Development of a Multigroup Estrus Synchronization Planner for Beef Cattle

A.S. Leaflet R3311

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Summary and Implications

The Multigroup Estrus Synchronization Planner is a tool for the orchestration and management of the breeding season of beef cattle mapping out on a calendar the series of hormones and timing of their administration to ensure a strong synchrony of estrous cycles in multiple breeding groups within and across herds.

Introduction

The Estrus Synch Planner was developed twenty years ago by the Iowa Beef Center to facilitate the accurate use of prostaglandin, gonadotropic releasing hormone and progesterone in the synchronization of estrous cycles of beef females for tightening calving windows and facilitating fixed time artificial insemination (AI). This software was received quite well by the beef industry and is currently in use today in every state and at least 20 foreign countries. The software has taken its direction from the Beef Reproduction Task Force from the start and has gone through 15 major updates over this time. Financial support by the National Association of Animal Breeders and programming support from the Iowa Beef Center maintains this tool, which is available for free from the Iowa Beef Center website (iowabeefcenter.org, search word = estrus synch). As time has progressed and the use of AI spreads among beef producers it has become apparent that this tool needed to accommodate producers with multiple breeding groups and technicians that work across herds with large breeding groups. The existing tool was therefore adapted to accomplish this task and to look forward into the situation where resynchronization protocols would also be called into service.

Materials & Methods

The current recommendations for effective, legal, beef cattle estrus synchronization protocols were based on the following sheets published yearly by the Beef Reproductive Taskforce (see following pages). The development was then done in MS Visual Basic for Applications in the context of Excel.

The program itself is quite simple in that users indicate if the cattle involved are of Bos indicus or Bos taurus. This provides two sets of possible synchronization protocols. Within the set the user then indicates if the synchronization will 1): implement heat detection from the herd manager, 2): be a timed AI without heat detection or 3) will include initial heat detection followed by a timed AI for nonresponding females. From this point a listing of protocols for cows and for heifers will be given. The list is quite exhaustive including as the preferred systems those indicated on the pages provided by the Beef Reproductive Taskforce along with a listing of less preferred systems. These less preferred exist because of previous popularity or convenience among users but are less preferred now since they may not have had the success of the preferred systems or because of their inconvenience relative to the systems currently being promoted.

