

PROTOCOLS FOR SYNCHRONIZATION OF ESTRUS AND OVULATION

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Introduction

The potential for genetic improvement in beef herds in the US through advances in biotechnology has never been greater. Recent improvements in our understanding of methods of inducing and synchronizing estrus and ovulation in postpartum beef cows and replacement beef heifers creates the opportunity to significantly expand the use of artificial insemination in both purebred and commercial herds. Technology now exists to successfully inseminate beef cows at predetermined fixed times with pregnancy rates comparable to those achieved with heat detection.

While many options exist for synchronization of estrus and ovulation, this short list of protocols was developed based on available research data and field use by the Beef Cattle Reproduction Leadership Team. This group is composed of representatives from the AI and pharmaceutical industries, veterinarians, and reproductive physiologists from the Beef Reproduction Task Force with active research programs in this area.

Selecting a synchronization protocol

Each producer should evaluate available resources and assess the cows or heifers intended for synchronization before selecting a protocol. Key considerations should include time and skill available for heat detection, body condition of the cows or heifers, days postpartum in cows, facilities, experience, and cost.

Amount of Heat Detection

The first step in selecting a synchronization protocol is to determine how much, if any, heat detection is feasible or desired. Some management systems make heat detection and the sorting of animals very simple and effective. In other cases, heat detection can be very difficult. Poor detection efficiency can result in a low AI pregnancy rate. The recommended protocols are divided into three groups based on amount of heat detection required; 1) heat detection for 7 to 8 days, 2) heat detection for 3 days followed by fixed-time AI of all remaining animals not previously detected in heat (clean-up timed AI) or 3) strict fixed-time AI.

Cow factors

Any of the synchronization protocols are recommended for mature cows with a body condition score of 5 or greater that are 50 days or more since calving at the time of AI. Young, thin, and late calving cows are all less likely to have resumed their estrous cycles at the beginning of the breeding season. If a high percentage of cattle are in these categories, consideration should be given to protocols that include a progestin such as a CIDR. The progestin will induce some non-cycling cows to cycle and improve their chance of conceiving to

AI. If cows are too thin or have calved too recently, the investment in synchronization of estrus may not be cost effective.

Heifer factors

Age and weight are key factors that influence time of puberty in heifers. Heifers should attain 60% of their mature weight prior to breeding. Because selection pressure on growth has increased mature cow size, producers may tend to underestimate future mature size. Producers that score heifer reproductive tracts at 50 to 60 days prior to breeding have a true measure of physiological maturity and time to adjust rations prior to breeding. If 50% of heifers have a tract score of 3 or greater 50 to 60 days prior to breeding, estrus synchronization programs tend to be more successful. Protocols including a progestin such as MGA or CIDR will induce some prepubertal heifers to cycle.

Other

Length of the protocol, number of times handled, and the ability to successfully deliver treatments such as MGA are other factors that must be considered when choosing a synchronization protocol. Management system, feed resource flexibility, and facilities will play a role in which protocol works best in each particular environment. Success of any protocol is dependent on the proper administration and timing of treatments. For help see the Estrus Synchronization Planner at http://www.iowabeefcenter.org/content/software_estrus%20planner.html

Cost

If labor is available or can be hired, protocols using heat detection are generally lower cost than fixed-timed AI. Treatments, semen and number of handlings will contribute to cash costs of synchronization. Estimated savings from fewer bulls needed for natural service and increased returns from age and weight of AI sired calves should be considered. Producers that find AI most cost effective are those that capture additional returns from AI sired calves.

Which animals should I synchronize?

When starting an AI program for the first time, replacement heifers probably are the easiest group of animals to work with and first calf heifers the most difficult group to achieve success. Start simple and add more animals as you gain experience.

PRODUCTS USED

Hormones common to many protocols are prostaglandin $F_{2\alpha}$ (**PG**), gonadotropin releasing hormone (**GnRH**) and progestins. They are available in the following commercial products. Follow label directions for dose and route of administration.

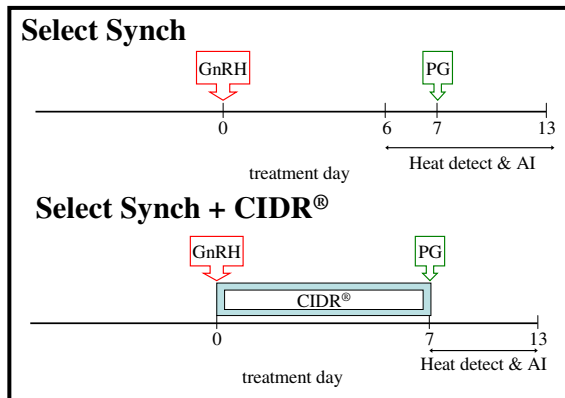
Type	Commercial Names
GnRH	Cystorelin [®] , Factrel [®] , Fertagyl [®] , OvaCyst [®]
PG	estroPLAN [®] , Estrumate [®] , In-Synch [®] , Lutalyse [®] , ProstaMate [®]
Progestin	MGA [®] (melengesterol acetate) CIDR [®] (progesterone)

PROTOCOLS

Heat Detection Protocols

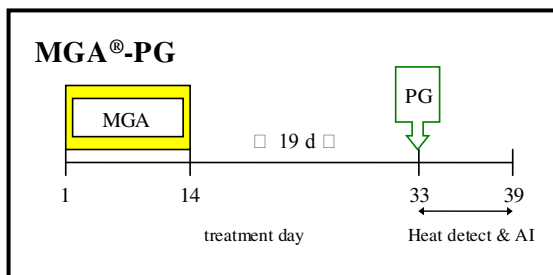
Animals in these protocols should be inseminated 6 to 12 hours after the first observation of standing heat. During peak activity (48 to 72 hours after PG for most systems), heat detection for a total of three hours per day at three or more times would be a minimum and a total of 5 to 6 hours better.

