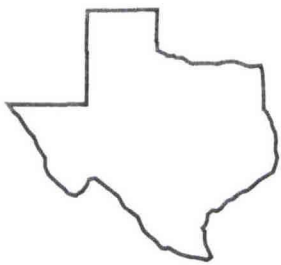
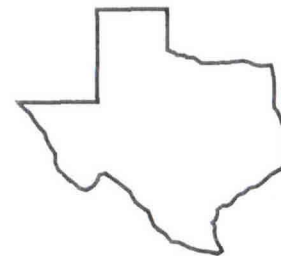
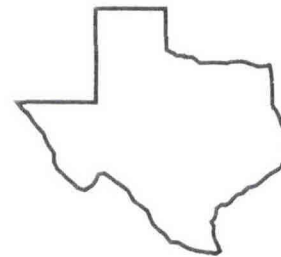
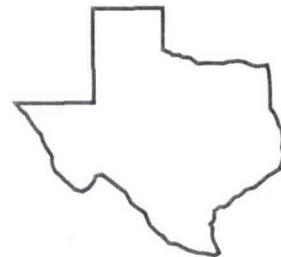


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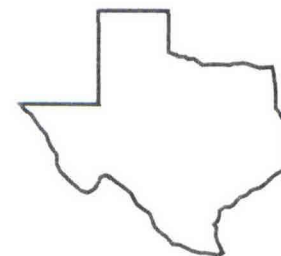
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EFFECT OF HAY, RYE-RYEGRASS PASTURE AND A FISH MEAL SUPPLEMENT ON GROWTH AND REPRODUCTION OF BRAHMAN HEIFERS

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Background. Different protein sources have different effects on live weight gain in the growing bovine. Sources of high undegradable intake protein, such as fish meal, tend to increase the flow of essential amino acids to the small intestine, which in turn, improves growth rate and feed efficiency. Manipulation of energy metabolism by feeding ionophores increased the proportion of gluconeogenic fatty acids and accelerated reproductive development of Brahman bulls and Brahman crossbred heifers. The administration of amino acids or supplementation of protein to underfed domestic ruminant animals improves their reproductive efficiency. However, the effects of increased absorption of essential amino acids on reproductive development of ruminants is not clear. Prepuberal heifers with greater ovarian volume reached puberty at younger ages, and heifers with the greatest number of ovarian follicles at 11 mo of age reached puberty at older ages and heavier weights. The objectives of this study were to assess the effects of rye-ryegrass, hay and fish meal on growth and reproductive function of Brahman heifers.

Research Findings. Thirty-six Brahman heifers (mean age = 332 d; mean body weight = 446 lb) were randomly allotted to three treatment groups: Coastal bermudagrass hay (10 to 12% CP) plus 1 lb of corn and 1 lb of fish meal/head/day (HAY), rye-ryegrass pasture overseeded on a Coastal bermudagrass sod and providing approximately (20 to 26% CP (PAS) without any supplementary feeding, and the same type of pasture plus 1 lb of corn and 1 lb of fish meal/head/day (FIS). Water and minerals were available free choice. Body weight was recorded at 28-d intervals for a 116-d period. After that period, all heifers were kept together in the same pasture with marker bulls. At the beginning (d 0) of the experiment and at d 248 the dimensions of the ovaries were estimated by rectal palpation, and at d 28 and 56, number and size (medium follicles = 4 to 8 mm; large follicle = >8 mm) of ovarian follicles was assessed by ultrasonography. Twice a week for a 248-d period, blood samples were collected to evaluate plasma progesterone (P_4) concentrations using a radioimmunoassay. Data on weights and average daily gains are presented in Table 1.

Table 1. Weights and average daily gain of yearling Brahman heifers.

Treatment	Weight d 0 (lb)	Weight d 116 (lb)	ADG (lb)
FIS	442 ± 9 ^a	704 ± 13 ^a	2.22 ± 0.1 ^a
PAS	437 ± 11 ^a	679 ± 16 ^a	1.99 ± 0.04 ^b
HAY	457 ± 20 ^a	579 ± 22 ^b	1.04 ± 0.04 ^c

Mean in the same column with different letters, differ ($P < 0.05$).

By day 248 only one heifer had reached puberty. Combined volume of right and left ovaries at d 248 (14 cm³) was larger than at d 0 (5 cm³), but did not differ ($P > 0.05$) between treatments. There were no treatment effects ($P > 0.05$) on average number of medium or large follicles between heifers assigned to the different treatments (Table 2).

Table 2. Mean number of medium (MF) and large (LF) follicles in yearling Brahman heifers.

Treatment	MF d 28	MF d 56	LF d 28	LF d 56
PAS	0.6 ± 0.2	1.2 ± 0.4	0.6 ± 0.1	0.8 ± 0.2
FIS	0.8 ± 0.2	1.7 ± 0.3	0.4 ± 0.1	0.7 ± 0.1
HAY	0.8 ± 0.3	0.8 ± 0.7	0.3 ± 0.1	0.8 ± 0.3

Application. The relatively high crude protein content of rye-ryegrass pastures (20-26%) makes it superior for body growth in Brahman heifers compared with hay plus supplemental energy or protein. The ruminally undegradable protein fraction of fish meal and the small daily energy supplement enhanced daily gain of heifers consuming rye-ryegrass pastures. No differences in reproductive development were seen between treatments during the trial period. Therefore, the decision to supplement Brahman heifers grazing rye-ryegrass pastures with small amounts of corn:fish meal needs to be based on the price of beef relative to the costs of this or any feed supplement.