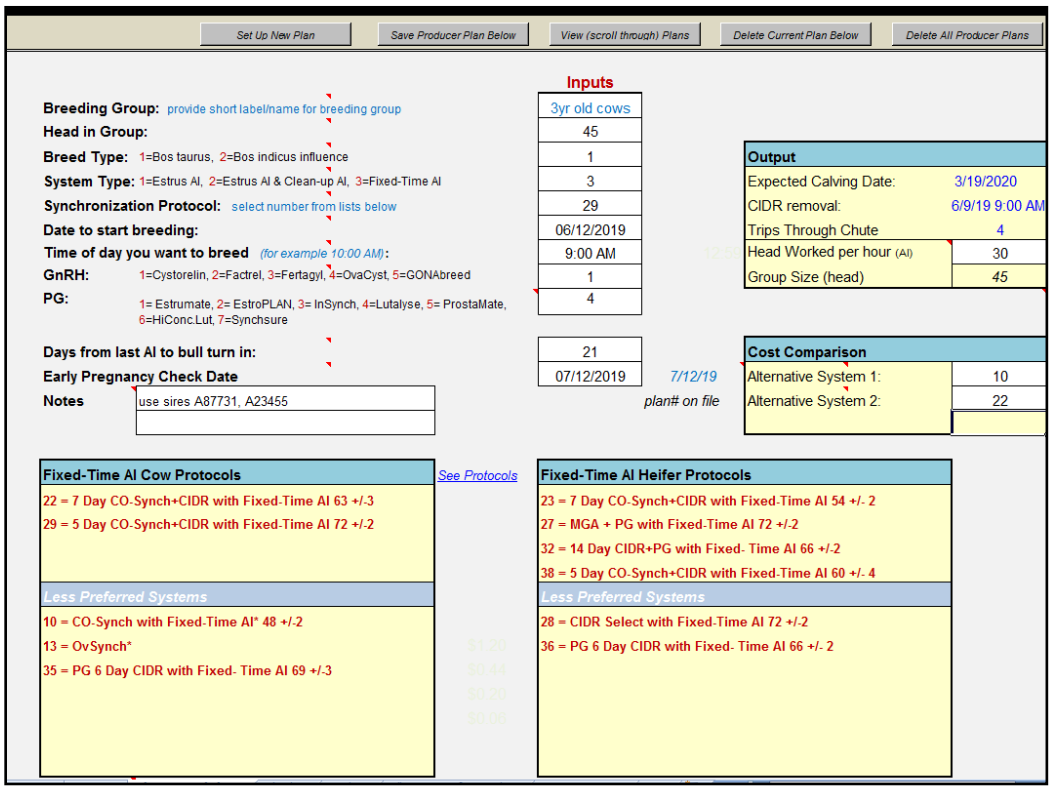
Results

Inputs as discussed in the Materials and Methods area are illustrated in more detail on the “Inputs” image that follows. Inputs are minimal and hopefully easily understood by the user. The results are sumarized in the “Outputs” images. The first is a cost summary output detailing the immediate cost of doing the system along with the cost of doing alternetive systems if a comparison is needed. The second output, illustrated in the second “Outputs” image, is the calendar. The calendar is a 12 page document in which the user can choose to format at will. Not all 12 pages need to be printed, but the space is there to allow a full year to be outlined in detail. A third output (not shown) is a supplied report that details the AI supplies needed to accomplish the tasks described from the previous pages.

Acknowledgements

This report was made possible by the Iowa Beef Center, Beef Reproduction Taskforce, National Animal Breeders Association and the final proofing of software by Sandy Johnson, Kansas State University

