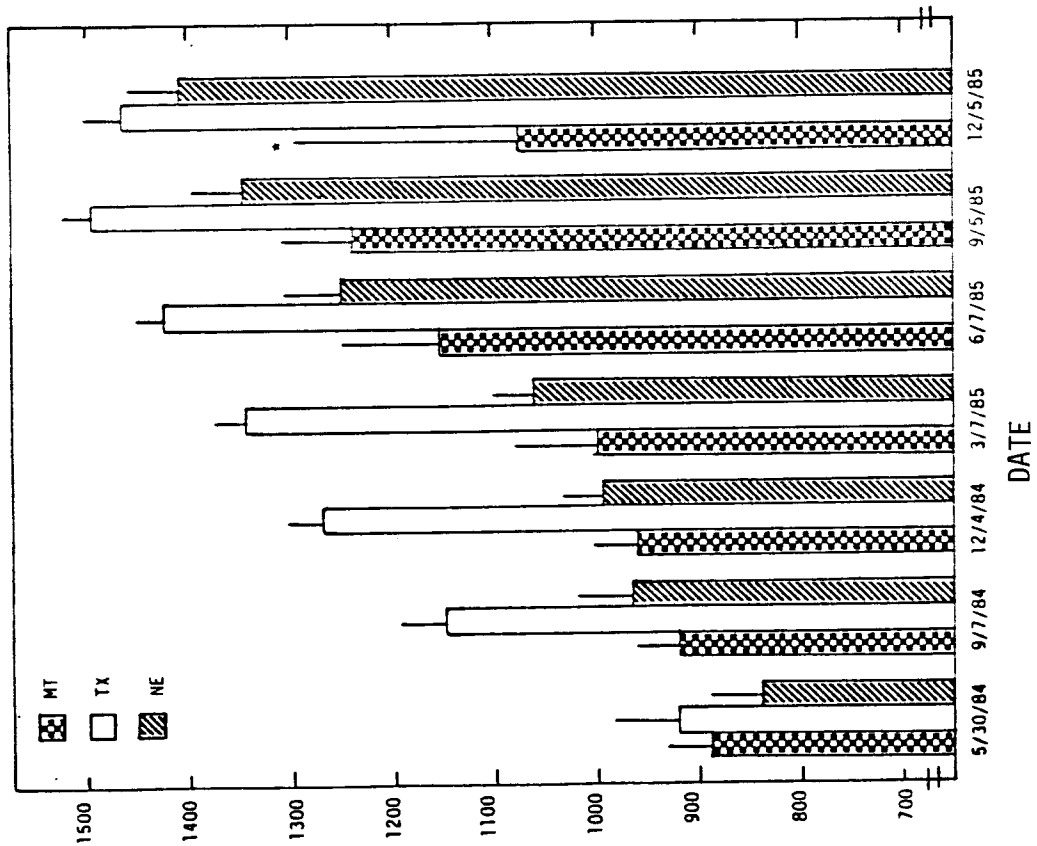


FIGURE 2. HIP HEIGHT OF BRAHMAN BULLS

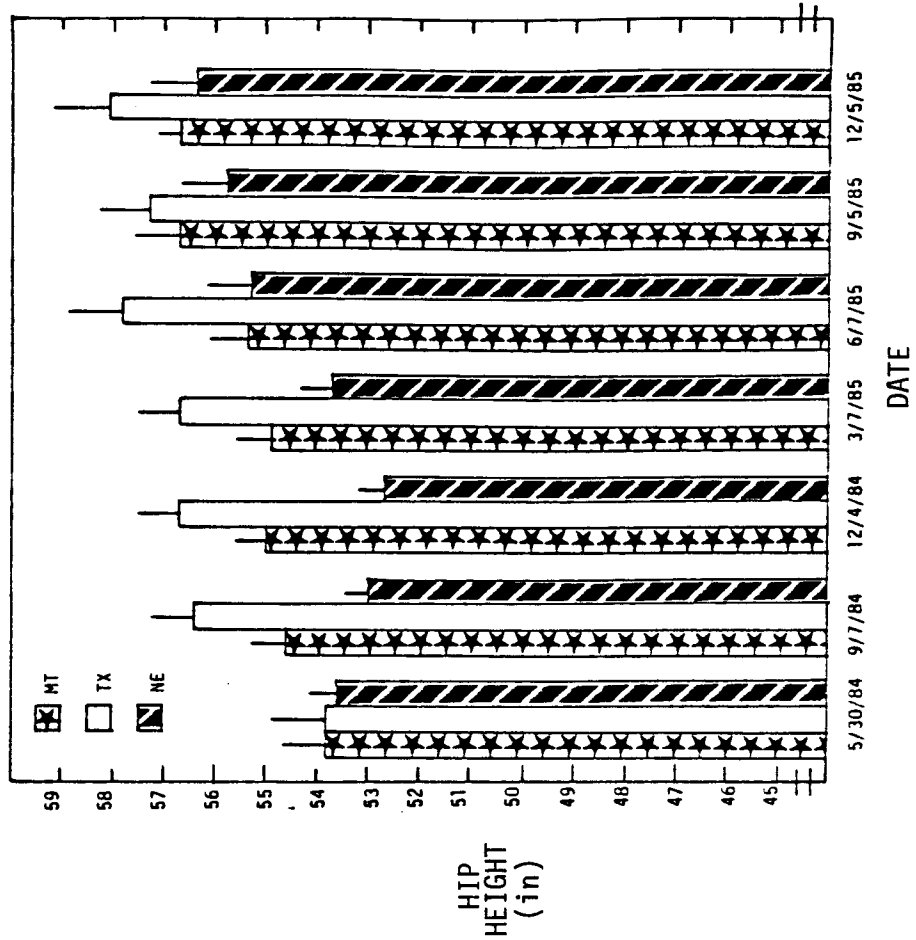


