Choosing Calving and Weaning Seasons in the Southern Plains

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Tradition

Traditional calving seasons in the South Plains have been closely aligned with Mother Nature's attempt to preserve the species Bos Taurus. With few exceptions, large mammals in the wild would deliver their offspring in springtime. The lactation and attempts to rebreed would coincide with the growing of warm season plants for food. From that basis, cow/calf management schemes have centered around the traditional spring calving season with early summer breeding seasons necessary to produce a 285-day gestation, generating a spring calf the following year. As beef cow operations became more efficient, cowmen learned the advantages in labor management, feed utilization, and market position that they gained by manipulating Mother Nature and creating a shorter more distinct calving season. In the Southwest, producers have been able to get the "jump" on their Northern Plains neighbors by starting the breeding season earlier in April or May, producing February and March calves. Early spring calves could be weaned earlier in the fall ahead of the glut of northern calves or weigh more at weaning time because they were older. The Southern Plains and Southeastern cattle operations also had the additional option of utilizing cool season pastures with fall-calving cows producing calves ready to market in spring or summer.

Why consider change

Traditional methods of cow-calf management are severely challenged by the squeeze of high input prices and low prices for weaned calves. Producers and land grant university cattle researchers are looking at many "non-traditional" alternatives. Efforts are being made to examine ways of reducing input costs or increasing value of the product as it leaves the ownership of the cow-calf operator. In Oklahoma, cost inputs per cow each year are near the national average. In 1995, the middle one-third of the Oklahoma herds were analyzed using the NCBA-IRM Standardized Performance Analysis (SPA) and had an average break-even cost of $.83/pound of weaned calf. Of that 83 cents, 51 cents could be attributed to grazing costs and home raised feed or purchased feed costs. This represents the largest single cost item and seems to be the item that gives the best opportunity for cost reduction. Therefore, examining non-traditional calving and breeding seasons in an effort to discover a much less expensive program for maintaining cows and producing calves was inevitable.

Cow-calf managers determine when the breeding season begins and ends and therefore they determine the calving season because gestation length is relatively constant. The manager also determines when the calves are weaned and marketed. Breeding, calving, weaning, and marketing dates are not the product of Mother Nature but are managerial decisions that do not have to conform to tradition. It is interesting to note beef is the only major meat animal specie that is currently allowed to rear its offspring. Is this due to necessity or tradition? Pork and poultry both have lower costs of production.

Lots of choices

Southern Plains producers have many alternatives for calving seasons. Length of seasons vary from 45 days to 365 days. Spring and fall are the seasons of choice, but tremendous differences exist as to what months within each of those seasons are the primary months for calves to be born.

Deciding on the use of one or two calving seasons is a big first step. Many fall calving seasons have evolved from elongated spring seasons. Two calving seasons fit best for herds with more than 80 cows. To take full advantage of the economies of scale, a ranch needs to produce at least 20 steer calves in the same season to realize the price advantage associated with increased lot size. Therefore, having a minimum of 40 cows in each season is desirable. Using two seasons instead of one can greatly reduce bull costs. Properly developed and maintained bulls can be used in both the fall and spring, therefore reducing the bull battery by half. Another small advantage of having two calving seasons is the capability of taking fall-born heifers and keeping them non-pregnant another few months into the spring season and vice versa. Because of this, replacement heifers are always 2 1/2 years old at first calving instead of 2 years old. These heifers should be more likely to breed early in the breeding season and have slightly less calving difficulty. Research has shown that these differences are very small. The cost of the other six months feed must be minimal to make this a paying proposition.

Many producers like the dual calving seasons because they spread their marketing risk. Having half of the calf crop sold at two different times allows for some smoothing of the cattle cycle roller coaster ride.

Two calving seasons requires more time spent watching cows and heifers during calving seasons. More pasture management and fencing may be needed to successfully

have two calving seasons. The fall and spring herds must be maintained separately because they are in different stages of production and have different nutritional requirements. In addition, breeding seasons will require that fall calving cows be separate from spring calving cows during their respective breeding seasons.

Spring calving decisions

Those that prefer the spring calving systems still have some alternatives from which to choose. Early spring calving (February and March) has been utilized to a great extent in Oklahoma and north Texas. This time frame often puts calving during a wet, cold weather pattern. Weather stresses on baby calves can cause some weather related death loss, or scours can be difficult to manage. Lactating cows require considerable energy and protein in February, March, and April before spring grass can supply all of the nutrients needed in May. The breeding season is initiated in April or May and continues through June. This comes at a time where weather stresses are minimal with the exception of the first blast of heat that sometimes occurs in June. Early spring calves are old enough to utilize forage by mid summer with weaning in mid to late October at about eight months of age. During years with adequate summer pastures, calves should reach their genetic potential for weaning weight.

