



Reproduction Topic: What to Know Before Breeding Cattle

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Central**Star**

Outline

- > Topic: Beef Breeding 101
- > * Breeding Options – how to decide Natural, AI, Clean Up Bulls
- > * Cow Estrus Cycle – management tools
- > * What does an extra cycle cost you as a beef producer?
- > * Things that effect estrus cycle: nutrition, minerals, BCS, calf on board, cow vs. heifer, days after calving, etc
- > * Choosing a bull – 50% of your herd genetics
- > * If I only have 4 cows, how important is it?
- > * Even if you AI, choosing a clean-up bull is extremely important.
- > * BSE – why is this important? What is a BSE and what's the risk when you do not complete one?
- > * AI 101
- > * Facilities needed (chute, headgate)
- > * Synch vs. heat
- > * How to detect heat – patches, steers, behaviour, etc?
- > * Types of Synch protocols
- > * What is GnRH and Lutalyse?

Outline

- Should you Artificially Inseminate (AI) your cattle?
- How to AI your cattle?

Should you AI your cattle?

- Economics of cow-calf production
 - Reproduction is the main factor influencing efficiency in the cattle industry
 - Failure to become pregnant is the primary reason for removing an animal from production
 - Economic losses associated with the failure to reproduce represents a significant production problem
 - In the management of cows, the most important factor to increase reproductive efficiency is the early onset of estrus after calving

Should you AI your cattle?

- Postpartum Anestrus
 - Interval between calving and first estrus during which the animal is not cycling
 - Influenced by body condition, nutrition, dystocia and age
 - Average length of 30-70 days
 - $365 \text{ days/year} - 283 \text{ day gestation} = 82 \text{ days}$ to maintain a yearly calving interval
 - $82 \text{ days} / 21 \text{ day estrus cycle} = 4$ opportunities to get her bred
 - How do you accomplish this?

Should you AI your cattle?

- AI offers numerous advantages to even small producers
 - Access to superior genetics at a reduced cost
 - Heavier weaning weights/better replacements
 - Tighter calving interval
 - Improved conception rates
 - Reduced bull requirements

Should you AI your cattle?

- Less than 10% of beef cows are AI'ed annually
- Barriers
 - Costs
 - Labor requirements
 - Handling facilities
 - Lack of knowledge
 - Just too much trouble
 - Does not fit with continuous grazing, continuous calving, low-input management styles

Should you AI your cattle?

- ***Depends on*** how you account for the cost of operator labor/management inputs
 - AI requires a more intense management regime
 - How much is YOUR time worth?
- ***Depends on*** how calves will be marketed
 - Not all outlets provide the desired premium for the better genetics and performance

Should you AI your cattle?

- **Increased Costs**

- Drugs/semen
- Labor/handling
- Facilities

- **Decreased Revenues**

- Cull bulls

- **Increased Revenues**

- Weaning weights
- Calving %
- Uniformity
- Replacement quality

- **Decreased Costs**

- # Bulls required
- Bull maintenance

Should you AI your cattle?

- AI Costs (\$/unit) (averages from various suppliers)
 - GnRH \$3.05/dose
 - Prostaglandin \$2.49/dose
 - CIDR \$11.48/dose
 - Supplies \$2.35/insemination
 - Semen \$25.00/straw
- Fixed Costs \$50/year

Should you AI your cattle?

- Natural Service Costs

Purchase Price	\$1,500	\$2,000	\$2,500	\$3,000
Total Cost/yr	\$751	\$863	\$1,011	\$1,158
Cows/bull	Cost/pregnancy (\$)			
15	50.78	61.24	71.70	82.16
20	38.08	45.93	53.77	61.62
25	30.47	36.74	43.02	49.30
30	25.39	30.62	35.85	41.08
35	21.76	26.24	30.73	35.21
40	19.04	22.96	26.89	30.81

Should you AI your cattle?

