Development of the First Calf Heifer

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Introduction

Young cow development on range and desert ranches is a costly and risky enterprise. Getting the yearling heifer bred can be a predictable management task. However, after the heifer's first pregnancy she is expected to grow, produce milk, get pregnant again and repeat this set of circumstances another year making second and third pregnancies less predictable. Not until she is 4 years old does the level of risk decline. Because of various sources of nutritional stress, it is not suprising that younger cows may require more care than senior cows.

Utilizing a Strategic Nutritional Plan for Young Cows

We know that successful reproduction is an all or none event. There are minimum requirements that need to be satisfied for a cow to become pregnant. These factors include; her current body condition score and trend, the direction of grazeable forage quality and quantity; quantity of nutrients required for milk production; previous nutritional history (including mineral status), extent of calving difficulty, and environmental factors such as weather events. In a strategic supplementation plan all of these factors and others are continually monitored and compared to the production objectives of the cowherd. When it is apparent that the stress imposed by one or more of the above factors jeopardize successful accomplishment of production goals then nutritional intervention may occur to rectify that limitation.

Low forage availability. Different types of stresses may require distinct remediation steps. During drought forage, quantity is the limitation to production. There are two practices used to maintain production; 1. Sell part of the herd or 2. Bring feed supplies to the cows. The sooner an action is taken the greater is the reduction in the negative effects caused of the drought. Recently Waterman et al. 2000 at the Corona Range and Livestock Research Center showed that feeding of 4 lbs. per day of a 18% CP. wheat middling sorghum grain base block had the same effects on ruminal function, digestibility and fecal output as did a 36% crude protein range block fed at 2 lb. per day. This is in contrast to the inhibitory effects on ruminal function associated with feeding a greater amount of starch containing grains (corn, wheat, barley, oats etc) manufactured into blocks or cubes. Supplementing with more than one pound per head per day of high starch grains will cause a depression in the digestibility of the grazed forage and a reduction in intake minimizing the benefit of feeding the grain. Therefore, if additional energy intake is needed (during a drought or when forage is covered by snow) then a cube made of a highly digestible fiber is the source of choice.

Winter stress. During severe winter conditions, the combination of wind and snow can have a depressing effect on grazing behavior while increasing maintenance energy requirements. The combination of these two factors plus increased nutrient requirements in the last third of pregnancy may expose a young cow to sufficient losses in body condition and weight that she will breed back later or not at all. In these circumstances, a highly efficient supplement that minimizes weight loss would be desirable. Tested under harsh winter conditions in Montana various protein supplement combinations have been tested. Adding ¼, lb. of blood meal to 1 lb. of a 40% crude protein cube changed cows from loosing 40 lbs. to 10 lbs. in sixty days. The additional blood meal was used with a feed conversion better than 1:1, (for every pound of blood meal fed .one pound of body weight was spared).

After calving stress. After calving, is the most nutritionally stressful time in the life of a cow. One week's worth of milk requires approximately the same nutrient demand to produce an 83-lb. calf (remember that calf is 75% water and is only 22lbs. weighed dry). Lactation has a high nutrient demand. Even during mild climatic conditions a cow that has just started lactation will lose weight in order to satisfy nourishment needs for lactation. Under this scenario she is unable to eat enough feed so, weight loss occurs to supply needed nutrients. Weight loss is antagonistic to reproduction, so as she looses weight she pushes back the onset of reproductive events. In fact, the sequences of physiological events that promote the return to estrus probably do not start until weight loss diminishes or reverses. Therefore, the amount of time required for a cow to begin cycling is dependent upon the length of time that is required for weight loss to end and weight gain to begin. The most obvious solution to this

dilemma is to throw feed at cows after calving. Although this maybe a predictably successful practice it is too costly. A more desirable solution might be to supply supplemental nutrients at the most effective time and in the most effective form. When priorities are assigned to ranch feed budgets this period should have the highest preference. A strategic supplementation plan to reverse post partum weight loss could be an important management practice to maintain timely conception during the breeding season. In the springs of 1998 and 1999 (at Corona Range and Livestock Research Center) we fed 2lb/head/day of a 36% crude protein range supplement formulated to contain 50% bypass protein (compared to a traditional type supplement that contains about 35% bypass protein). The higher bypass formulation initiated a higher rate of gain from the onset of supplementation (after calving) to the breeding season. In these two years, the cost of the supplements per cow was $20.65 (traditional) and $21.35 (50% bypass). In addition, earlier cycling was sometimes associated with the higher weight gain