Some producers may consider moving their spring calving season to later in the spring or early summer. University of Nebraska researchers have been studying the use of June as a target calving month. This data was discussed at the National Cattlemen's Beef Association Cattlemen's College by Dr. Don Adams. They have been attempting to reduce cow costs by making this change. Calving is done at a pleasant time of year so weather stresses on the calves will be reduced. Breeding is done in August and early September. Cows are wintered on sandhills range, with very little added supplemental feed. Additional hay is given only in times of severe winter weather. The subirrigated meadows available in the sandhills are used for early spring grazing. The hope is that cows will regain enough body condition in spring to calve in adequate body condition by May. In order for cows to have adequate body condition going into the winter, the calves will be weaned in the fall at the usual dates, even though they are considerably younger. Results from this multi-year study suggest that the program may be successful. Similar calving season changes are being tried by a few Kansas cow-calf operations. Some of these herds have been written about in the popular press. Consequently, Oklahoma and Texas producers are asking about the feasibility of changing to late spring and summer calving.

Hot weather and breeding seasons

The first real concern to address with this potential change is the breeding season in late July, August, and early September. Heat stress is rarely a problem for cows pastured in Nebraska. Although daytime temperatures can occasionally reach the century mark, night time temperatures in Nebraska often fall into the 60's. Only the mid to late afternoon hours are extremely warm. The number of days that fit this situation are quite few. Fertility of cattle will not be affected in these conditions. Contrast those temperatures with typical Oklahoma - Texas summer weather where many days in a row can exceed 95°F with night time lows only dropping to near 80°F. Many hours of the day can be quite hot and cause the slightest rise in body temperature of cattle. Research conducted several years ago at OSU illustrated the possible impact of heat stress of beef cows on their reproductive capability. In this experiment, the cows were bred naturally (after synchronization), then exposed to mild or severe heat stress. The cows were stressed on days 8 through day 16 after breeding. See the table below.

Table 1. Effects of Imposed Heat Stress on Reproduction in Beef Cows (Biggers, 1986; OSU).

	Control	*Mild Stress*	*Severe Stress*
Daytime Temp. (°F)	71	97	98
Nighttime Temp. (°F)	71	91	91
Relative Hum. (%)	25	27	40
Rectal Temp. (°C)	38.9	39.3	39.8
Rectal Temp. (°F)	102.0	102.7	103.6
Pregnancy (%)	83	64	50
Conceptus wt. (g)	00.158	00.111	00.073

All of the cows were slaughtered on day 17 and the uterine contents were studied for the presence of an embryo. Note that only half of the cows undergoing severe heat stress had an embryo present, and the conceptus (embryo + fluids and membranes) weighed half as much as did those from control cows. This severe heat stress shortly after breeding certainly had an adverse affect on embryo survivability and therefore pregnancy rates.

The impact of hot weather on bull fertility

Several research trials have been conducted throughout the years looking at the effect of high temperatures on bull fertility. As far back as 1963, researchers exposed bulls to temperatures of 104°F and 54% humidity for an eight hour period and then allowed the temperature to drop to 82°F with 72% humidity for the remainder of the 24 hour period. This temperature regimen was continued for seven days and was designed to resemble natural conditions in the subtropics. **They found the high temperatures resulted in major detrimental effects on initial sperm motility, sperm concentration, and total numbers of sperm per ejaculate.**

More recently (Meyerhoeffer, et al 1978), Oklahoma scientists placed bulls in controlled environments of 95°F for eight hours and 87° for the remaining 16 hours, while similar bulls were placed in environments of a consistent 73°F. These treatments were applied to the bulls for eight weeks, and then all bulls were exposed to the 73° environment for another eight weeks. During the treatment, the heat stressed bulls had rectal temperatures 0.9°F higher than non-stressed bulls. The percentage of motile sperm cells decreased significantly in the stressed bulls by two weeks of heat stress. See Figure 1.