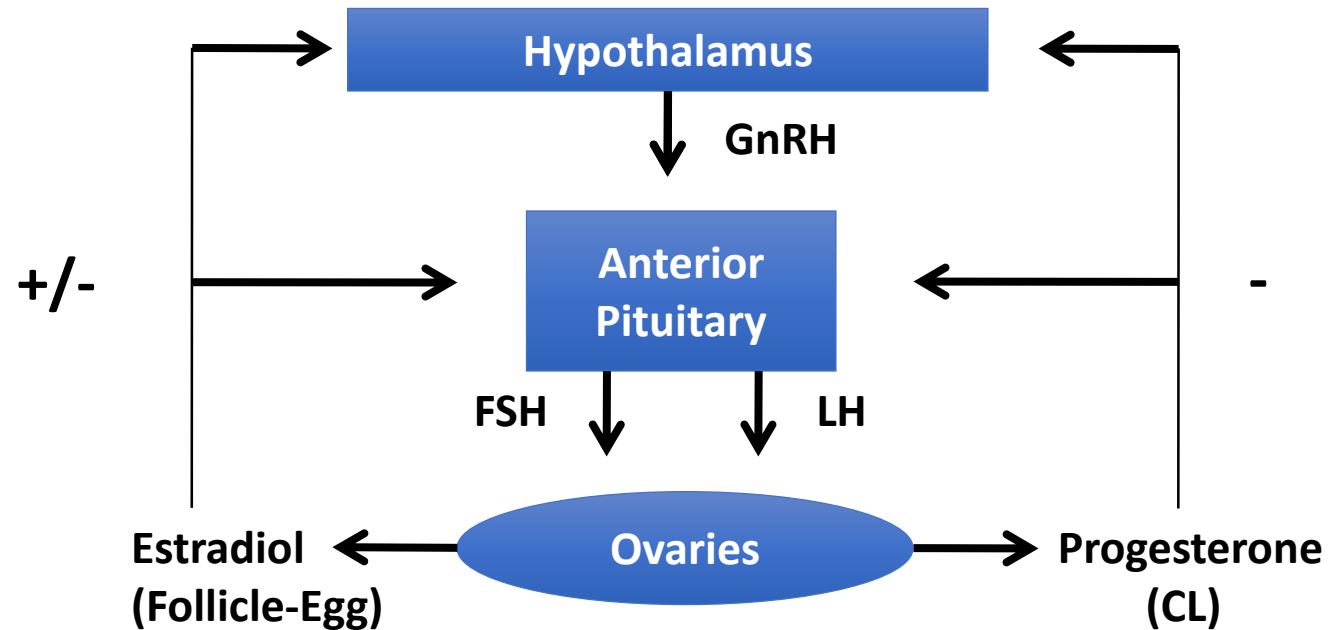
- Estrus synch and AI systems involve additional costs but will most likely increase returns
 - More calves
 - Heavier calves (genetic and age effects)
 - More uniform calves
- Whether or not returns are great enough to encourage estrus synch and AI adoption depends on each individual situation
 - Time, facilities, inclination to gather and work cattle multiple times, interest in genetic improvement

How to AI your cattle?