Figure 1. Heat detection only protocols for cows; Select Synch and Select Synch + CIDR.



is that heifers do not require the GnRH injection at the beginning of the treatment. Research has shown pregnancy rates from the 7-day CIDR[®]-PG protocol similar to those from the Select Synch + CIDR[®] protocol in heifers. Select Synch is not preferred for heifers because a wider range in responses to Select Synch has been reported in heifers perhaps due to inconsistent response to GnRH.

Figure 3. Heat detection only protocol for heifers, MGA-PG.

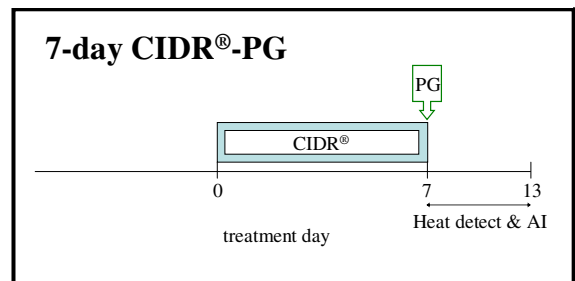


Select Synch and Select Synch + CIDR[®]

(Figure 1) are protocols for use in cows. Including the CIDR is recommended when more cows are likely to be anestrus and/or when heat detection prior to PG is not feasible. With Select Synch, 5 to 20% of the animals may show heat 1.5 to 2 days before PG. Both protocols could be applied to the same group of cows, with CIDRs selectively placed in young, thin, and/or late calving cows.

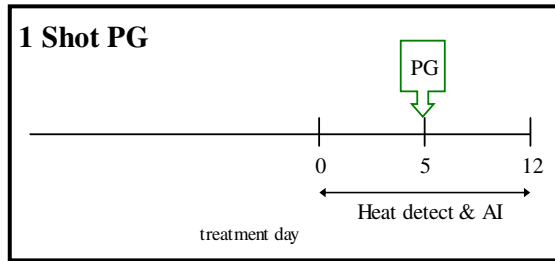
The 7-day CIDR[®]-PG protocol (Figure 2) is recommended in heifers in contrast to the Select Synch + CIDR[®] protocol in cows. The difference

Figure 2. Heat detection only protocol for heifers, 7-day CIDR-PG.



Feeding of MGA is specifically approved for estrus suppression in heifers only. The MGA-based protocol recommended for heifers is MGA[®]-PG (Figure 3). More advance planning is needed as this protocol begins with feeding MGA for 14 days starting 33 days before injection of PG. If MGA can be delivered accurately on a daily basis; this is a very effective protocol in beef heifers. The original recommendation for the interval between the last feeding of MGA and PG injection was 17 days. Delaying this interval to 19 days improves synchrony of estrus.

Figure 4. Heat detection only protocol for heifers, single shot PG.



A single injection of PG (Figure 4) can be used on heifers. This protocol does not provide the degree of synchrony of others and the heat detection period is twice as long. Nevertheless, it is a low cost method that often works well for those just starting to use AI. It could be used on cows but because sorting and heat detection are more complex when the calf is present, other options should be strongly considered. Heifers that have not reached puberty or cows that have not initiated estrous cycles do not have a corpus luteum (CL)

and **will not** respond to this treatment. Heifers observed in heat and inseminated before the time of PG injection do not require PG.

Heat Detection & Timed AI (TAI) Protocols

Heat detection and timed AI protocols involve AI 6 to 12 hours after observed estrus for 3 days then timed AI of all non-responders 72 to 84 hours after PG with GnRH given at TAI. The amount of time spent on heat detection is reduced and early responders have a better chance of conceiving compared to a single fixed-timed AI.

The same protocols recommended for heat detection are also recommended for the combination of heat detection and timed AI in cows (Figure 5). The success of these protocols is still dependent on good heat detection, particularly for early heats in the Select Synch protocol.

In heifers, the MGA[®]-PG (Figure 6) protocol can be used combining heat detection and timed AI. A second protocol recommended for use in heifers is Select Synch + CIDR[®] (Figure 6). GnRH is recommended in this protocol as it adds little additional cost and heifers that do respond with a new follicular wave are more likely to conceive at the clean-up timed AI.

Figure 5. Heat detection and clean-up timed AI protocols for cows, Select Synch & TAI and Select Synch + CIDR & TAI.