Sperm motility did NOT return to normal values until eight weeks after the end of the heat stress. This explains some of the reduction in fertility that is often associated with summer and early fall breedings. One cannot escape the conclusion

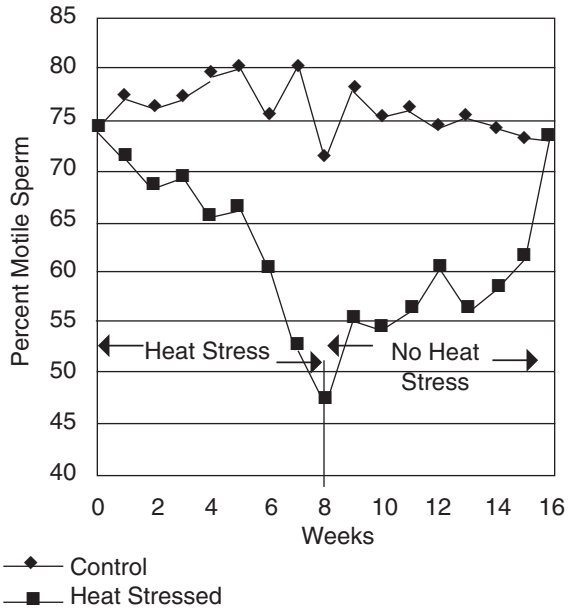

Figure 1. Percent Motile Sperm from bulls during and after heat stress.

that high ambient temperatures can result in detrimental effects on fertility by effects on both the cow and the bull.

Recently Dr. L.R. Sprott of Texas A&M reviewed data from experiment stations in Northern, Midwestern, and Southern states. In Montana and South Dakota (Northern) data, spring and late summer breeding seasons were similar in reproductive performance. In Kansas (Midwestern) there was a substantial drop-off of first service conception rates for artificially bred cows from May to June, and a further reduction in July. Illinois (Midwestern) data showed a 14% greater pregnancy percentage for cows exposed to bulls in May and June, compared to cows exposed in July and August. The data for the Southern states Louisiana, Texas, and New Mexico produced the expected responses. Cattle exposed to breeding seasons in the high desert of New Mexico had excellent reproductive performance throughout the spring and summer months. Low night time temperatures and low humidities in the higher altitudes of New Mexico provide comfortable environments for reproducing cattle. However, spring and summer month breeding seasons in Louisiana and Texas where both heat and humidity are a problem produced very low pregnancy rates especially in the months of July through September. Late spring and summer calving seasons that require breeding to start in late July and August are going to be impacted by the Oklahoma heat and humidity and fertility can be expected to be reduced.

What do you do with late spring and summer calves?

The next point of concern with late spring-summer calving is what to do with the calves. Leaving them to nurse the cow until they are seven months old would be self-defeating as the cows would become extremely thin or need considerably more feed to nurse in the dead of winter. Therefore they should be weaned (in this scheme) in early fall at about 120 days of age. The Nebraska program had calves winter on alfalfa hay, supplemental grain, and subirrigated meadows, then ready for sale as summer pastures are beginning to grow. They are examining retained ownership options through summer grazing and/or the feedlot. The expense to feed the calves in the winter will offset some of the advantage gained in reduced feed for the cows. Small grain pastures may provide a source of feed for these lightweight calves in Oklahoma and northern Texas. This is a program that we will examine more closely when discussing fall calving possibilities.

Another key issue is the body condition of the cows at calving time if they have been "roughed" through the winter and the growth of spring grasses is limited due to a late spring. Thin cows at calving time provide less and poorer colostrum for early health of the calves, return heat very slowly, may be later calving in subsequent years, or be found open at pregnancy checking time.

The Nebraska Sandhill research certainly merits our consideration in those regions of the Southern Plains where expected climatic conditions during breeding will not be detrimental to reproductive performance. The issue of heat stress in July, August, and early September really suggests that we "look before we leap" into changing the calving season to late spring or early summer.

Fall calving

The advantages and disadvantages of fall calving have been discussed in Oklahoma since the introduction of perennial cool season grasses such as fescue. Many producers living in the central or western parts of the state have only warm season pastures (native and bermuda) available to them. They often think that fall calving is only for those that live close to Arkansas or Missouri. Ranchers with only warm season grasses might be surprised at the comparative advantages that fall calving can deliver. Fall calving programs are now being tried (to a very limited extent) in Wyoming, Nebraska, and the Dakotas. Producers in those states are becoming aware of the strengths of a fall-calving program.

