FACILITATING THE PRODUCTION OF HIGH-QUALITY BEEF WITH ESTRUS SYNCHRONIZATION AND FIXED-TIME AI

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Introduction

In an ever changing world, we find ourselves always looking for new ways to do things and new things to do. What started out as a simple commercial cow-calf operation now consists of three parts. First, we still have a commercial cow-calf operation emphasizing the production of high quality, white table cloth beef in a low input grass management system. We also raise and sell heifers through the Missouri Show-Me-Select Replacement Heifer Program (SMS) with that same genetic emphasis. Second, I have what I call the Mike Kasten Beef Alliance program which is an extension of our herd. The producers in this program own their cows and I provide records management. I also provide bulls and semen of my choosing to be used in these herds. I either custom develop heifers for these farms from their herds or sell replacement females to them. At weaning, I purchase their calves. These calves are either retained and go to the feedlot or selected to go through the SMS program. Third, we now do custom heifer development for producers putting all the heifers through the SMS program.

AI, high quality proven genetics, and production records are the foundation upon which our program is based. We know that these three management tools will play an essential part in reaching our future goals.

Reproductive Management

I have had the opportunity and pleasure over the last 12 years to work with Dr. David Patterson and his crew at the University of Missouri on different synchronization protocols. The latest insemination protocols we have been using involve fixed-time AI (FTAI). We have been using these protocols on both our cows and heifers.

I have been using AI heavily for the last 37 years. Over those years I have tried just about ever type of breeding system imaginable. I have used observation 2 and 3 times a day, MGA, Prostaglandin, Pregnant Mare Serum, Syncro-Mate B, limited suckling and early weaning. All of these systems worked to some degree. None, however, have worked remotely as well as the fixed-time AI breeding protocols we are using today.

On the heifers, we use the 14-day CIDR-PG protocol (Show-Me-Synch) with FTAI at 66 hours after prostaglandin and we administer GnRH at insemination.

The protocol we are using on the cows is the 7-day CO-Synch + CIDR protocol. Insemination is performed 66 hours after CIDR removal and prostaglandin with GnRH at AI. We have been getting in the 60 to 70% FTAI pregnancy rate range on our cows and 55 to 65% for heifers on

average. Bull selection plays a very important part in determining the pregnancy rate. There is wide variation in pregnancy rates on bulls with fixed-time AI.

The time and labor savings coupled with better results, make the fixed-time breeding systems very appealing. The ability to schedule breeding times has given us the opportunity to utilize AI in our alliance herds which would have never been possible with in a heat detection program.

The number of times the animals must go through the chute seems to be a sticking point for people with the fixed-time systems (3 times for cows and 4 times for heifers). We, however, have found that we actually spend less time with these systems than with detecting heat. The 4 trips through the chute for heifers take a total of 5 minutes and 36 seconds per heifer. If you multiply this times 2 people, our total labor per heifer is 11.2 minutes. The 3 trips through the chute for cows take a total of 5 minutes per cow. If you multiply this times 2 people, our total labor per cow is 10 minutes.

For us, this is a tremendous system and a substantial time saver. We calve 90% of our cows in the fall so we are breeding in late November and early December. The daylight hours are very short, which makes it even harder for good visual observation for signs of heat. **We no longer observe heat at all.** We just breed when the calendar and clock says that it's time.

The Economic Impact of Fixed-time Artificial Insemination

There is a long list of positive economic impacts with this system. I want to focus on 3.

Conception/pregnancy rates. The overall increases in pregnancy rates we have achieved with these protocols have been very beneficial. The fact that every cow is in estrus on the first day of the breeding season, gives each of them 4 chances to conceive in a 65 day breeding period. The estrus stimulation of cows resulting from the protocols (progestins) has also had a significant influence in increasing pregnancy rates.

The biggest benefit of increased pregnancy rates is a higher retention rate for our females and the need for fewer replacements. This has moved pregnancy status from first to third in our reason to cull animals. In turn, this gives us the ability to cull more on performance traits and increase our selection process for desired results. Listed below are the retention rates of the first three groups of heifers that we fixed-time bred. We have continued to use fixed-time breeding annually on them ever since.

Table 1. Retention rates of the first three groups of heifers that were fixed-time bred.

Year born	Breeding seasons (no.)	Animals still in herd (%)	AI services resulting in a live calf (%)
2001L	9	61	74
2002M	8	59.5	75
2003N	7	57.6	76

The percentage of animals still in the herd comes from the number of heifers we calved the first time and includes all culling reasons and death loss.

Increased age and access to more females. The ease of fixed-time breeding has given us access to herds of cattle owned by individuals that would never have considered AI if it required daily observation to detect estrus and gathering of cattle. I have now been fixed-time breeding for 5 years in four of my alliance herds. These herds have a total of 390 females. The up front benefit of fixed-time breeding for these individuals has been three fold. First, the average age of their calves at weaning has increased by 11 days. This alone pays all the expenses for breeding. Second, the time saving at calving for all of them has been significant. More concentrated calving has also resulted in less death loss at calving. Third, is the improved genetic makeup of their herds.