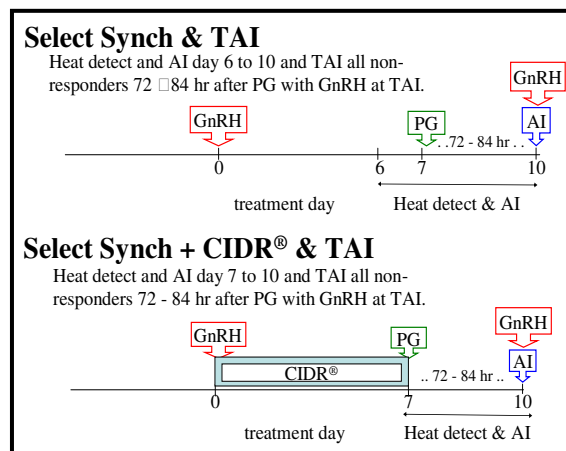
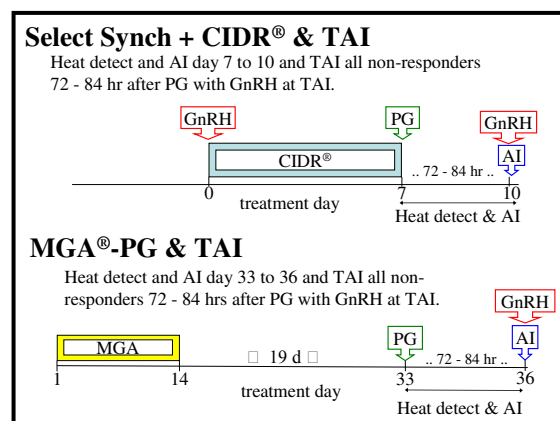


Figure 6. Heat detection and clean-up timed AI protocols for heifers, Select Synch + CIDR & TAI and MGA-PG & TAI.

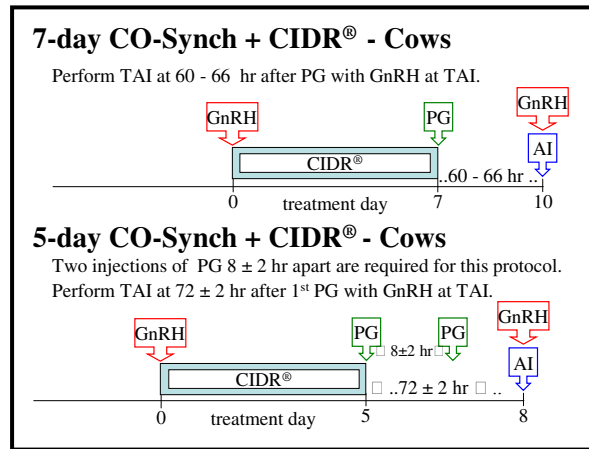


The third option for combination heat detection and TAI in heifers is **14-day CIDR[®] + PG** (Figure 7). This protocol appears similar to MGA-PG but the interval between CIDR removal and PG is reduced to 16 days. This is because the progesterone in CIDR treated animals is cleared from the body much faster than melengesterol acetate in MGA-treated animals.

Fixed-Time AI protocols

In fixed-time AI protocols, all animals are inseminated at a predetermined time. For cows, fixed-timed AI can produce similar pregnancy rates as protocols that require 5 to 7 days of heat detection. For heifers, pregnancy rates from current TAI protocols tend to be 5 to 10% lower than using heat detection alone. The times listed for fixed-time AI should be considered as the approximate average time of insemination. This should be based on the number of females to inseminate, labor and facilities.

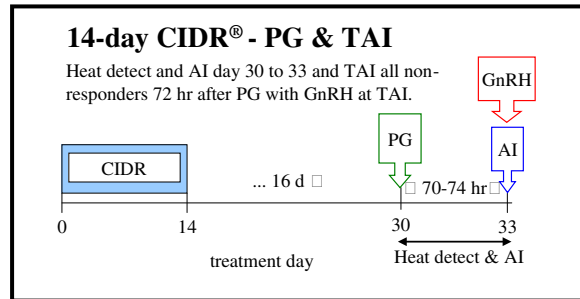
Figure 8. Fixed time AI protocols for cows, 7-day CO-Synch + CIDR and 5-day CO-Synch + CIDR.



between 60 and 66 hours after CIDR removal. Insemination time for heifers is recommended at 52 to 56 hours after CIDR removal. A shortened **5-day CO-Synch + CIDR[®]** protocol (Figure 8) is another option for cows. Two full doses of PG given 8 hours apart are critical for success in the shortened protocol.

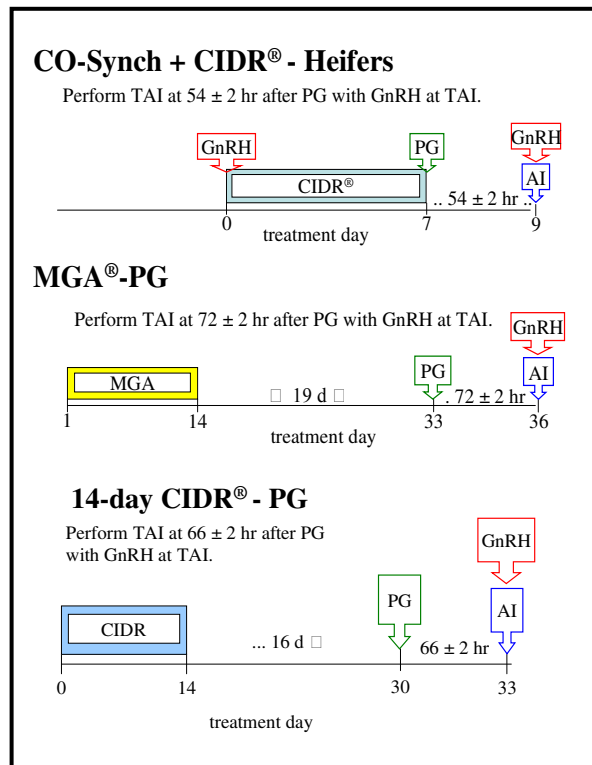
MGA[®]-PG (Figure 9) can be used with fixed-timed AI in heifers; however, pregnancy rate will likely be lower than with the CO-Synch + CIDR[®] protocol or 14-day CIDR[®]-PG.