Producing a weaned calf ready to graze on lush spring and early summer grass is appealing. Examine the 10 year average percentage change in beef cattle prices and one quickly sees that the fall-born calf can be in strong demand in the spring and early summer. The following graph illustrates the average percentage change in the sale price of 400 - 500 pound steer calves and 700 - 800 pound feeder steers in Oklahoma City. The slaughter cattle price changes represent the averages for Oklahoma and Texas Panhandle feedlots. The midpoint of the graph (100) represents the yearly average. Therefore you can predict that 400 - 500 pound steer calves will bring three to four percent above the yearly average in March and April. Likewise producers can expect calves to be two to four percent below the yearly average if marketed in the fall (October and November). It is no mystery that the price dips at the normal "weaning time" for the glut of calves that are sold in the October and November time frame.

Fall calving operations that calve in September and October enjoy excellent reproductive performance from the cows. The body condition of cows after summer pastures should be excellent. These cattle return to heat more quickly than do the thinner spring calving cows. The breeding season in late November and December usually is completed in moderate

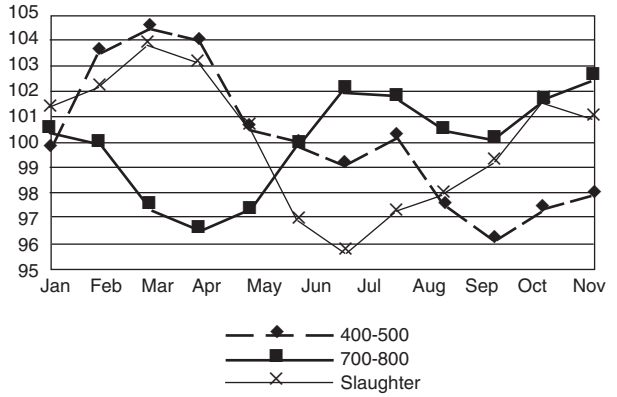

Figure 2. Ten Year Average Price Percentage Change in Steers.

(1998 Current Farm Economics, OSU Dep't of Agricultural Economics.)

weather. Many times the producers that dislike fall calving have tried to calve in October and November (often after wheat planting is complete). This puts the breeding season well into the harsh winter months, and causes some disruption in the pregnancy percentage. An added bonus to fall calving is that fall born calves are lighter in average birth weight than genetically similar spring born calves. The lower incidence of dystocia also aids in the return to estrus and partially helps explain the routinely high reproductive rates of fall-calving cows.

Producers that winter cows on native range often believe that it would be too costly to have fall calving because of feeding a lactating cow all winter. However, upper Midwest producers are finding the fall calver does not have to be more expensive. The trick is to reduce expensive feed inputs after the breeding season is over. This will get the pregnant fall calving cow through the winter thrifty enough to regain body condition during the summer months after the calf has been weaned. Below is a comparison of a typical range supplementation program for spring and fall cows. The amounts of supplement shown are the daily per head feed supplied during each respective month. The dollar figure would then be the number of days in the month multiplied by the price of supplement fed each day. These cows are considered to be moderate in frame size and milk production. The price listed for cottonseed meal (CSM) is $240/ton and for 20% range cubes is $190/ton.

The supplementation program for fall calving cows requires that adequate forage be available. Standing forage in the fall and early winter will be adequate to maintain body condition with the supplemental protein. In late winter and very early spring the energy requirements of lactating spring calving cows are increased to the point that protein alone may not get the job done and the 20% range cubes are necessary. Why are they not needed for the fall calvers? The fall calving cows are in excellent body condition at calving time. They return to heat early in the fall breeding season. Most mature fall calvers will be rebred by the first of the year. These cows can stand some loss in body condition between the end of the breeding season and spring grass. Therefore protein supplementation and hay, in addition to standing forage, will suffice. **It is expected that fall calving cows consume 20% more forage than spring calvers because of the longer lactating period.** This is reflected in the overall cost of raised and purchased feed that has been given to Oklahoma herds in the Standardized Performance Analysis (SPA) data base. Fall calving herds reported a total feed cost per cow, per year of $133. The spring calving herds were very similar with a total feed and forage cost of $126 per head. Most producers are surprised that these two totals are similar. If the fall-calvers are weaned at seven to eight months of calf age, weaning weights may be depressed due to reduced milk production in cows that are marginal in energy intake. OSU is currently looking into the impact of this reduced cow feed cost by following calves in retained ownership scenarios. Many producers with fall calving herds wean the calves at nine months of age to achieve even greater weaning weights.

Table 2. Comparing Daily Supplement Programs for Mature 1000 Pound Moderate to Low Milk Cows.

