MANAGING HEIFERS IN FLORIDA TO CALVE FIRST AT TWO YEARS OF AGE

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Dr. Corah has done an excellent job of developing an organized system of managing the developmental period of beef females. His comments assume that heifers are to be calved first at approximately two years of age. However, many Florida producers are not presently breeding yearling heifers. I have been asked to continue this discussion by making some recommendations concerning managing heifers in Florida to calve first at two years of age.

Most of the published heifer development research and resulting management recommendations has been completed and implemented in temperate environments with *Bos taurus* cattle. The application of these recommendations have often met with failure in Florida. The subtropical climatic conditions in the majority of our state make it imperative to utilize *Bos indicus* breeding in our commercial cow herds. Additionally, our forage base and herd health challenges are quite unique and will be addressed in detail by other speakers during today's program.

During the 1988 Beef Cattle Short Course, I presented a paper discussing the effects of *Bos indicus* breeding on reproductive traits in Florida's beef cattle population (Marshall, 1988). The most critical point drawn from that discussion is the influence of genotype on age at puberty in beef heifers. In order to successfully breed yearling heifers, they must be experiencing a fertile heat by 12-14 months of age. Puberty is a function of genotype (breed and family), age and weight. Like all other traits, puberty is influence by genotype; or said differently, each female has an inherent age at puberty that can be increased by a restricted environment but can not be decreased by higher levels of feeding. This genetic potential can be thought of as the optimal limit or goal that should be managed for with a given population or herd. The dilemma that beef managers often face includes the fact that the inherent age at puberty in *Bos indicus*-crossbred females is over 14 months of age. At Ona during a 100 d breeding season, the age at conception varied greatly across heifers ranging from 50 to 75% *Bos indicus* breeding (Peacock et al., 1985). The average age at conception was 14.5 months for 50% Brahman heifers and 17.5 months for 75% Brahman heifers. Recent work at our Beef Research Unit has further quantified age and weight at puberty for *Bos taurus* × *Bos indicus* crossbred females (Weekley *et al.*, 1991a). Heifers were produced from mating F_1 *Bos taurus* × *Bos indicus* cows to Braford, Simbrah, Senepol and Simmental bulls, and Brahman bulls to Angus cows. Sire breed affected weight ($P<.05$) and age ($P<.005$) at puberty. The average age and weight at puberty by sire breed were: Braford = 441 days and 777 lbs, Simbrah = 434 days and 834 lbs, Senepol = 419 days and 768 lbs, Brahman = 451 days and 774 lbs, Simmental = 360 days and 768 lbs. With this genetic limitation, changing (improving) the level of management is merely a waste of money.

Given this situation there are some questions to be asked and recommendations to be made.

1. Use minimum percentage of *Bos indicus*

breeding necessary for adaptation to the environment.

2. Consider breeds that are early puberty breeds such as Simmental, Gelbvich, etc.
3. Select bulls within breeds based on yearling scrotal circumference.

After a manager has decreased the age at puberty in his female herd to the point at which calving first at two years of age is possible, he must then address the question of "How?". How does a cattleman grow heifers at such a rate to ensure a high percentage of females cycling by the beginning of the yearling breeding season? There are two phases that must be addressed, and these were introduced by Dr. Corah: preweaning and postweaning.

There are a few critical points that a manager must identify for his cow herd if management to optimize reproductive efficiency is to be possible: 1. cow mature weight, 2. age and weight at puberty, and 3. weaning weight of heifers, 4. breeding season dates.