Figure 7. Heat detection and timed AI protocols for heifers, 14-day CIDR-PG & TAI.



The **7-day CO-Synch + CIDR[®]** protocol is recommended for both cows (Figure 8) and heifers (Figure 9). Cows should be inseminated

Figure 9. Fixed time AI protocols for heifers, CO-Synch + CIDR, MGA-PG and 14-day CIDR-PG.



For many producers a CIDR-based protocol would be lower risk for fixed-timed AI than MGA[®]-PG as they are not reliant on accurate, daily MGA consumption and control of follicular growth should be better. The 14-day CIDR-PG is the most recent fixed-timed AI protocol for heifers. It is 3 days shorter than MGA-PG and requires one more handling than CO-Synch +CIDR.

Concluding Comments

Considerable research and field data support the use of these protocols as described. General comparisons of the protocols are found in Tables 1 and 2. Other protocols should only be considered in unique situations and with the advice of someone with extensive experience with synchronization protocols. Alterations of any protocol should be supported with sound research data

COMPARISON OF PROTOCOLS

Table 1. Beef Cows

Heat Detection	Cost	Labor	Reports ^a	No. of cows	Pregnancy Rate ^b	
					Range	Avg.
Select Synch	Low	Medium/High	4	678	38-70	46
Select Synch + CIDR [®]	High	Medium	8	595	42-85	51
Heat Detect & TAI						
Select Synch	Low	Medium/High	6	2048	31-89	51
Select Synch + CIDR [®]	High	Medium	8	1596	36-77	56
Fixed-time AI						
7-day CO-Synch + CIDR [®]	High	Medium	23	10,701 ^c	32-79	58
5-day CO-Synch + CIDR [®]	High	Medium	8	2189	49-80	62

^aNumber of reports in published literature

^bNumber pregnant to AI / total number treated

^cIncludes field data from 35 herds (3015 head) in Missouri

Table 2. Beef Heifers

Heat Detection	Cost	Labor	Reports ^a	No. of heifers	Pregnancy Rate ^b	
					Range	Avg.
1 Shot PG	Low	High	1(18 herds)	2700		45
7-day CIDR [®] - PG	Medium	Medium	1	147	41-59	51
CIDR [®] - PG (3 days of heat detection)			2	745	33-61	46
MGA [®] - PG	Low	Low/Medium	6	2746	40-71	60
Heat Detect & TAI						
Select Synch + CIDR [®]	High	Medium	2	748	31-67	56
MGA [®] - PG	Medium	Medium	5	1905	48-64	56
14-day CIDR [®] -PG	Medium	Medium	2	159	50-62	56
Fixed-time AI						
CO-Synch + CIDR [®]	High	Medium	11	1495	24-68	50
MGA [®] - PG	Medium	Medium	5	831	36-62	46
14-day CIDR [®] -PG	Medium	Medium	1	934 ^c	58-69	63

^aNumber of reports in published literature

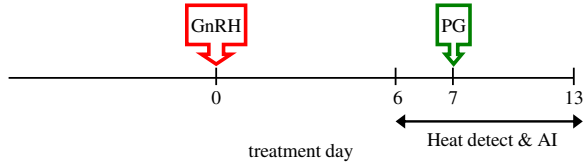
^bNumber pregnant to AI / total number treated

^cIncludes field data from 5 herds (734 head) in Missouri

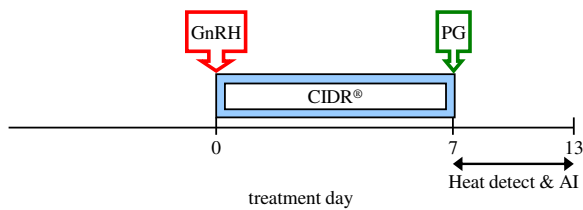
BEEF COW PROTOCOLS - 2010

HEAT DETECTION

Select Synch



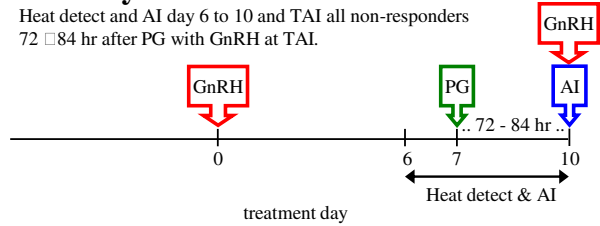
Select Synch + CIDR®



HEAT DETECT & TIME AI (TAI)

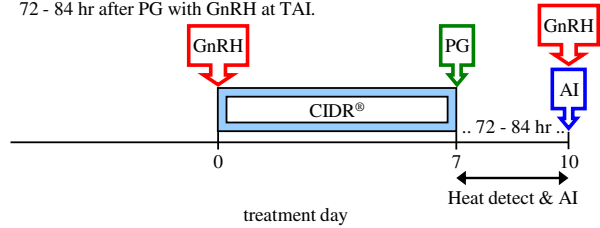
Select Synch & TAI

Heat detect and AI day 6 to 10 and TAI all non-responders
72 - 84 hr after PG with GnRH at TAI.



