IF AI IS SO GOOD, WHY ARE WE CHALLENGED WITH ITS USE IN COMMERCIAL BEEF OPERATIONS?

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The artificial insemination (A.I.) industry has been around for many years and has made considerable advancement to improve its efficiency since it was initiated. The dairy industry has used it extensively however still a relatively small percentage of beef producers utilize A.I. (NAHMS 2000 estimate less than 10%). Use has especially been limited in the mature commercial cowherd. Studies and economic models have shown the economic benefits for several years. Dr Sandy Johnson and coworkers did an excellent job in comparing costs and returns of natural service to several synchrony and A.I. programs. In her evaluations she considered a range in the purchase price of the bull, herd size and bull:cow ratios and found many A.I. programs were more cost effective that natural service (Table 1).

In an excellent study in Kentucky where Anderson and Deaton utilized a herd of 351 cows, where 1/3 of the cows were in a natural service program and were compared to 2/3 of the herd which where synchronized and timed A.I. In their study all input costs and labor were recorded plus the output (pounds of calf weaned/cow exposed) and they found an additional $70 profit for the A.I. herd. (Table 2)

Many tools have been added to improve A.I. efficiency, especially synchronization and timed A.I. however with all this in place few beef producers utilize what seems to some as obvious. This raises the question as to why.

Labor

I believe that the need for increased labor may be the main reason A.I. is not used to a higher degree. This is not only a question of availability of labor (quantity), but also quality of people with skills of heat detecting, handling cattle quietly, practicing quality control in utilizing products and synchronization programs, handling semen to actually inseminating cattle with high accuracy. In almost any survey conducted concerning the needs or concerns of the industry two things often raise to the top – labor and excessive environmental regulations.

The bull stud industries have done an excellent job in providing training of A.I. technicians and in most all cases that training includes many areas of husbandry and management practices that assures a high degree of success when utilizing A.I. Private schools offer short courses in AI and management. Universities have taught the basics over many years and in some cases teach the technique of inseminating. One area that probably only experience gives the best training is heat detection and that is important even in a successful timed A.I. program. We all know that some stockmen that are

extremely good at heat detection and some would describe as having a natural innate ability. They can see and pickup the smallest detail while others do not have this ability and if trainable, it may be a long frustrating process that may cost thousands of dollars in the learning process. We haven't seen a mule entered into the Kentucky Derby yet because most feel it is too much of a risk to even try to train them. The same may be true with some people in training how to successfully heat detect. We know the more experience the person has in the inseminating the higher the success rate. This leads to the problem of gaining the experience. Few want to utilize technicians with little experience however how can they get experience if no one gives them the opportunity to gain experience and to learn.

So if a considerable number of people have been trained where are they and why would labor be such a problem? In most herds where A.I. is utilized it is only part of the personnel's responsibility plus it is seasonal where a concentration of labor is required for a relatively short period of time. In cow herds where labor is stretched A.I. becomes a relatively low priority when compared to other needs such as cattle management, fencing needs, hay making, perhaps farming operations, youth activities, plus many other tasks. Some beef cattle operations that have goals of one person caring for 800 – 1000 cows year around which means there is barely enough time to get the bulls out and certainly not time to A.I. Many ranchers that have cow herds of 500 head or less find it difficult to justify a full time high quality employee that can be paid high enough to have long tenure at the operation. Some have relied on "A.I, crews" to handle the A.I. program and have functioned with varied success. Again, because of the seasonality of the labor needs the few that offer this service can't meet the demand (if they have a good reputation) in the spring and then need to find other employment during the off-season. It is questionable if "A.I. crews" will be the answer to the labor problem in the majority of ranchers that would like to use A.I.

Market Incentive

Even though we have made considerable gains in differentiating and paying differently for high value and low value cattle we are still an industry that often deals on averages and sell a commodity. Many tools have become available and progress has been made to pay premiums for high quality cattle that gain efficiently in the feedlot and produce a high quality carcass and some have found ways to take advantage of this opportunity. Yet still the majority of finished cattle in Western Nebraska feed yards are sold live over the scales and all bring about the same price. This gives little incentive for the feed yard to pay a justified premium for the feeder calf and therefore does not give the cow-calf producer the insensitive to reach out and pay for very top genetics, which can be available through an A.I. program. In fact some very successful feed yards deal primarily on purchasing "cheaper" cattle and then sell them live directly to the packer for average price. We are still an industry that knowingly puts the bad apples in the box in order to get then sold at an average price. Economic models and research has shown that high performance cattle can be managed and sold at a high enough premium to justify the

added expense, however the majority of producers do not retain ownership or are not involved in profit sharing through the entire system to take advantage of producing the premium product. Part of this is due to the many small herds of cattle in the U.S.

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Extensive operations

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I believe that some operations would be more attracted to A.I. if they were more concentrated during the breeding season. In the majority of cases cows are grazing during the A.I. season and because of the high costs of harvested feeds I don't see that changing. Some have developed irrigated pastures specifically to enhance cattle concentration during the A.I. season which facilitates bringing cows into corrals for A.I. However, $6 corn and $10 soybeans, doubling and tripling fertilizer cost, water cost plus LABOR in managing the irrigated pastures has limited the development of irrigated pastures. Also some have raised a justified concern of breeding cattle on a pasture with extremely high levels of protein or nitrogen and its impact on early embryonic mortality of fertility. More research needs to be conducted to further evaluate what effect irrigated pastures have on fertility. As we have seen many progressive beef producers expand their operations we see them expand over miles and often their operation is no longer contiguous. Often land is purchased or leased some distance from the home operation and distance and perhaps lack of adequate corrals in the pastures during A.I. season becomes an issue. Yes, portable corrals plus other innovative ideas can be used but again that requires labor.

