DEVELOPING REPLACEMENT HEIFERS WITH LIMITED INPUTS

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Replacement heifers represent a significant cost to beef cattle producers. The primary cost associated with developing heifers is purchased feed which goes to a young female who provides no return until her first calf is weaned. The replacement female poises numerous problems to producers, including determining appropriate rate of growth, age and duration of breeding season and appropriate sire to breed to. The age at which the female reaches puberty (initiation of fertile heat periods) is dependent upon several events including age, body weight, percent body fat, nutrition and genetics. Traditional thoughts on heifer development are that she should be bred at 65% of her predicted mature body weight. In the southwestern U.S. this is seldom obtained. Currently, most producers attempt to maximize growth and reproductive performance in heifers by beginning supplementation soon after weaning. This strategy results in acceptable pregnancy rates in heifers. However, strategies which optimize growth and reproduction (compared to maximizing) may provide more financial benefit to producers. Use of feeds which affect metabolic and hormonal function provide alternatives to heifer development. These feeds include bypass proteins which exit the rumen and are utilized by the lower GI tract. By delaying the time supplementation begins, costs associated with purchased feed is reduced. This provides the producer with the option of investing dollars into heifers which are diagnosed pregnant instead of the entire heifer herd.

The dilemma exist: How do I economically get enough gain on the heifers to cycle and become pregnant and minimize calving and rebreeding difficulties as two year olds?

Two lines of thought exist on this controversial topic: 1) feed them to reach the 65% target weight aiming for maximum pregnancy rates and 2) rough them through the winter, and expose more heifers than I will actually need and keep the females that become pregnant (optimizing reproductive performance). There are advantages and disadvantages to both approaches, producers should determine which program will positively influence profitability.

Research has and is currently being conducted at the NMSU Corona Range Research Center (CRRC) to address low input heifer development. Heifers at the CRRC are Angus x Hereford crossbreeds raised on the ranch. Heifers are weaned during the month of October and are bred in May. The breeding program consists of one time breeding via artificial insemination (A.I.) followed by a 45 to 60 day exposure to bulls. All herd sires used for heifers (A.I. and natural service sires) are Angus bulls with EPD's for low birth

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weight. Estrus synchronization is used to facilitate A.I.

Another obvious concern is calving difficulties and rebreeding performance in heifers developed with minimal feeding. At the NMSU CRRC the use of low birth weight Angus bulls have essentially eliminated calving problems. Rebreeding performance does not appear impaired by the low input development, yet more data is necessary to confirm this. Another effect of this type of development program is placing selection pressure on reproductive traits. Heifers which become pregnant with minimal supplementation obviously have had this type of selection pressure applied.

Trials have been conducted in 1994-1995 (67 head), 1996-1997 (72 head) and 1997-1998 (56 head). Supplementation was initiated February (1994-1995 and 1996-1997) or November (1997-1998). The initiation of supplementation differed to determine if any advantage in rates of gain and percent pregnant were achieved by supplementing early (November) versus later (January-February).

1994-1995

In 1994-95 heifers (n=67) were fed cake containing bypass protein, bypass protein plus fat or cottonseed control. Supplements were fed three times per week. The feeding period lasted until early May in 1995. Heifers were synchronized with Syncro Mate-B and those which came into heat were AI'd. Cleanup bulls were turned in for a 60 day breeding season.

1996-1997

In 1996-97 supplements were fed to heifers (n=82) in a 40 lb block delivered twice per week. Supplements used in 1997 were either bypass protein or cottonseed control. The feeding period lasted until mid April when synchronization with MGA began. For 14 days heifers were feed 2 pounds of a 37% supplement containing MGA; 17 days after the end of MGA feeding heifers were given Lutalyse and those which displayed heat were AI'd. Cleanup bulls were turned in for a 45 day breeding season.

1997-1998

In 1997-98 supplements are being fed to heifers (n=56) in a 40 lb block delivered twice per week. Supplements used were either bypass protein or cottonseed control. The feeding period will last until early May. Estrous synchronization will be similar to 1994-1995.

All heifers were assigned to treatments by date of birth so that each treatment had an equal age distribution. All supplements were similar in crude protein (approximately 40%). Supplementation for '94 and '96 did not begin until February following an October weaning, whereas supplementation in 1997 began in November. Heifers were palpated for pregnancy 60 days after the end of the breeding season which was confirmed (1995) by calving date.

Results

1995

Body weights at the end of the trial (May) are presented in Table 1. Body weights did not differ among treatments. However, backfat (measured with ultrasound) was the greatest in heifers fed the bypass protein supplements. This indicates that although weights were not different fat deposition was altered by bypass protein. Pregnancy rates

(Table 1) were greatest for heifers fed the bypass protein and fat supplement. Also number of heifers bred in the first 21 days of the breeding season was greatest for the heifers fed bypass protein and fat supplement (Table 1)

1997

In 1997 heifers were feed the bypass supplements until mid April when MGA feeding began for 14 days. As in 1995, body weights going into the breeding season were similar (Table 2) among treatments. Pregnancy rates which were lower than 1995 but were greatest in bypass supplemented heifers. Data regarding when heifers were bred is being confirmed during the present calving season (1998). It is worthwhile to realize that heifers were only exposed for 45 days during the 1997 breeding season.

1998

Heifer weights at the current time (Table 3) do not indicate any measurable advantage to early supplementation (about 90 days more time on supplements than previous years). The cost associated with the additional 90 days of feed is around $00.20 per day ($18.00 per head for the 90 day period). Yet it is premature to draw any conclusions until pregnancy rates are determined.

Summary

It appears possible to achieve optimum pregnancy rates (not maximum) by limited use of bypass protein. The attainment of optimal reproductive rates should increase revenue to producers. The narrow profit margin that cow-calf producers operate in dictate that cost effective strategies be developed to maximize return and contain inputs in a matter that is biologically effective.

Table 1. Heifer body weights (lbs) and pregnancy data for 1994-1995.

1994-1995[a,b]	Weight		
	Control (n = 22)	Bypass (n = 23)	Bypass + Fat (n = 22)
October (weaning)	506	519	515
February	517	521	522
March	539	544	547
April	564	567	581
May	565	587	597
Pregnancy[c]			
1st 21 days of breeding season	43%	56%	45%
Overall pregnancy rate	77%	100%	86%

[a]Supplementation began February 23, 1995 and continued until late April

[b]Heifers were synchronized with Syncro-Mate B and those which display estrus were artificially inseminated one time. Bulls were then turned in for a 60 day breeding season from May-June.

[c]Pregnancy was determined by palpation and confirmed by date of calving.

Table 2. Heifer body weights (lbs) and pregnancy data for 1996-1997.

1996 - 1997[a]	Weights	
	Control (n = 41)	Bypass (n = 41)
October (weaning)	494	494
February	498	502
March	522	524
April[b]	534	558
May	564	563
Pregnancy[c]		
Overall pregnancy rate	60%	67%

[a]Supplementation began February 1996 and continued until mid April.
[b]In mid April all heifers consumed 2 lbs/hd/day a 36% CP supplement containing MGA for 14 days to synchronize estrus. Heifers which displayed estrus were artificially inseminated one time. Bulls were turned in for a 45 day breeding season (mid May-June).
[c]Pregnancy was determined by palpation and is currently being confirmed by calving date.

Table 3. Heifer body weights (lbs) for 1997-1998.

1997 - 1998[a]	Weight	
	Control (n = 28)	Bypass (n = 28)
October (weaning)	522	522
January	512	502
March	547	545

[a]Supplementation began in November.