Select Synch + CIDR® & TAI

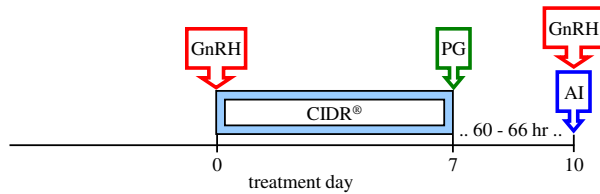
Heat detect and AI day 7 to 10 and TAI all non-responders
72 - 84 hr after PG with GnRH at TAI.



FIXED-TIME AI (TAI)*

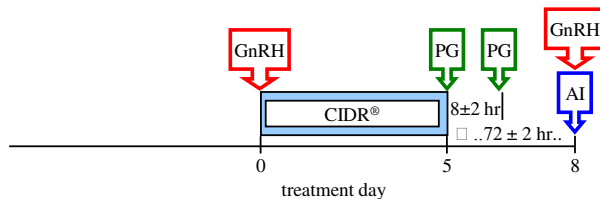
7-day CO-Synch + CIDR®

Perform TAI at 60 to 66 hr after PG with GnRH at TAI.



5-day CO-Synch + CIDR®

Perform TAI at 72 ± 2 hr after 1st PG with GnRH at TAI.
Two injections of PG 8 ± 2 hr apart are required for this protocol.



COMPARISON OF PROTOCOLS FOR BEEF COWS

HEAT DETECTION	COST	LABOR
Select Synch	Low	Medium/High
Select Synch + CIDR®	High	Medium

HEAT DETECT & TAI

Select Synch (TAI non-responders 72-84 hr after PG)	Low	Medium/High
Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)	High	Medium

FIXED-TIME AI (TAI)

7-day CO-Synch + CIDR® (TAI 60 to 66 hr after PG with GnRH at TAI)	High	Medium
5-day CO-Synch + CIDR® (TAI 72 ± 2 hr after 1 st PG with GnRH at TAI)	High	High

* The times listed for Fixed-time AI should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.

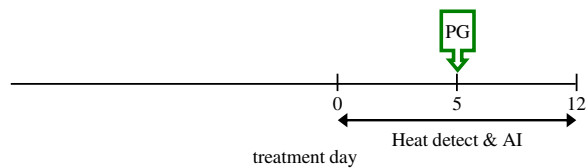
GnRH Cystorelin®, Factrel®, FertagyI®, OvaCyst®

PG estroPLAN®, Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

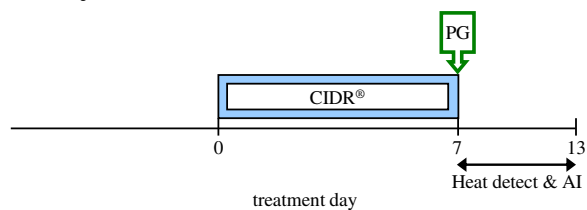
BEEF HEIFER PROTOCOLS - 2010

HEAT DETECTION

1 Shot PG



7-day CIDR®-PG



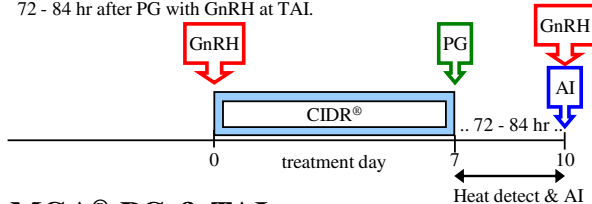
MGA®-PG



HEAT DETECT & TIME AI (TAI)

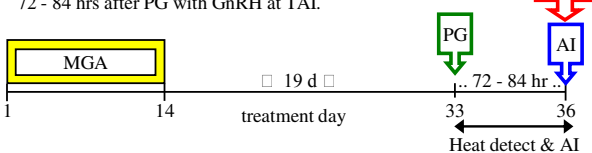
Select Synch + CIDR® & TAI

Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.



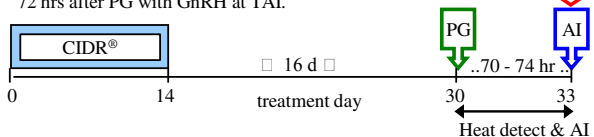
MGA®-PG & TAI

Heat detect and AI day 33 to 36 and TAI all non-responders 72 - 84 hrs after PG with GnRH at TAI.



14-day CIDR®-PG & TAI

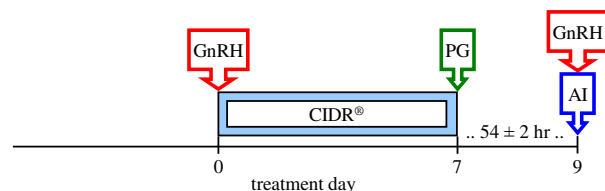
Heat detect and AI day 30 to 33 and TAI all non-responders 72 hrs after PG with GnRH at TAI.