Results stemming from multiple generations of high-quality proven genetics. The access to high quality proven genetics is certainly the biggest positive of all. Also, the ability to use one bull over a large number of females is of great benefit. We have been using AI for over 37 years. We have total performance records from birth weight to carcass traits. Our females must maintain a 365 calving interval in a low input system. Our goal has been to produce cattle that work on grass in a low input system. With access to a large volume of proven genetics through AI we can do this and also breed for a high quality product. As I said in my introduction our business is three fold. One, to produce high quality females for the Show-Me-Select Heifer Replacement Heifer Program (SMS), and two, to produce high end white-table-cloth beef for the consumer. We want to capture premiums everywhere we can.

We have been very pleased with and thankful for the SMS program. It has given us the ability to create and capture true value for our commercial females. It has also given us the knowledge and tools to succeed in the third part of our operation, custom heifer development.

We have been retaining ownership in our calves through the feedlot stage and collecting carcass data for over 22 years. Marketing our finished cattle through the USPB quality grid has been very beneficial for us and has given us a great deal of genetic information to use in our breeding program. It has also allowed us to capture more value for our genetics. Below is the performance data for our calves from 2009. This included two pens of steers and one pen of heifers that were fed at the Irsik and Doll Feed Yard in Garden City, KS and marketed through USPB.

Table 2. 2009 calf performance.

No. head	ADG	Dry matter conversion	Prime	CAB	BCPR	Select	YG1	YG2	YG3	YG4
151	3.56	5.30	23%	58%	10%	0%	1.5%	21%	68%	9.5%
Steers: Average carcass premium per head = $115.24										
74	3.48	5.40	15%	55.4%	28%	1.4%	0%	23/2%	74.3%	2.5%
Heifers: Average carcass premium per head = $101.59										

We have been pleased with the results of AI in our herd but we want to keep improving. We have been stacking generations of high quality genetics for decades. With today's EPD's we have the ability to take the guess work out of bull selection. The use of multiple generations of high accuracy bulls in our cow herd has moved us in a very positive direction.

The chart below shows the percentage of cattle that have graded choice or better and the percentage of cattle that received a quality grade permuim. We have been fortunate to have had a high percentage of cattle grading choice, but the part I am excited about is the positive upward trend line of cattle that are receiving a quality grade permuim. The dips in that line represent years where new alliance herds came into our program with unknown geneitcs in their cows.
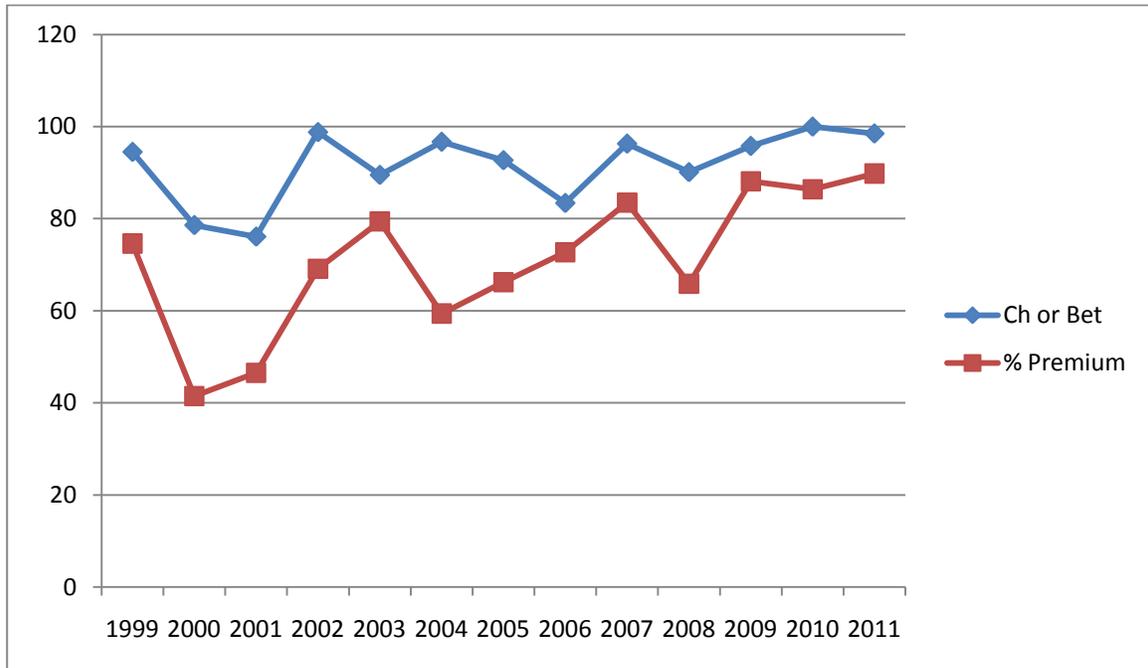

Figure 1. Percentage of cattle that graded choice or better and the percentage of cattle that received a quality grade premium.