Types of protein supplements. Not all protein supplements fed to young cows after calving are equal. (Serratos-Corona 1997, Appeddu-Richards 1997, Tovar-Luna 1997, Knox 1998, Sawyer 2000). There are three types of protein source formulations used when creating supplements milled for approximately 2 lb./hd/day. The protein sources can vary from a high percentage of non protein nitrogen (NPN), to a natural protein that is mostly utilized in the rumen to a mix that allows for 50% or more of the protein to bypass ruminal utilization and get absorbed directly at the small intestine. All three of these types have different costs and biological effectiveness. In favorable range conditions of adequate rainfall, forage availability, with cows in adequate body condition and low stress nutrient requirements the lower cost of NPN or urea based supplements are attractive sources of supplemental protein for cows grazing dormant rangeland. However, as forage conditions decline, selectivity is reduced and cow stress increases a more costly but more effective protein source maybe preferred. In this case protein cubes or blocks that have been formulated with protein feeds like cottonseed, soybean, canola or other oil seed meals will be the most effective. The efficacy of these type of supplements are 30 to 50% higher (as measured by changes in body weight) than the high NPN source based supplements. This type of formulation with nearly all natural protein have been most effective during late pregnancy when cows experience diminished forage selectivity to reduce weight loss. Also post partum senior cows or moderate conditioned young cows after calving, can achieve pregnancy goals fed this type of supplement. The third type of protein supplement contains 50% of the protein in the form of bypass protein. These supplements will usually be composed of both the oil seed meal and byproduct proteins such as blood, fish, feather, corn gluten meal etc. This type of supplement is the most costly and can cost $1 to $10 more per head in a feeding season. However it provides another level of protection against weight loss and may improve reproductive success. In one study, our 2 and 3-year-old cows were supplemented with a natural protein and 50% bypass protein. The cows fed these two supplements were pregnancy tested in the fall. The cows fed the all natural protein supplement were found to be 72% pregnant and those when fed the 50% bypass protein were 90% pregnant (Knox et al 1997).

Compensatory gain in thin cows. We read and hear about compensatory gain in calves destined for the feedlot and how feeders like to take advantage of it because it is a source of low cost gains for the first 30 to 45 days in the feedlot. Rarely do we hear about taking advantage of compensatory gains in the management of commercial range beef cows. Two years ago a study by 2 graduate students was conducted at the Livestock center on the NMSU campus. Two groups of post-partum beef cow were fed the same quantity of supplement during the period after calving. One group was fed supplement every other day from calving until 90 days post partum. The second group was fed the exact same amount of supplement during the 90 days but feeding began 45 days after calving. At the end of 90 days, the cows that were supplemented in the last 45 days weighed 15 lbs. more. It appears that these cows showed a compensatory gain effect in the last forty days as shown by a higher body weight after 90 days of supplementation (Sawyer and Waterman 1999).

Fresh pasture. Another interesting management practice deals with the value of a fresh pasture when vegetation is dormant. A study that has been ongoing at the Corona Range and Livestock Research Center has measured the nutrient content of young cow diets during the late winter and spring as selected by ruminally cannulated cows. There is a group of three pastures at this study site. The two and three year old cows graze from calving through breeding in these 3 pastures (mid February to early July). When the cows are moved into or out of a pasture all three pastures are sampled by ruminally cannulated cows to collect diet quality samples. We have found to this point that moving cows into a fresh pasture is equivalent to feeding 2 pounds of a cottonseed meal supplement for a minimum amount of days after turn in. In our nutritional management scheme we plan to exploit the ability of the cows to select a higher quality diet when needed most such as after calving and at breeding.

Fat fortified supplements. Fat fortified diets have been demonstrated improvements in reproductive success in Texas and Montana using cottonseed or safflower oil. Research a NMSU has used dried fats and tallow as fat source. In young cows at the Corona Range and Livestock Research Center, fat has delayed estrus and conception mostly likely because milk production has been increased (Appeddu-Richards 1997). Currently we are conducting a 4-year study measuring the effects of fat fortification of liquid supplements we are currently in the third year. Preliminary results show a trend for increased milk production and a slight increase in weaning weights however the results will be clearer with 2 more years of results.

Summary

Productively managing young range cows is challenging. Rebreeding of 2 and 3 year, old cows are influenced by a complex array of conditions. These factors can continually be evaluated through out the production year. The point being to determine which of the influences will be most restrictive to achievement of reproductive and economic goals. Many successful methods can be used to attain these goals. The common aspect across nearly all ranches is the desire to achieve profitability productivity. Results of economic analyses of New Mexico and Texas operations show a strong trend for low fed cost with normal productivity to be a trait of the most profitable. Using the advantages of thin cows, fresh pastures, differences in feed sources and fortifying against stress maybe additional methods that can be implemented to enhance productivity and profitability.