FIXED-TIME AI (TAI)*

CO-Synch + CIDR®

Perform TAI at 54 ± 2 hr after PG with GnRH at TAI.



MGA®-PG

Perform TAI at 72 ± 2 hr after PG with GnRH at TAI.



14-day CIDR®-PG

Perform TAI at 66 ± 2 hr after PG with GnRH at TAI.



COMPARISON OF PROTOCOLS FOR BEEF HEIFERS

HEAT DETECTION	COST	LABOR
1 Shot PG	Low	High
7-day CIDR®-PG	Medium	Medium
MGA®-PG	Low	Low/Medium
HEAT DETECT & TAI		
Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)	High	Medium
MGA®-PG (TAI non-responders 72-84 hr after PG)	Medium	Medium
14-day CIDR®-PG (TAI non-responders 70-74 hr after PG)	Medium	Medium
FIXED-TIME AI (TAI)		
CO-Synch + CIDR® (TAI 54 ± 2 hr after PG with GnRH at TAI)	High	Medium
MGA®-PG (TAI 72 ± 2 hr after PG with GnRH at TAI)	Medium	Medium
14-day CIDR®-PG (TAI 66 ± 2 hr after PG with GnRH at TAI)	Medium	Medium

* The times listed for Fixed-time AI should be considered as the approximate average time of insemination. This should be based on the number of heifers to inseminate, labor, and facilities.

- GnRH Cystorelin®, Factrel®, Fertagyl®, OvaCyst®
- PG estroPLAN®, Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

Beef Reproduction Task Force

Producer Name: Calvin Cowman
Address: Rural Route
Town: USA
Phone Number:

Estrus Synchronization Planner

Prepared by: Sandy Johnson
Phone Number: 785-462-6281

Inputs	Tips
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Date to start breeding:	5/26/2010	<i>(Example: 6/1/2010)</i>
Time of day you want to breed:	7:30 AM	
Detection-Insemination type:	1	1 = Estrus AI, 2 = Estrus AI & Clean-up AI, 3 = Fixed-Time AI
Estrus synchronization system:	6	Select number from list of systems below.
Days from last AI to bull turn in:	1	
Trips through the working facility:	2	
Cost Comparison - Alternative 1:	16	Select number from list of systems below.
<i>optional</i> Alternative 2:	32	Select number from list of systems below.

Heat detect & Breed

Cow Systems
7 = Select Synch 14 = Select Synch + CIDR
Less Preferred Systems
1 = 1 Injection Prostaglandin (prior estrus detection) 2 = 1 Injection Prostaglandin (no prior estrus detection) 3 = 2 Injection Prostaglandin (no prior estrus detection) 15 = 7-Day CIDR+PG

Heat detect & Breed

Heifer Systems
1 = 1 Injection Prostaglandin (prior estrus detection) 6 = MGA + Prostaglandin 15 = 7-Day CIDR+PG
Less Preferred Systems
3 = 2 Injection Prostaglandin (no prior estrus detection) 12 = 7-11 Synch 14 = Select Synch + CIDR 30=14 - Day CIDR+PG with E-AI

Head in group:	100	Forage:	20	\$0.040	PG (\$/dose):	\$2.60	
Labor Estimate:	62.0	<i>hours</i>	Grain:	4	\$0.063	GnRH (\$/dose):	\$2.00
Labor Charge:	\$10.00	<i>\$/hour</i>	MGA:	1	\$0.200	CIDR (\$/insert):	\$10.20
Yardage:	\$0.25	<i>\$/hd/day</i>	Supplement:	0.25	\$0.150	Semen (\$/unit):	\$20.00
User Defined Charges:	Name of Item:	Estrotec	No.Units	100	Cost - \$ per Unit:	\$0.95	
	Name of Item:		No.Units		Cost - \$ per Unit:		
	Name of Item:		No.Units		Cost - \$ per Unit:		

12/7/09

Estrus Synchronization Planner

Producer Name: Calvin Cowman
Address: Rural Route
Town: USA
Phone Number: _____
Prepared by: Sandy Johnson
Phone Number: 785-462-6281

Date to start breeding: 5/26/10
Clean-up bull turn in date: 6/2/10
Start of calving season: 3/3/11

6 = MGA + Prostaglandin		
		Estimated average number of times per head through the working facility: <u>2</u>
Comments		
<p style="color: red;">This system is highly recommended for heifers and works effectively in postpartum cows. Estrus detection should begin at the time of PG administration. Majority will exhibit estrus between 48 and 96 hours after PG. Daily intake during MGA feeding is critical, may require drylot feeding. Deliver MGA in either a well mixed ration or a supplement with not less than 3-5 lbs fed per head per day. For either MGA feeding methodology provide adequate bunk space(12 in. for TMR, 18 in. for MGA + grain only). Immediate addition of clean-up bulls could lead to questions about parentage.</p>		
Date of Activity	Day of the Week	Description of Activity
04/24/10	Saturday	Start feeding Melengestrol Acetate (MGA) at .5 mg/hd/day. Continue feeding until 5/7/2010.
05/07/10	Friday	Last day to feed MGA at .5 mg/hd/day.
05/09/10	Sunday	Large numbers of females will show heat the next 4 days - DO NOT BREED!
05/26/10	Wednesday	Inject Prostaglandin (PG) to all females. Start heat detection. Breed females AI 10-14 hours after standing heat.
05/27/10	Thursday	Continue heat detection. Breed females AI 10-14 hours after standing heat.
05/28/10	Friday	Peak heat at 60 - 72 hours after PG. Continue heat detection. Breed females AI 10-14 hours after standing heat.
06/01/10	Tuesday	Last day of heat detection. Breed females AI 10-14 hours later if showing standing heat.
06/02/10	Wednesday	Turn clean up bulls in with females. Immediate addition of clean-up bulls could lead to questions about parentage.