FIGURE 4. PAIRED TESTICULAR VOLUME OF BRAHMAN BULLS

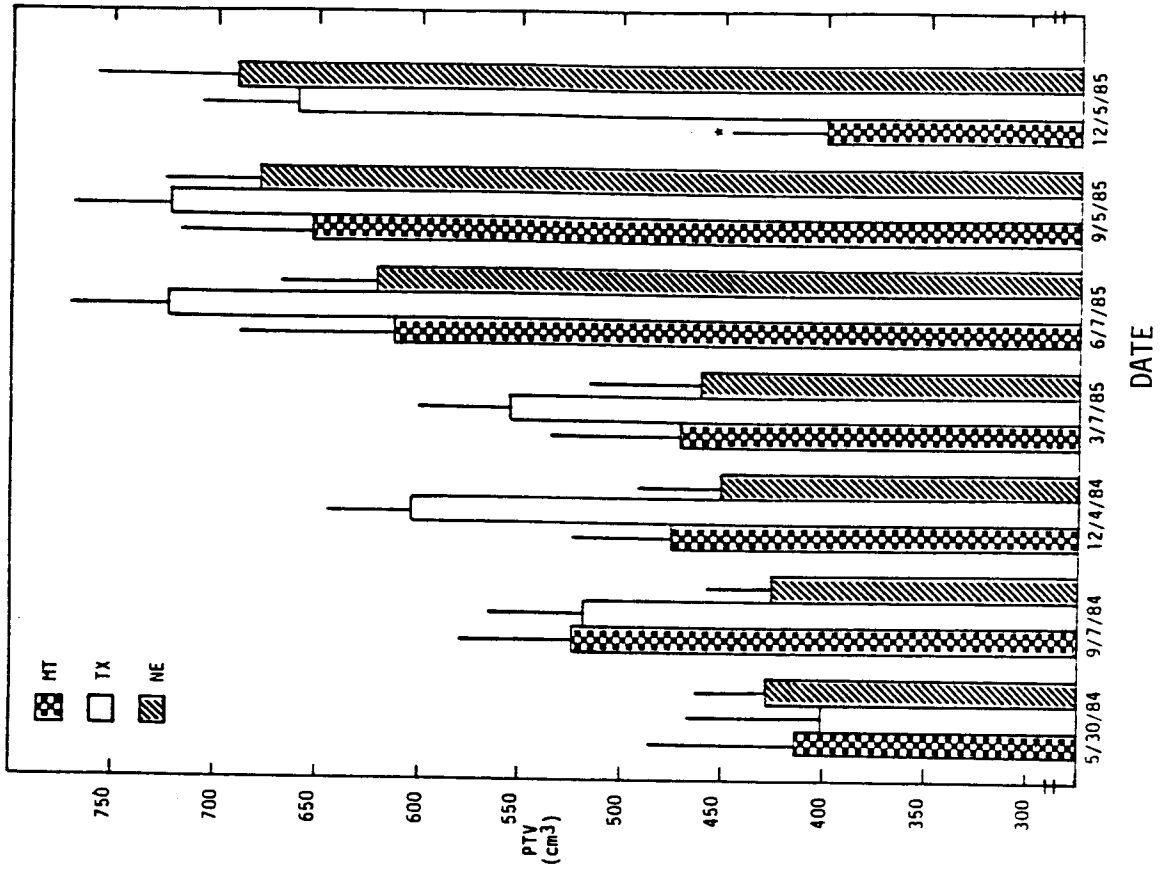


FIGURE 3. SCROTAL CIRCUMFERENCE (SC) OF BRAHMAN BULLS