	Spring Calving Cows	*Fall Calving Cows*
October	None	1 lb CSM = $3.72
November	1 lb CSM = 3.60	2 lb CSM = 7.20
December	2 lb CSM = 7.44	3 lb CSM = 11.16
January	3 lb CSM = 11.16	3 lb CSM = 11.16
February	5 lb 20% = 13.30	3 lb CSM = 10.08
March	6 lb 20% = 17.67	3 lb CSM = 11.16
April	5 lb 20% = 14.25	2 lb CSM = 7.20
Winter supplement total	$67.42	$61.68

As we research different methods of dramatically reducing feed inputs in fall calving herds, one point of emphasis has been in the area of early weaning. Early weaning (at 60 to 90 days of age) would seem impossible with calves in the winter. However, several OSU trials have been completed that indicate that these young calves will survive early weaning at this time. The consequences on cow feed inputs are impressive. At the Eastern Oklahoma Agronomy Station, fall calving cows were early weaned, wintered on poor quality sudan hay (with no supplementation), and rebred 19 days earlier than cows that nursed their calves and were fed both grass and legume hay. At the Range Cow Research Center near Stillwater, similar trials were conducted and cows that were early weaned were given $60 less feed in the winter but rebred quickly at a very high percentage. The question that remains is the survival and gain ability of the baby calves. They must be raised to weaning age for less than the $60, which was saved in feed cost to the cows. Wheat pasture is a high quality forage that provides an opportunity to raise these very light weight calves at a competitive cost. Several fall calf crops have now been put on wheat pasture at OSU with varying degrees of success. Calves will not gain as well as when they are with their mothers. Producers who try this method should expect 50 to 100 pounds less weaning weight. Therefore retaining ownership until they compensate for the lost gain may be very important. Calf health is a real question mark. In OSU experiences, calves have done surprisingly well. The worst case occurred when calves were mixed in the wheat pasture with other stocker calves. In this instance, a 30% sick rate and 10% death loss occurred. Most of the other situations resulted in a small percentage sick rate and

very low death loss. Calves at this age have considerable passive immunity available to help through disease exposure. These trials are reported in detail in the OSU Animal Science Research Reports. Producers that examine this management scheme are encouraged to start slow and with a small number of calves. One possibility would be to try this with a few calves from the two-year old cows to help the rebreeding rates. Certainly this concept must be studied more as it represents a potentially great savings in cow input costs.

Calving season length

The optimum length of the calving season has long been a controversial topic among producers and researchers. Most of the research data on this topic has been generated by mathematical models. It is too expensive to do lifetime studies with enough cows to directly evaluate different lengths of calving seasons. The most recent attempt to answer this question for commercial cow-calf operations comes from Nebraska. They looked at a hypothetical commercial herd with 1000 lb. cows and selling calves at weaning. The Nebraska data were generated in the mid to late '80s when calf prices were low. However the inputs at that time were also lower than many modern input costs. They compared 45, 70, and 120 day breeding seasons. If the operation chooses to keep inputs very low and the cows calved in low body condition, the economic advantage naturally fell to the longer breeding season, because even a 70 day season left too many cows unbred in this scenario. If the cows were kept in moderate to good body condition, the 70 day breeding season had the advantage over each of the other two possibilities. The 120 day season lost considerable efficiency, and the 45 day season was still too narrow for optimum pregnancy rates. Given the 1980s inputs, the moderate condition cows bred in a 70 day breeding season had the overall economic advantage compared to the other combinations.

Cows that calve in excellent body condition (BCS=6) such as fall-calvers, often will have excellent rebreeding percentages in 45 days. Fall breeding seasons in the OSU research usually extended from about Nov. 20 to Jan. 5.

Final thoughts

The important points to remember from all of these examples include:

- No one calving and breeding season fits everybody (thankfully)!
- Larger herds in the Southern Plains should consider two calving seasons. The cost savings on reduced bull inputs and older replacement heifers and spread out marketing should allow for overall economic advantages. Additional labor during two calving seasons must be considered.
- Producers with traditional spring calving programs may wish to consider switching to or adding fall calving. It need not be more costly. Fall calving can meet current higher seasonal market trends.
- Moving the spring calving season to May and June should be studied closely in Oklahoma because of the potential rebreeding problems that can occur in very hot weather.
- Before any change in breeding, calving, and weaning seasons are made, consider the marketing plan first. Is the producer willing and capable of retaining ownership to market the product at its best advantage? Study Figure 2 on the seasonality of cattle prices before making a significant change.

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