

# New Ideas on Development of Replacement Heifers

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**Feed resources used to develop replacements can have a major influence on long-term profitability of a cattle operation.** The direct expense of either purchasing or developing heifers is often obvious for producers, however, the impact that the management system used for rearing heifers has on lifetime productivity is much less obvious and more difficult to assess.

When considering how to feed replacement heifers for proper development, most attention has been placed on providing sufficient feed resources during the postweaning period to ensure that a maximum number of heifers will attain puberty prior to breeding. Research conducted at Ft. Keogh and elsewhere during the late 1960s through the early 1980s established guidelines that replacement heifers should be fed to achieve 60 to 66% of their expected mature body weight by the time breeding starts to ensure attainment of puberty. While the

recommended target weights have served the industry well over time, it appears that genetic change in cattle over the last several decades may allow heifers to be developed to lighter breeding weights, while still achieving acceptable breeding rates.

Research conducted over the last 5 years at Fort Keogh evaluated puberty and pregnancy rates of heifers developed with either unlimited or restricted access to feed during 140 days of the postweaning period from 8 to 12.5 month of age. Results obtained so far indicate a potential to reduce target weights when developing replacement heifers, and thereby decrease input of harvested feeds. Over the course of the 140-day treatment period, restricted heifers were fed 27% less feed than the control heifers provided unlimited access to feed, which resulted in lower ADG (1.14 vs. 1.5 lb/day) for restricted fed heifers during the 140-day period. Efficiency of body weight gain during the 140-day period, was greater

for restricted heifers (0.12 lb gain/lb feed) than control heifers (0.11 lb gain/lb feed). After the 140-day trial, restricted heifers were fed the same as the unrestricted controls. Although there was substantial variation over the years, average weight for restricted and control fed heifers at the last weight measurement prior to initiating breeding at 14 months of age was equivalent to 57% (698 lbs) and 60% (740 lbs) respectively, of their predicted mature weight of 1230 lbs. The proportion of heifers achieving puberty prior to breeding over the 5 years was less in the restricted heifers (55%) than the control fed heifers (67%). Of those heifers that achieved puberty prior to breeding, there was no difference in age at puberty (overall average 380 days), but weight of heifers at time of puberty was less in restricted (667 lb) than control (713 lb) fed heifers. The average weights of heifers at time of puberty corresponded to 54 and 58 % of the expected 1230 lbs for mature weight of cows in this herd. These results indi-

cate that reaching a sufficient age was more critical for achieving puberty than reaching a sufficient weight.

When AI pregnancy rates for years 1-4 were averaged with the first 21-days of natural breeding during the 5th year 2006, no difference was observed between restricted (45.8%) or control (46.4%) fed heifers. Likewise, final pregnancy rates did not differ between feeding treatments over the 5 years, with an overall average pregnancy rate of 90%. A comparison of the year to year variation in weight at breeding with the variation in percentage achieving puberty and AI pregnancy rates indicated that there was not the expected association among these traits over the years (i.e., year with lowest weight at breeding was not year with lowest proportion reaching puberty or lowest AI pregnancy rate). Likewise, the consistent reduction in weight and proportion pubertal at start of breeding observed in restricted fed heifers did not correspond to a consistent reduction in pregnancy rates. These results indicate that the industry recommendations developed several decades ago that heifers should be fed to achieve

60 to 66 % of their expected mature weight by the beginning of the breeding season may need to be revised. A factor that needs to be considered when interpreting the results from this research, is that the heifers studied were from the CGC composite herd of cattle developed at Ft Keogh (1/2 Red Angus, 1/4 Charolais and 1/4 Tarentaise), and therefore the results may be affected by the high level of heterosis that exists in these and other crosses or composite cattle. Additionally, heifers in years 1-3 received an estrous synchronization protocol that is capable of inducing estrous cycles, whereas in year 4, heifers received a protocol that does not induce estrous cycles.

When averaged over the years, ADG from the end of the 140-d period to time of breeding (~ 40 days) was greater in restricted heifers (1.6 lb/day) than control heifers (1.3 lb/day). During the period from the beginning of breeding to the fall pregnancy diagnosis, when all heifers were grazing native range, ADG was also greater in heifers that had been developed on the restricted feeding level than control heifers (1.15 vs. 0.96 lb/d).

The increased gain among restricted fed heifers during both of these periods may place these heifers in a more positive energy balance that improves fertility. However, restricted heifers still remained about 25 lbs lighter than control heifers at the fall pregnancy diagnosis. Thus, in addition to a decrease in direct cost associated with developing heifers on limited nutritional inputs which improved efficiency during the winter feeding period, the greater rates of gain while grazing after the winter feeding period and lighter weights going into the subsequent winter are also indicative of improved efficiency. These results indicate an opportunity to decrease cost of production by decreasing amount and/or quality of harvested feeds used for heifer development and improving efficiency. A question we will try to answer with our data set is whether the improved efficiency of restricted fed heifers is maintained over the course of their lifetime. ■

*More information on this study can be viewed in the 2007 December Ft Keogh Researcher available at:*  
[www.ARS.USDA.GOV/NPA/FtKeogh](http://www.ARS.USDA.GOV/NPA/FtKeogh)