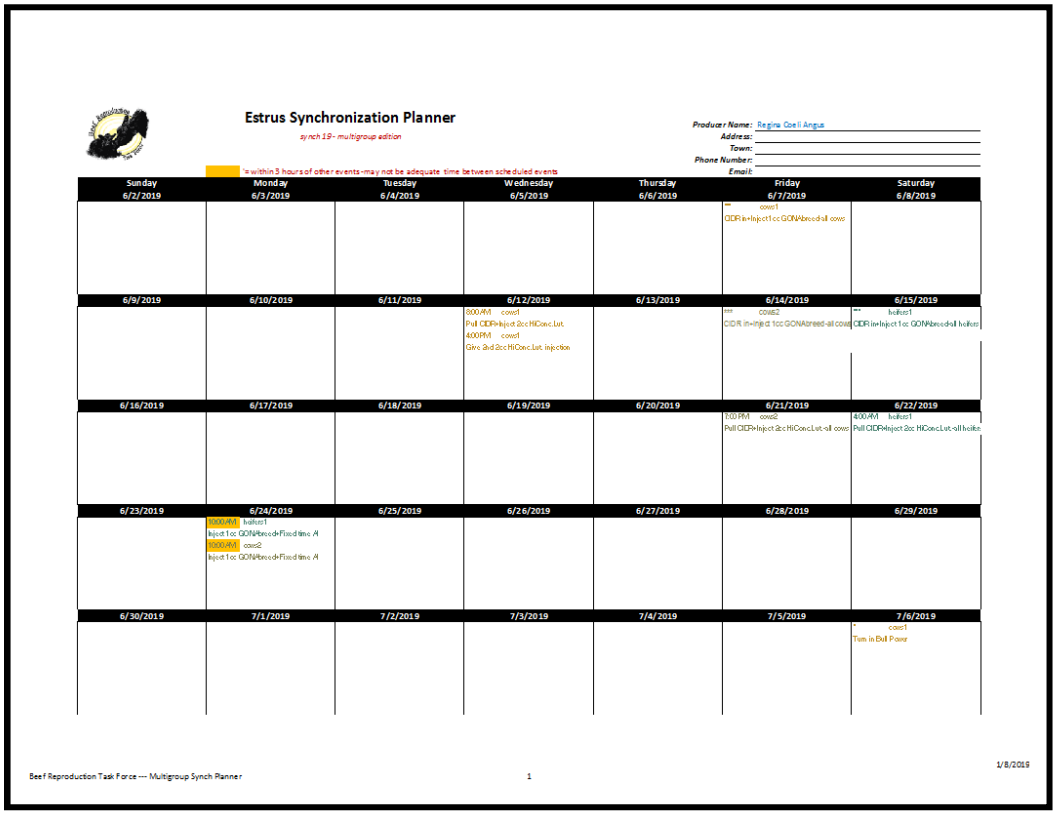
Inputs Page


Set Up New Plan
Save Producer Plan Below
View (scroll through) Plans
Delete Current Plan Below
Delete All Producer Plans
Inputs
Breeding Group: provide short label/name for breeding group
3yr old cows
Head in Group:
45
Breed Type: 1=Bos taurus, 2=Bos indicus influence
1
System Type: 1=Estrus AI, 2=Estrus AI & Clean-up AI, 3=Fixed-Time AI
3
Synchronization Protocol: select number from lists below
29
Date to start breeding:
06/12/2019
Time of day you want to breed (for example 10:00 AM):
9:00 AM
GnRH: 1=Cystorelin, 2=Factrel, 3=Fertagyl, 4=OvaCyst, 5=GONAbreed
1
PG: 1= Estrumate, 2= EstroPLAN, 3= InSynch, 4=Lutalyse, 5= ProstaMate, 6=HiConc.Lut, 7=Synchsure
4
Days from last AI to bull turn in:
21
Early Pregnancy Check Date
07/12/2019
7/12/19
plan# on file
Notes
use sires A87731, A23455
Output
Expected Calving Date:
3/19/2020
CIDR removal:
6/9/19 9:00 AM
Trips Through Chute
4
Head Worked per hour (AI)
30
Group Size (head)
45
Cost Comparison
Alternative System 1:
10
Alternative System 2:
22
Fixed-Time AI Cow Protocols
See Protocols
22 = 7 Day CO-Synch+CIDR with Fixed-Time AI 63 +/-3
29 = 5 Day CO-Synch+CIDR with Fixed-Time AI 72 +/-2
Less Preferred Systems
10 = CO-Synch with Fixed-Time AI* 48 +/-2
13 = OvSynch*
35 = PG 6 Day CIDR with Fixed- Time AI 69 +/-3
Fixed-Time AI Heifer Protocols
23 = 7 Day CO-Synch+CIDR with Fixed-Time AI 54 +/- 2
27 = MGA + PG with Fixed-Time AI 72 +/-2
32 = 14 Day CIDR+PG with Fixed- Time AI 66 +/-2
38 = 5 Day CO-Synch+CIDR with Fixed-Time AI 60 +/- 4
Less Preferred Systems
28 = CIDR Select with Fixed-Time AI 72 +/-2
36 = PG 6 Day CIDR with Fixed- Time AI 66 +/- 2

