

Progress Report:

Use of Estrous Synchronization, via Prostaglandin, and Early Pregnancy Detection, via Blood Test, to Identify and Select Replacement Heifers: An Alternative Approach

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Background

Heifer Selection and Development. Traditional doctrine has been to recommend to producers to select replacement heifers at weaning based on 1) the oldest animals - which are the most physiologically mature, or 2) if calving data are not available, to select the largest or heaviest ; and then to grow and develop them to meet a “target” age and estimated “target” weight at first breeding. The latter is usually 60% to 65% of “expected” mature weight. Given the variation in mature cow size within herds, expected mature weight can be difficult to accurately predict. Further, individual heifers that are able to reach puberty and breed early, with less weight gain, on lower quality forage, are reported to be better adapted to function in harsh environments as cows (Funston et. al. 2012; Roberts, et. al. 2009). Heifers are typically managed and developed to reach these targets followed by pregnancy testing 2 to 5 months after the end of the breeding season. With this procedure, early conceivers / calvers may not be identified until first calving season - if at all.

Earliness of Conception Affects Lifetime Production. It has been well demonstrated that heifers that become pregnant with their first calf early in the breeding season will have superior lifetime reproductive performance (pregnancy and earliness of calving), as well as production for weaning weights (Cushman et. al. 2013, Sprott, and others).

An Alternative - or Direct Method of Heifer Selection

Three groups of yearling heifers (n= 319) on three Texas ranches are being evaluated. Herds were synchronized with a single 2 cc shot of estrumate® on day 5 following the first day of bull exposure. The reason for giving the shot on day five of the breeding season (vs. on day one of the breeding season) is to not penalize heifers that were pubertal and cycling - but because of the stage of their estrous cycle - would have been unable to respond to the shot on day one. An early blood pregnancy test 40 days after the first day of bull exposure was used to identify those heifers that: A) were pubertal and able to respond to an estrous synchronization shot and B), got pregnant on their first heat of the breeding season. These heifers will be evaluated next year, as two-year-olds, for both pregnancy and conception pattern (early- vs. late- conceivers).

The South Texas Ranch at La Pryor began breeding on April 1 with an 80 day breeding season. The panhandle ranch at Canadian began breeding on May 20 with a 103 day breeding season. And the Southwest Texas ranch at Valentine began breeding on September 5. A bull to female ratio of 1:15 to 1:20 was used. All bulls passed a breeding soundness exam.

Results

As of this writing, the breeding season is still ongoing on the SW TX Ranch. Overall pregnancy rates were 86% and 90% on the other two ranches. First estrus conception was 41%, 54% and 54% on the three ranches respectively. About half (35%, 60% and 47%; respectively) of the first estrus pregnancies occurred at breeding weights that were below the herd median for each ranch (TABLE 1).

TABLE 1.

	<i>South Texas</i>	<i>Panhandle</i>	<i>Southwest Texas</i>
% Pregnant	86	90	
% Pregnant on First Estrus	41	54	54
Average Herd Wt. at Breeding (lbs)	798	792	675
Median* Herd Wt. at Breeding (lbs)	795	795	680
% Pregnant on First Estrus and Less Than Median Herd Wt. at Breeding	35	60	47

*Median = The middle, or the weight at which half the animals were above and half were below

Implications

These trials are in progress. Based on previous research, we anticipate that yearling heifers that become pregnant on their first estrus / bull exposure may have better reproductive performance as 2-year-olds (and probably throughout their lives) compared to those that became pregnant later in their first breeding season. Thus, the methods discussed here might be a way to identify and select directly for puberty and fertility - as measured by pregnancy at first estrus.

Another (probably undesirable) consequence of selection of replacement heifers based on a large body size (as an indicator of maturity, and a predictor of yearling puberty) is that, over time, there is concurrent selection for a larger mature body size. Bigger cows have higher maintenance requirements and are less efficient in many environments. As stated, since about half of the first estrus pregnancies occurred at breeding weights that were below the herd median for each respective ranch, this might suggest a possible way to avoid some of the consequences of selection for large body size. That is, if body weight at breeding was measured in conjunction with this estrous synchronization and early pregnancy testing protocol, breeders would have an option of direct selection for smaller heifers, but that were also identified as pubertal and fertile.

Economic projections for early culling and sale of non-breeders, and/or late-breeders, will also be evaluated. This could offer options to ranchers facing drought or other challenges which might require stocking rate adjustments during an ongoing breeding season.

Summary

This may be “an alternative” way of replacement heifer selection by using this protocol to directly measure fertility by identifying early breeders.

References:

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Acknowledgments:

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Chaparosa Ranch

Panhandle Spade Ranch

Miller Ranch