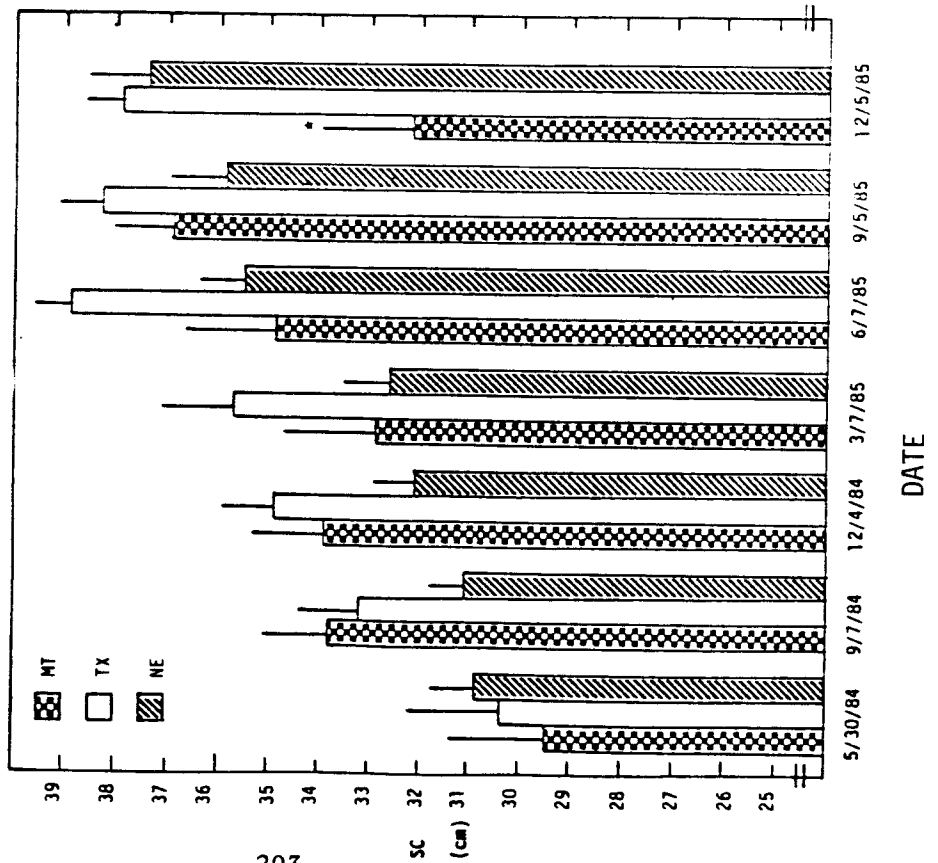


FIGURE 5. GROSS MOTILITY SCORE OF BRAHMAN AND HEREFORD BULLS AT 3 LOCATIONS