Outputs – Cost Comparison

System Cost Comparison:		29 = 5 Day CO-Synch+CIDR with Fixed-Time AI 72 +/-2		10 = CO-Synch with Fixed-Time AI 48 +/-2	22 = 7 Day CO-Synch+CIDR with Fixed-Time AI 63 +/- 3
Cost Analysis:	**Units**	**Cost/Unit**	**Total Cost**	**Total Cost**	**Total Cost**
5cc Lutalyse Cost	90.00	$2.80	$252.00	$126.00	$126.00
2cc Cystorelin Cost	90.00	$2.90	$261.00	$261.00	$261.00
MGA Supplement	0.00	$0.200	$0.00	$0.00	$0.00
CIDR Cost	45.00	$13.00	$585.00	$0.00	$585.00
Synchroniaztion Cost Subtotal			**$1,098.00**	**$387.00**	**$972.00**
Detect/Mgt.Labor	33.9	$13.50	$458.24	$396.85	$396.85
Semen	45	$22.00	$990.00	$990.00	$990.00
patches	45	$0.50	$22.50	$22.50	$22.50
			$0.00	$0.00	$0.00
			$0.00	$0.00	$0.00
AI Cost Subtotal			**$1,470.74**	**$1,409.35**	**$1,409.35**
Total Cost (not including feed & yardage)			**$2,568.74**	**$1,796.35**	**$2,381.35**
Cost / Female Synchronized			**$57.08**	**$39.92**	**$52.92**
Drylot Costs:**					
Days in Drylot/days for system			*9*	*10*	*11*
Forage (units = lbs)	8,100	$0.060	$486.00	$540.00	$594.00
Grain (units = lbs)	1,620	$0.110	$178.20	$198.00	$1,089.00
Yardage (units = hd-days)	405	$0.600	$243.00	$270.00	$5,940.00
Other Supplement (units = lbs)	101	$0.250	$25.31	$28.13	$2,475.00
Feed & Yardage Cost Subtotal			**$932.51**	**$1,036.13**	**$10,098.00**
Drylot Cost per Head per Day			**$2.30**		
Total Cost / Female Synchronized			**$77.81**		***Pasture charge not included.*

Outputs – Calendar (page one shown)



Estrus Synchronization Planner

synch 19- multigroup edition

Producer Name: Regina Coeli Angus
Address:
Town:
Phone Number:
Email:

= within 3 hours of other events-may not be adequate time between scheduled events

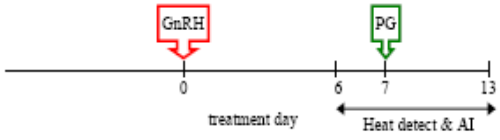
Sunday 6/2/2019	Monday 6/3/2019	Tuesday 6/4/2019	Wednesday 6/5/2019	Thursday 6/6/2019	Friday 6/7/2019	Saturday 6/8/2019
					** cows1 CIDR in-Inject 1cc GONAbreed-all cows	
6/9/2019	6/10/2019	6/11/2019	6/12/2019	6/13/2019	6/14/2019	6/15/2019
			800 AM cows1 Pull CIDR+Inject 2cc HiConc.Lut 400 PM cows1 Give 2nd 2cc HiConc.Lut injection		*** cows2 CIDR in-Inject 1cc GONAbreed-all cows	** heifers1 CIDR in-Inject 1cc GONAbreed-all heifers
6/16/2019	6/17/2019	6/18/2019	6/19/2019	6/20/2019	6/21/2019	6/22/2019
					400 PM cows2 Pull CIDR+Inject 2cc HiConc.Lut -all cows	400 AM heifers1 Pull CIDR+Inject 2cc HiConc.Lut -all heifers
6/23/2019	6/24/2019	6/25/2019	6/26/2019	6/27/2019	6/28/2019	6/29/2019
	1000 AM heifers1 Inject 1cc GONAbreed+Fixed time AI 1000 AM cows2 Inject 1cc GONAbreed+Fixed time AI					
6/30/2019	7/1/2019	7/2/2019	7/3/2019	7/4/2019	7/5/2019	7/6/2019
						cows1 Turn in Bull Pens