The first step in growing heifers to the optimal weight at the beginning of the breeding season is optimizing heifer weaning weight. Assuming a 90 d breeding season and an 8 mo. mean weaning age, heifers should wean at a minimum of 40% of their mature weight. In fact, a goal should be to wean 50% of a brood cow's weight, which would increase income from sale calves and insure replacement heifers a better chance of reaching puberty quickly. This 50% should equate to heifers being weaned at 50% of their own mature weight if the cow herd is at the suitable mature size for the environment. In this case, selection criteria for bulls would not include increasing growth rate or mature size, because the resulting females would be too large for the available resources. Therefore, the cows should be producing heifers with mature weights equal to their own. Recent research at the UF Beef Cattle Research Unit indicates that breeds differ in the percentage of their mature weight at which they reach puberty. F_1 Brahman × Angus heifers reached puberty at 66.1% of their estimated mature weight. Simmental-sired heifers out of F_1 *Bos indicus* × *Bos taurus* cows reached puberty at 60.4% of their mature weight. Similar cows were also bred to Simbrah, Braford and Senepol bulls, and the resulting heifers reached puberty at 65.7, 63.9, and 63.0% of mature weight, respectively. In general, as percentage of Brahman breeding decreased the percent of mature weight needed for puberty decreased. Seventy-four percent of the Simmental-sired heifers had cycled by the beginning of the breeding season compared to 21 to 27% of the heifers in the other breed groups. Once you identify mature weight and percent of mature weight that your heifers need to reach in order to attain puberty, it is easy to calculate necessary postweaning gain for a given group of heifers.

Example:

mature weight = 1050 lbs
% mature weight at puberty = 65%
weaning weight = 450 lbs
days from weaning to breeding = 180 days
target weight for breeding = 65% of 1050 = 683 lbs
target postweaning ADG = 683-450/180 = 1.3lbs.

If 1.3 lb/d is not possible then there are several options which could be considered:

1. increase weaning weight,
2. decrease mature size,
3. change genotype to decrease age/weight at puberty,
4. change postweaning management program,
5. do not breed yearling heifers.

I want to discuss option four. Dr. Corah has mentioned the use of ionophores such as Rumensin and Bovatec, exposure of heifers to vasectomized bulls and the use of estrus

synchronization products. I will spend some time discussing the postweaning nutritional management of heifers. There is much variation in postweaning heifer growing programs within Florida. Two systems were evaluated at our Beef Research Unit. Half of the heifers were fed to maintain a constant postweaning growth rate (C), while others were fed for a reduced growth rate during the first half of the postweaning period followed by a rapid growth rate till the beginning of the breeding season (RR). Heifers on the C program attained puberty at a younger age than the RR heifers, 404 vs 439 days. However, weight at puberty, percentage of estimated mature weight at puberty, and pregnancy percentage were not affected by growing program (Weekley et al., 1991b). Heifers on the RR program were bred later during the breeding season, and therefore, calved later than the C heifers. This situation would suggest that many of these late calving heifers may not rebreed during a short breeding season, since the postpartum period to estrus is usually longer for heifers than mature cows.

RECOMMENDATIONS FOR MANAGING HEIFERS IN FLORIDA TO CALVE FIRST AT TWO YEARS OF AGE.

1. Maintain a herd of cows with a mature weight suitable for available resources and environmental conditions.
2. Use bulls with yearling scrotal circumference 34 cm.
3. Use 25-50% *Bos indicus* breeding in females used south of the Gainesville area, and consider using one of the dual purpose breeds to increase reproductive performance.
4. Wean heifers weighing 40 to 50% of mature weight.
5. Use a high energy, high protein preconditioning diet to ensure weight gain rather than weight loss during the first month postweaning.
6. Maintain a postweaning gain necessary to result in heifers weighing 65% of their mature weight. Will require approximately 7-9 lbs/day of TDN intake.
7. Use an ionophore in the supplemental feed during the period from weaning to the end of the breeding season.
8. Breeding season for heifers: 60-75 days.
9. Use bulls with low birth weight pedigree (Best EPD if available) and acceptable post-birth growth rate.
10. Measure pelvic area when heifers are palpated for pregnancy and cull heifers with pelvic area less than 190 cm^2.
11. Develop heifers to reach 80-85% of mature weight before calving.
12. Grow heifers to gain .5 lb from calving through the breeding season (15 lbs of TDN and 1.8 lb of crude protein/day).

LITERATURE CITED

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