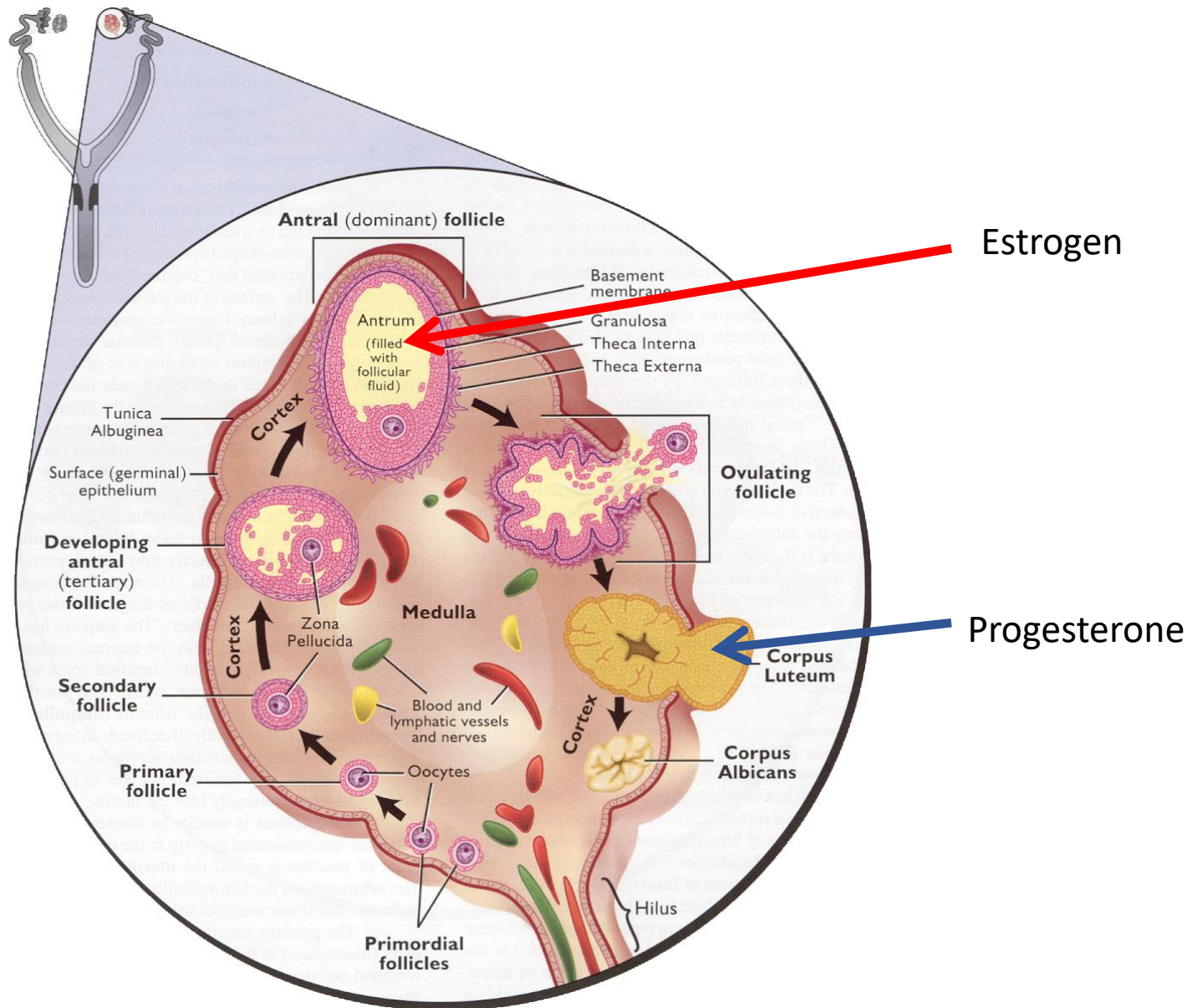
- Estrus Synchronization
 - Controlling the estrous cycle so that a group of females express estrus at approximately the same time
 - Most often used as part of an AI/ET program to reduce labor
 - Can also be used to advance breeding date of late calving cows and manipulate marketing scenarios

Endocrinology of Reproduction

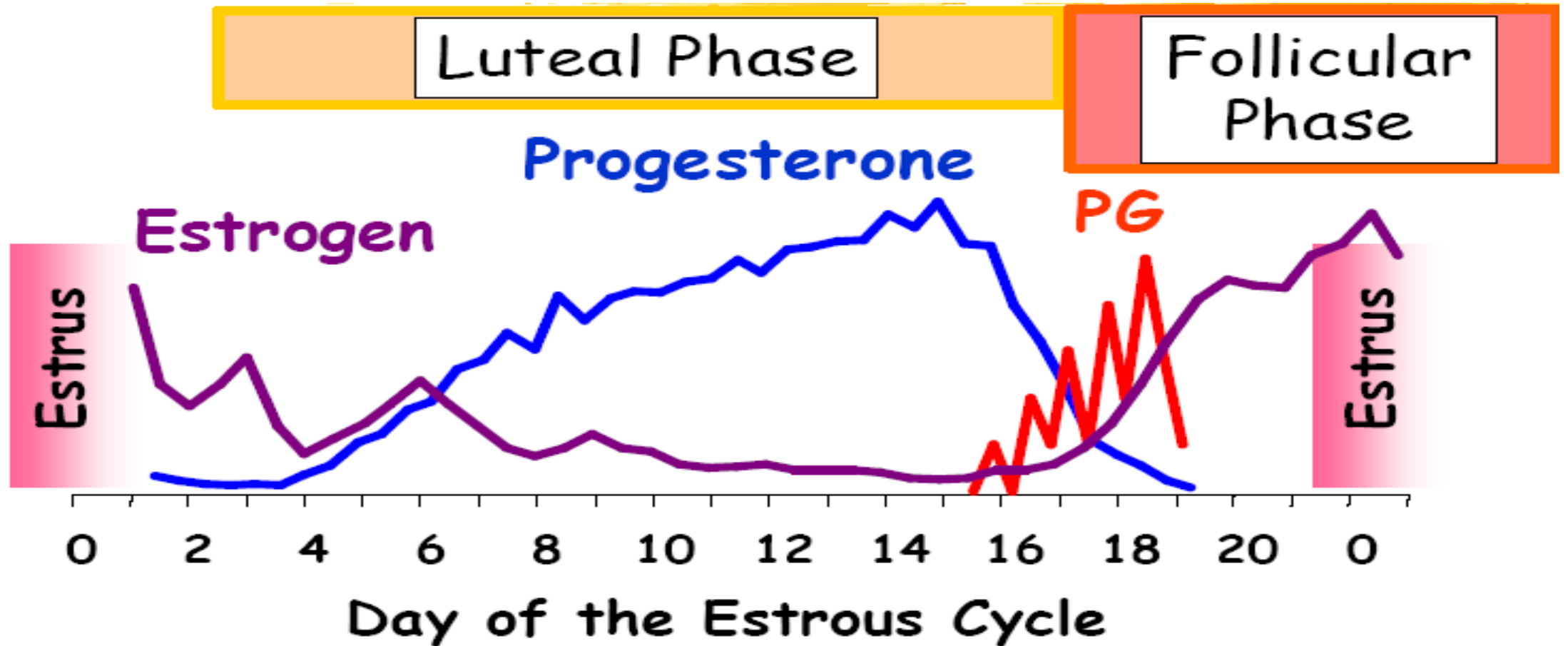
- Hypothalamic-pituitary-gonadal axis
 - Regulatory mechanism of reproduction