Beef Reproduction Task Force --- Multigroup Synch Planner 1 1/8/2019

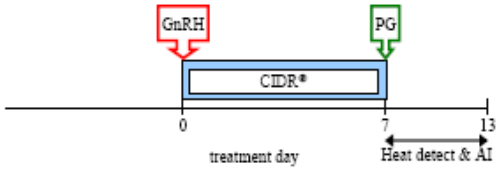
BEEF COW PROTOCOLS - 2019

HEAT DETECTION

Select Synch

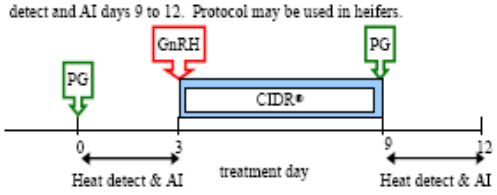


Select Synch + CIDR®



PG 6-day CIDR®

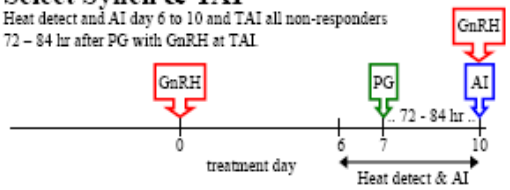
Heat detect and AI days 0 to 3. Administer CIDR to non-responders and heat detect and AI days 9 to 12. Protocol may be used in heifers.



HEAT DETECT & TIME AI (TAI)

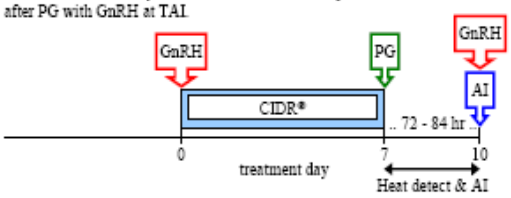
Select Synch & TAI

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



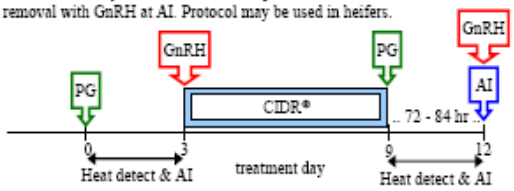
Select Synch + CIDR® & TAI

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



PG 6-day CIDR® & TAI

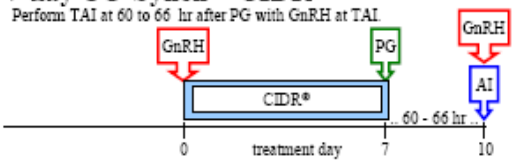
Heat detect & AI days 0 to 3. Administer CIDR to non-responders & heat detect and AI days 9 to 12. TAI non-responders 72 - 84 hr after CIDR removal with GnRH at AI. Protocol may be used in heifers.



FIXED-TIME AI (TAI)*

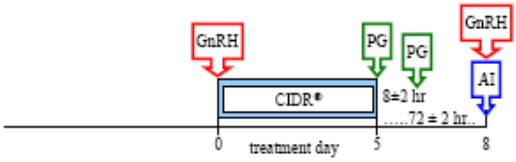
7-day CO-Synch + CIDR®

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 CIDR removal with GnRH at TAI.
Two injections of PG 8 ± 2 hr apart are required for this protocol.

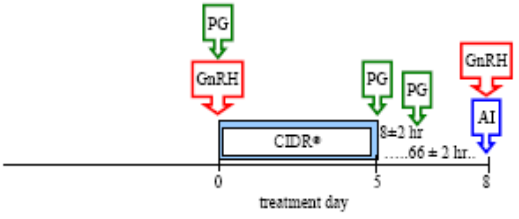


FIXED-TIME AI (TAI)*

for *Bos Indicus* cows only

PG 5-day CO-Synch + CIDR®

Perform TAI at 66 ± 2 hr after CIDR removal with GnRH at TAI.
Two injections of PG 8 ± 2 hr apart are required for this protocol.



* The time 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.

These protocol sheets were assembled by the ***Beef Reproduction Task Force***. Programs are intended to promote sustainable food production systems by the beef industry through sound reproductive management practices for replacement heifers and postpartum cows. The Beef Reproduction Task Force recommends working with a licensed veterinarian for proper use and application of all reproductive hormones. **Approved 8-28-18.**

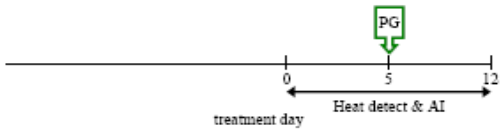
GnRH — Cystorelin®, Factrel®, Fertagyl®, OvaCyst®, GONABreed®