Estrus Synchronization Planner

Date to start breeding: 5/26/10
 Clean-up bull turn in date: 6/2/10
 Start of calving season: 3/3/11

Producer Name: Calvin Cowman
 Address: Rural Route
 Town: USA
 Phone Number:
 Prepared by: Sandy Johnson
 Phone Number: 785-462-6281

06/20/10 Sunday				Cost Comparison of Three Selected Systems			
6 = MGA + Prostaglandin				16 = Select Synch + CIDR with E-AI and Cleanup AI		32=14 - Day CIDR+PG with Fixed- Time AI	
Cost Analysis Item:	Units	Cost/Unit	Total cost	vs.	Total cost	vs.	Total cost
PG Cost	100	\$2.60	\$260.00		\$260.00		\$260.00
GnRH Cost		\$2.00			\$270.00		\$200.00
MGA Supplement	1400	\$0.20	\$280.00				
CIDR Cost		\$10.20			\$1,020.00		\$1,020.00
Synchronization Cost Subtotal			\$540.00		\$1,550.00		\$1,480.00
Detect/Mgt.Labor	62.0	\$10.00	\$619.72		\$565.73		\$506.00
Semen \$	100	\$20.00	\$2,000.00		\$2,000.00		\$2,000.00
Estroject	100	\$0.95	\$95.00		\$95.00		\$95.00
AI Cost Subtotal			\$2,714.72		\$2,660.73		\$2,601.00
Total Cost (not including feed & yardage)			\$3,254.72		\$4,210.73		\$4,081.00
Cost / Female Synchronized			\$32.55		\$42.11		\$40.81
Days in Drylot	39						
Roughage	78000		\$3,120.00				
Grain	15600		\$982.80				
Yardage	3900		\$975.00				
Supplement	975		\$146.25				
Feed & Yardage Cost Subtotal			\$5,224.05				
Total Cost			\$8,478.77		\$4,210.73		\$4,081.00

This feed & yardage cost does not credit in the cost of maintaining the female on pasture.

\$/Synch AI = cost per successful AI pregnancy for the selected system under the given success rate.

Cost - Response Analysis:		6 = MGA + Prostaglandin				
Estrous Response Rate		Conception Rate of those Responding to Synchronization				
		45%	55%	65%	75%	85%
75%	% AI Pregnant	33.8%	41.3%	48.8%	56.3%	63.8%
	\$/Synch AI preg.	\$81.62	\$66.78	\$56.51	\$48.97	\$43.21
80%	% AI Pregnant	36.0%	44.0%	52.0%	60.0%	68.0%
	\$/Synch AI preg.	\$79.30	\$64.88	\$54.90	\$47.58	\$41.98
85%	% AI Pregnant	38.3%	46.8%	55.3%	63.8%	72.3%
	\$/Synch AI preg.	\$77.25	\$63.20	\$53.48	\$46.35	\$40.90
90%	% AI Pregnant	40.5%	49.5%	58.5%	67.5%	76.5%
	\$/Synch AI preg.	\$75.43	\$61.71	\$52.22	\$45.26	\$39.93
95%	% AI Pregnant	42.8%	52.3%	61.8%	71.3%	80.8%
	\$/Synch AI preg.	\$73.79	\$60.38	\$51.09	\$44.28	\$39.07

**This cost analysis does not include the feed & yardage cost subtotal which would be - \$52.24

12/7/09

Estrus Synchronization Planner

Producer Name: Calvin Cowman
Address: Rural Route
Town: USA
Phone Number: _____
Prepared by: Sandy Johnson
Phone Number: 785-462-6281

Date to start breeding: 5/26/10
Clean-up bull turn in date: 5/30/10
Start of calving season: 3/3/11

26= MGA + PG with E-AI and Cleanup AI		
Estimated average number of times per head through the working facility:		<u>2</u>
Comments		
<p>Estrus detection should begin at the time of PG administration. Majority will exhibit estrus between 48 - 96 hours after PG. Cleanup AI performed from 72 - 84 hours after PG if more than 50% of heifers have been detected after 72 hours. Daily intake during MGA feeding is critical, may require drylot feeding. Deliver MGA in either a well mixed ration or a supplement with not less than 3-5 lbs fed per head per day. For either MGA feeding methodology provide adequate bunk space(12 in. for TMR, 18 in. for MGA + grain only). Immediate addition of clean-up bulls could lead to questions about parentage.</p>		
Date of Activity	Day of the Week	Description of Activity
04/24/10	Saturday	Start feeding Melengestrol Acetate (MGA) at .5 mg/hd/day. Continue feeding until 5/7/2010.
05/07/10	Friday	Last day to feed MGA at .5 mg/hd/day.
05/09/10	Sunday	Large numbers of females will show heat the next 4 days - DO NOT BREED!
05/26/10	Wednesday	Inject Prostaglandin (PG) to all females at: 7:30 AM Start heat detection. Breed females AI 10-14 hours after standing heat.
05/27/10	Thursday	Continue heat detection. Breed females AI 10-14 hours after standing heat.
05/28/10	Friday	Continue heat detection. Breed females AI 10-14 hours after standing heat.
05/29/10	Saturday	Last day of heat detection. For females not detected in heat, inject GnRH & inseminate between the hours: 7:30 AM 7:30 PM
05/30/10	Sunday	Turn clean up bulls in with females. Immediate addition of clean-up bulls could lead to questions about parentage.

