

HEIFER DEVELOPMENT

Lesson 7

OSU Extension Beef Team

<http://beef.osu.edu>

Additional Tools

The following information is on additional tools that might be consider for use in heifer selection in development. There are limitations on their use because of cost and technical skills needed to implement them.

Ultrasound to Monitor Body Fat: Although rectal ultrasound scanning is frequently used to evaluate current reproductive status, little information is available regarding the use of backfat, rump fat, ribeye area and intramuscular fat ultrasound measurements as a tool to predict reproductive performance in beef cattle. Minick et al. (2001) observed that heavier heifers with more rump fat are more likely to have more mature reproductive tracts at breeding. In the same study, no relationship was observed between reproductive tract scores and backfat over the 12-13th rib. This could be due to a possible higher heritability of the rump fat or due to variation differences in young cattle for rump fat versus backfa. In the same study, they found heifers that are cycling at approximately one year of age have larger ribeye areas and that there is a relationship between time of estrus and ribeye area.

Pelvic Area: Research from the Miles City Research Center indicate that out of 13,296 females calving, 41% of calf deaths occurred with first-calf heifers; 57.6% of the deaths occurred within 24 hours of birth; calving difficulty accounted for 37.9% of the deaths. There are many factors associated with calving difficulty such as birth weight, gestation length, shape of calf, the dam too thin, too fat, or abnormal fetal presentation. Research indicates that one cause of dystocia is a disproportionate size between the calf and the cow's birth canal (pelvic area). Death losses are 4-5 times greater for assisted calves compared to unassisted calves. Calving ease can be an all or nothing situation: if you have calving problems, chances are you will have problems rebreeding and decrease the percentage of heifers weaning calves. Pelvic measurements taken prior to breeding can be used to cull potential problem heifers from the herd.

Pelvic measurements are taken by measuring the vertical and horizontal opening of the birth canal. By multiplying the width by the height, the pelvic area is determined. Measure pelvic area in heifers 2-3 weeks before they are bred. The main objective of pelvic area measurement is to cull those heifers that may experience calving difficulty due to inadequate volume to the birth canal. If calving difficulty has been a problem with heifers, culling 5 to 15% of the heifers with smallest pelvic areas should help.

$$\text{Height (cm)} \times \text{Width (cm)} = \text{Total Pelvic Area (cm}^2\text{)}$$

A typical yearling heifers will have a pelvic area of 140 to 170 cm². Pelvic area of heifers should be adjusted to a constant age by using the growth factor of .25-.27 cm² per day. To accurately compare heifers within a group, the pelvic areas should be adjusted by the following formula:

Adjusted 365-day pelvic area = actual pelvic area + $((.27 \times (365 - \text{actual days of age})))$. For example, a 385-day old heifer with a 160 cm² pelvic area would have a 365-day adjusted pelvic area of 154.6 cm².

Selection for pelvic area should be done within a size category. Allowing size and pelvic area to increase together will likely allow birth weight and pelvic area to increase in a parallel fashion.

Pelvic area of bulls: The pelvic areas of bulls affects the pelvic areas of their offspring. The pelvic area of a yearling bull increases approximately .25 cm² per day. To accurately compare bulls within a group, the pelvic areas should be adjusted by the following formula: Adjusted 365-day pelvic area = actual pelvic area + $((.25 \times (365 - \text{actual days of age})))$. A 355-day-old bull with a 165 cm² pelvic area would have an adjusted pelvic area of 167.5 cm². Avoid using bulls with small pelvic areas (less than 160 cm² as yearlings) to generate replacement heifers. The danger here is actually selecting for large pelvic areas. You may be causing your cattle to increase in frame.

Reproductive tract score: Although not recommended as a general practice, reproductive tract scoring can be done when 25 to 50% of the heifers are thought to be cycling or 30 days before the breeding season. Heifers with poorly developed tracts should be culled. Reproductive tract scoring will require a skilled technician.

The reproductive tract scoring (RTS) system was designed to estimate pubertal status by rectal palpation of the uterine horns and ovaries. Scores are subjective estimates of sexual maturity, based on ovarian follicular development and palpable size of the reproductive tract. Each heifer is assigned a score of 1 (immature) through 5 (cycling) as described in Table 19.

Table 19. Description of reproductive tract score.

Reproductive tract score	Ovaries Size and characteristics				
	Uterine horns	Length (mm)	Height (mm)	Width (mm)	Ovarian structures
1	Immature <20 mm diameter, no tone	15	10	8	No palpable follicles
2	20--25 mm diameter, no tone	18	12	10	8mm follicles
3	25--30 mm diameter, slight tone	22	15	10	8--10 mm follicles
4	30 mm diameter, good tone	30	16	12	>10 mm follicles, Corpus luteum possible
5	>30 mm diameter, good tone, erect	>32	20	15	>10 mm follicles, Corpus luteum present

Note: Reproductive tract score was determined approximately 1 month prebreeding by rectal palpation.

Source: Anderson, K. J., D. G. Lefever, J. S. Brinks, and K. G. Odde. 1991. The use of reproductive tract scoring in beef heifers. *Agri-Practice* 12(4):19.

The RTS values can be used to predict reproductive performance of yearling heifers, especially for pregnancy rates to synchronized breeding and to pregnancy rates at the end of the breeding season. Heifers with more mature reproductive tracts had higher pregnancy rates and calved earlier. Preliminary data indicate that tract scores can be used to evaluate the status of heifer development and time synchronization programs and the start of the breeding season. Scoring can be done as part of a yearling heifer evaluation and health program in conjunction with collection of yearling weights, condition scores, pelvic measurements, and general processing. An RTS of 1 is assigned to heifers with infantile reproductive tracts, indicated by small, toneless uterine horns and small ovaries lacking significant structures. Heifers scored as 1 are probably the furthest from cycling at the time of examination. Heifers given an RTS of 2 are thought to be closer to cycling than those scoring 1, due primarily to the presence of small follicles and slightly larger uterine horns and ovaries. Heifers assigned an RTS of 3 are thought to be on the verge of cycling based on slight uterine tone in addition to the presence of follicles. Heifers assigned a score of 4 are presumably cycling, as indicated by good uterine tone, uterine size, and follicular growth. However, heifers with tract scores of 4 lack an easily distinguished corpus luteum due to the stage of the estrous cycle. Heifers with tract scores of 5 are similar to those scoring 4 except for the presence of a palpable corpus luteum.