PG — estroPLAN®, Estrumate®, In-Synch®, Lutalyse®, Lutalyse® *HighCon*, ProstaMate®, SYNCHSURE™

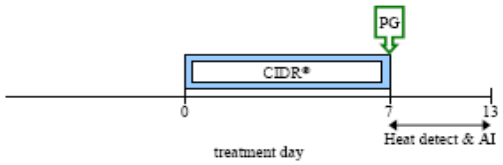
BEEF HEIFER PROTOCOLS - 2019

HEAT DETECTION

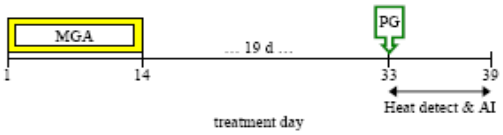
1 Shot PG



7-day CIDR®-PG



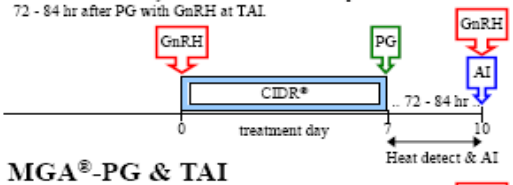
MGA®-PG



HEAT DETECT & TIME AI (TAI)

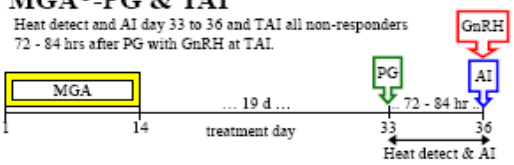
Select Synch + CIDR® & TAI

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



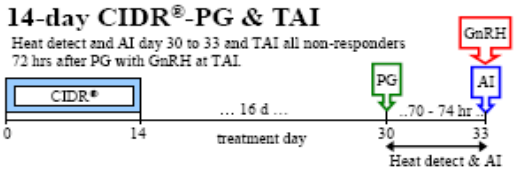
MGA®-PG & TAI

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.

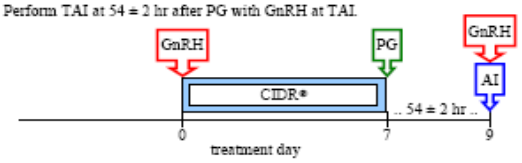


FIXED-TIME AI (TAI)*

Short-term Protocols

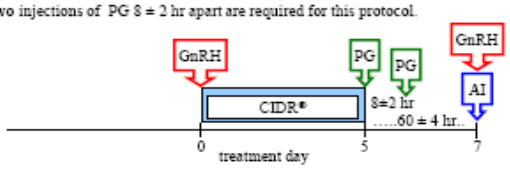
7-day CO-Synch + CIDR®

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



5-day CO-Synch + CIDR®

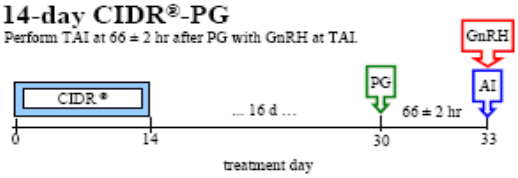
Perform TAI at 60 ± 4 hr after CIDR removal with GnRH at TAI.
Two injections of PG 8 ± 2 hr apart are required for this protocol.



Long-term Protocols

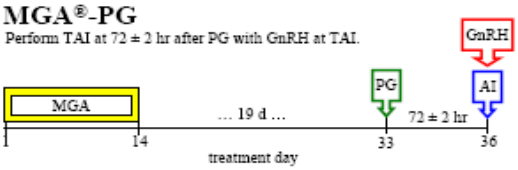
14-day CIDR®-PG

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



MGA®-PG

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



* 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.

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GnRH: Cystorelin®, Factrel®, Fertagyl®, OvaCyst®, GONABreed®

PG: estroPLAN®, Estrumate®, In-Synch®, Lutalyse®, Lutalyse® *HighCon*, ProstaMate®, SYNCHSURE™