The chart below shows the percentage of cattle grading Prime, CAB, or NAB. The same quality trends as shown above demonstrate the effects we observed with the introduction of new herds of unknown genetics and the associated effect on quality grade. What I am happy to see is the upward trend in the percentage of cattle grading prime and the downward trend in NAB, which is an indication of moving the whole population to a higher quality grading level.
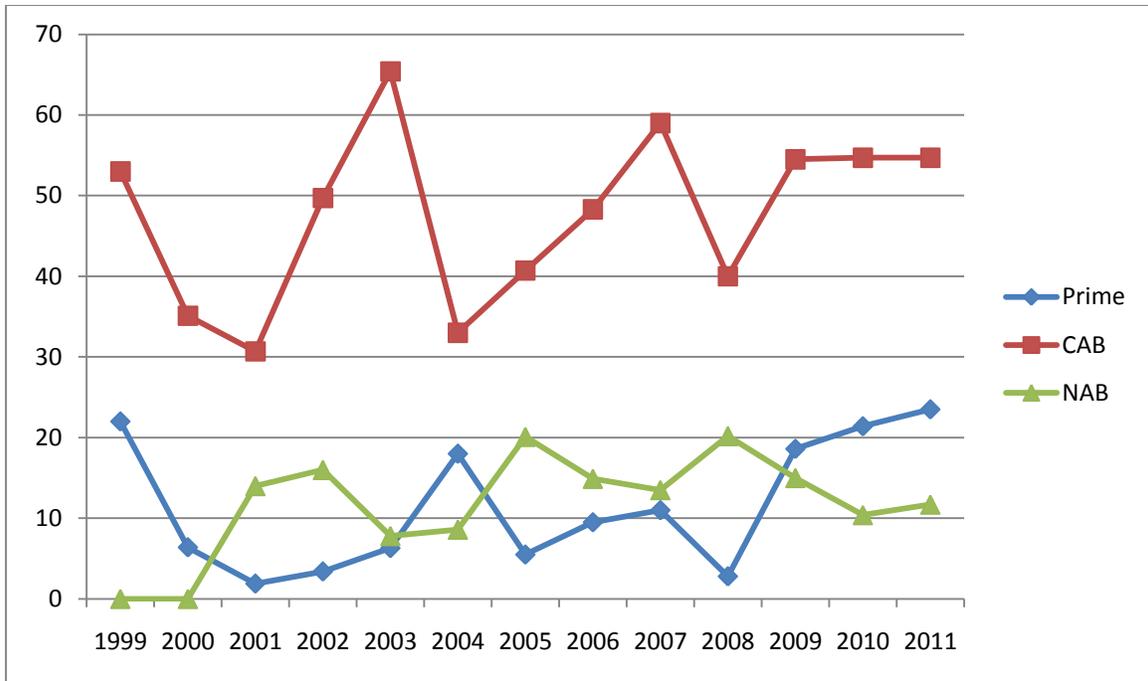
Figure 2. The percentage of cattle grading Prime, CAB, or NAB.

I thought it would be interesting to look at our data based on sire and the number of generations of high accuracy bulls on the maternal side of the pedigree for calves in the of the feedlot. I defined high accuracy using the SMS Tier 2 criteria. Some of these animals could have as many as six generations of high accuracy sires in their pedigree. Some are sired by a bull with just positive carcass EPD's with no maternal history. I organized the data into three categories. The First category would include cattle with two or more generations of high accuracy bulls including, sire, maternal grandsire or maternal great-grand sire. Second, one generation of high accuracy sires including either the sire or maternal grand or great-grandsire. Third, being sired by a bull with positive carcass EPD's.

Table 3. Results stemming from multiple generations of high-quality proven genetics.

	Highly proven x 2	Highly proven x 1	Positive
No. head	83	38	56
Carcass weight	827	815	797
Average REA	12.4	12.8	12.5
Average Marbling Score	Moderate 69	Modest 61	Modest 19
Average Yield Grade	3.3	2.9	3.3

As you see from the data, the carcass weight, rib-eye area and yield grade are similar for each category. The big difference among the carcasses lies in the marbling score and quality grade. How the cattle graded is listed below.

Percent Prime	49%	0%	0%
Percent CAB	47%	79%	59%
Percent Low Choice	4%	21%	37.5%
Percent Select	0%	0%	3.5%
Average sale price/head	$1,444.07	$1,319.48	$1,266.59
Positive value difference: Highly proven x 2 over highly proven x 1			$124.59
Positive value difference: Highly proven x 2 over positive			$177.48

A person could pick apart these data because they are not adjusted for age, carcass weight, days on feed, etc. The reality of the data, however, is that stacked generations of highly proven genetics brought back $177.48 per head more, and adjustments won't change that fact. Another hard fact is that you cannot get these genetics in your herd without using AI. The only aspect of a cattle operation that we as producers have total control over is genetics. You can't control the weather, prices, politics etc., but you can control the genetic makeup of your herd. Why not use highly proven genetics as a risk management tool? A third hard fact is that fixed-time AI breeding protocols have made AI easier, cheaper and more efficient than ever before. Fixed-time AI has become an integral part of our operation, and we will continue to use this technology at every available opportunity.