Estrus Synchronization Planner

Producer Name: Calvin Cowman
Address: Rural Route
Town: USA
Phone Number: _____

Date to start breeding: 5/26/10
Clean-up bull turn in date: 5/30/10
Start of calving season: 3/3/11

Prepared by: Sandy Johnson
Phone Number: 785-462-6281

Cost Comparison of Three Selected Systems									
26= MGA + PG with E-AI and Cleanup AI				vs.	16 = Select Synch + CIDR with E-AI and Cleanup AI		vs.	32=14 - Day CIDR+PG with Fixed- Time AI	
Cost Analysis Item:	Units	Cost/Unit	Total cost		Total cost		Total cost		Total cost
PG Cost	100	\$2.60	\$260.00		\$260.00		\$260.00		\$260.00
GnRH Cost	35	\$2.00	\$70.00		\$270.00		\$200.00		\$200.00
MGA Supplement	1400	\$0.20	\$280.00						
CIDR Cost		\$10.20			\$1,020.00		\$1,020.00		
Synchronization Cost Subtotal			\$610.00		\$1,550.00		\$1,480.00		
Detect/Mgt.Labor	50.6	\$10.00	\$506.00		\$565.73		\$506.00		\$506.00
Semen \$	100	\$20.00	\$2,000.00		\$2,000.00		\$2,000.00		\$2,000.00
Estroprotect	100	\$0.95	\$95.00		\$95.00		\$95.00		\$95.00
AI Cost Subtotal			\$2,601.00		\$2,660.73		\$2,601.00		
Total Cost (not including feed & yardage)			\$3,211.00		\$4,210.73		\$4,081.00		
Cost / Female Synchronized			\$32.11		\$42.11		\$40.81		
Days in Drylot	36								
Roughage	72000		\$2,880.00						
Grain	14400		\$907.20						
Yardage	3600		\$900.00						
Supplement	900		\$135.00						
Feed & Yardage Cost Subtotal			\$4,822.20						
Total Cost			\$8,033.20		\$4,210.73		\$4,081.00		

This feed & yardage cost does not credit in the cost of maintaining the female on pasture.

\$/Synch AI = cost per successful AI pregnancy for the selected system under the given success rate.

Cost - Response Analysis:		26= MGA + PG with E-AI and Cleanup AI				
Estrous Response Rate		Conception Rate of those Responding to Synchronization				
		35%	45%	55%	65%	75%
100%	% AI Pregnant	35.0%	45.0%	55.0%	65.0%	75.0%
	\$/Synch AI preg.	\$91.74	\$71.36	\$58.38	\$49.40	\$42.81
	% AI Pregnant					
	\$/Synch AI preg.					
	% AI Pregnant					
	\$/Synch AI preg.					
	% AI Pregnant					
	\$/Synch AI preg.					

**This cost analysis does not include the feed & yardage cost subtotal which would be - \$48.22

Estrus Synchronization Planner

12/7/09

26= MGA + PG with E-AI and Cleanup AI

Producer Name: Calvin Cowman
 Address: Rural Route
 Town: USA
 Phone Number: _____

Date to start breeding: 5/26/2010
 Clean-up bull turn in date: 5/30/2010
 Start of calving season: 3/3/2011

Prepared by: Sandy Johnson
 Phone Number: 785-462-6281

Clean-up AI between:						
5/29/10 7:30 AM			5/29/10 7:30 PM			
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
4/18/2010	4/19/2010	4/20/2010	4/21/2010	4/22/2010	4/23/2010	4/24/2010
						* MGA @ 0.5 mg/hd/day
4/25/2010	4/26/2010	4/27/2010	4/28/2010	4/29/2010	4/30/2010	5/1/2010
* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day
5/2/2010	5/3/2010	5/4/2010	5/5/2010	5/6/2010	5/7/2010	5/8/2010
* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	* MGA @ 0.5 mg/hd/day	
5/9/2010	5/10/2010	5/11/2010	5/12/2010	5/13/2010	5/14/2010	5/15/2010
* Many females in heat next 4 days. DO NOT BREED!						
5/16/2010	5/17/2010	5/18/2010	5/19/2010	5/20/2010	5/21/2010	5/22/2010
5/23/2010	5/24/2010	5/25/2010	5/26/2010	5/27/2010	5/28/2010	5/29/2010
			* Detect Estrus & Breed * Inject PG - all females	* Detect Estrus & Breed	* Detect Estrus & Breed * Peak Estrus	* Detect Estrus & Breed * GnRH injection & Clean-up AI (72-84 hrs after PG)
5/30/2010	5/31/2010	6/1/2010	6/2/2010	6/3/2010	6/4/2010	6/5/2010
* Turn in Bull Power						