Many beef producers utilize A.I. in their yearling heifers and this is primarily due to the fact they are in the dry lot and can utilize the MGA/prostaglandin program with two passes through the chute. The MGA/prostaglandin can be incorporated with timed breeding or at least utilizing a very short and concentrated period of time to inseminate the heifers. Producers also like the opportunity to use proven low birth weight bulls on heifers and in many cases bulls with good gain performance and maternal value, so many of the heifers can be maintained in the herd. If many producers continue to calve heifers in early spring, I would anticipate an increase in A.I. in heifers, however if producers choose to calve in later spring where the heifers are on grass during the breeding season, I would see less A.I. utilized in heifers.

Superior Genetics from Seedstock Producers and Expected Progeny Differences

The seedstock industry relies heavily on A.I. and as a result offer many bulls with many generations of superior genetics (assuming they have selected for leading economic traits over the years) and as a result offer bulls with excellent genetics that provide the insemination service at little added cost. How many times have you heard the comment that the natural service calves outperformed the A.I, calves? I usually take these comments with some question but in some cases I know it is true, at least for the trait measured, but true or holistic or not it is still often stated. Part of the reason this can

occur is because with the use of EPD's, often times with very high accuracy on the sire and probably the grand sire, ultrasound plus actual performance we have the tools available today to select very high quality bulls to use naturally. In fact it should not be too surprising to find that the top end of the bulls from an excellent herd will produce calves that would be similar to calves from a yearling bull offered by an A.I. stud even though they may have been 5 to 10X difference in the cost of the bull.

Other

Often times the news media, the dominant talker at the coffee shop or sometimes the neighbor likes to report on the "wreck". "Did you hear about the A.I. wreck ……?" Sometimes wrecks do occur and sometimes they are unexplained but the fact is this story is probably told 20 times more by the naysayer than the success stories are told by the quiet conservative cattlemen. I am not sure how much of an influence it has had but I am sure it is not positive.

Many more comments are expressed each year indicating the desire to improve the quality of life for the people on the ranch. Does the rancher and his family want to work 16 hour days, 365 days of a year? It ties some to labor but it is more than just labor. What simplifies ones life may improve their quality of life.

Many herds of cattle are small where the operator does not depend on the cow-calf operation for a large part of their income. The fixed costs can be relatively high for small operations plus it may be more difficult for them to achieve a justified premium for a superior calf.

Facilities are often a limitation. I once heard a cattlemen say "anything that is easy to do will likely get done." If facilities are not convenient and/or designed to contain and easily handle cattle then cattle handling can be a stress on the cattle and perhaps more importantly on the people (family members sorting as an example) so it is easy to just let the bull handle the insemination chores.

What can be done?

As I indicated earlier, I feel every effort needs to be made to continue to improve the conception with timed A.I. with a minimum of passes through the corrals. Anything to reduce labor requirements and to continue to look for ways to provide an economic incentive to produce superior genetics should be pursued. When the economics become great enough to overcome the cost, A.I. in commercial herds will increase in use just as it has been utilized in the dairy and swine industry. That's the American way – I hope.

Table 1. Breeding Systems Cost ($) and 500 lb Equivalent weaning Calf Breeding Cost ($) per Cwt at Various AI Pregnancy Rates

System	Days Worked	Preg. Rate (%)	No. of Bulls Herd Size			Cost ($) per pregnancy Herd Size			500 lb. equivalent weaned calf breeding cost ($) per cwt. Herd Size					
			30	100	300	30	100	300	30	Diff[a]	100	Diff[a]	300	Diff[a]
Natural Service			2	4	12	56	34	34	12.91	-	7.79	-	7.79	-
CO-Synch	3	40	1	3	7	70	59	50	13.93	(1.02)	11.50	(3.71)	9.48	1.11
	3	50	1	2	6	70	51	48	13.41	(0.51)	9.04	(1.25)	8.32	(0.53)
	3	60	1	2	5	70	51	45	12.90	0.01	8.53	(0.74)	7.16	0.63
MGA/PGF	6	40	1	3	7	58	46	36	11.20	1.71	8.41	(0.63)	6.21	1.58
	6	50	1	2	6	60	39	35	11.20	1.71	6.47	1.32	5.56	2.23
	6	60	1	2	5	62	42	35	11.20	1.71	6.46	1.33	4.91	2.88
Select Synch	9	40	1	3	7	65	51	41	12.75	0.16	9.68	(1.90)	7.33	0.45
	9	50	1	2	6	67	45	40	12.75	0.16	7.74	0.05	6.68	1.11
	9	60	1	2	5	69	47	40	12.75	0.16	7.73	0.06	6.03	1.76

[a] Diff = difference between natural service and breeding system, $/cwt

Adapted with permission from Johnson et al. 2003

Table 2. Increased revenue from utilizing synchronization + AI verse natural service

	Revenue	
Weaning Weight	72.6 poundsx $80 cwt =	$58.08
% Calf crop	9% more calves x $80 cwt =	$41.54
Total Revenue		$99.62
Return on Investment	$99.62 — 29.88 =	$69.74

Anderson and Denton
www.beefimprovement.org/proceedings/03proceedings/Anderson.pdf