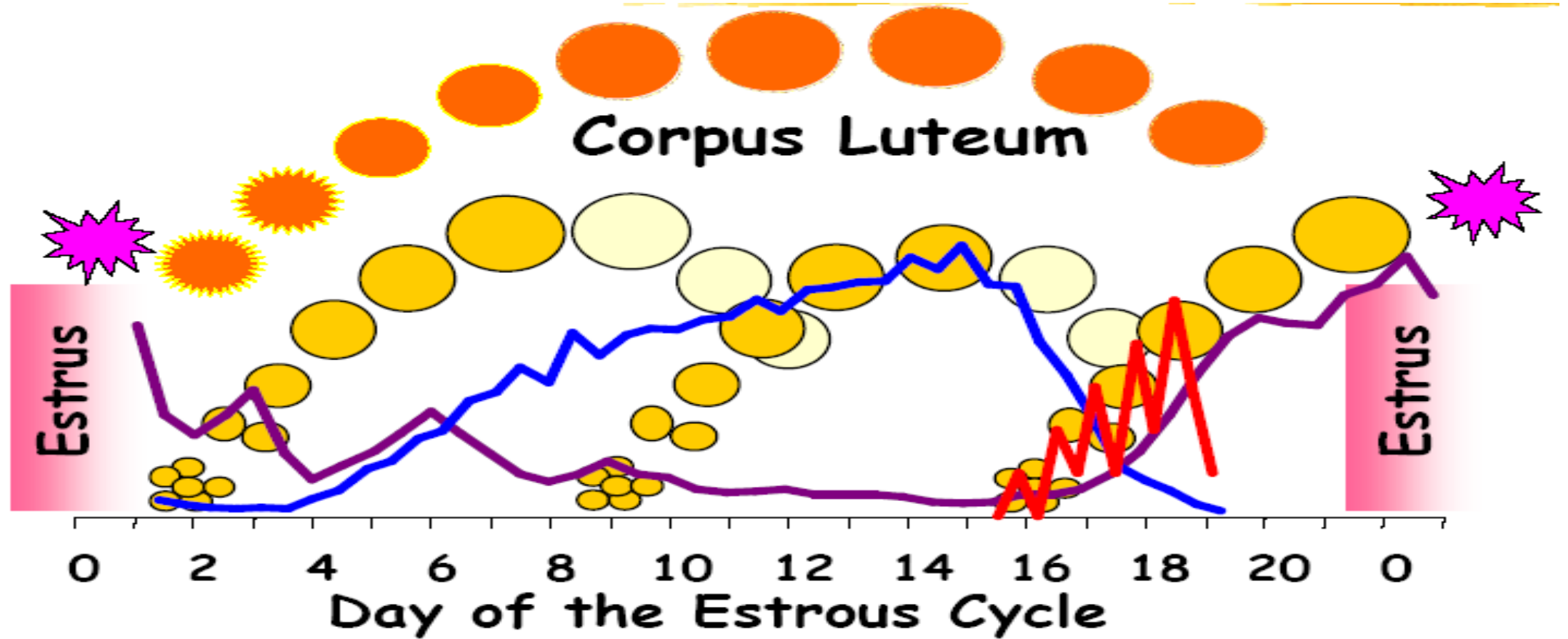
Ovary



Endocrinology of the Estrous Cycle



Physiology of the Estrous Cycle



Hormones of Reproduction

- **GnRH**
 - Gonadotropin Releasing Hormone
- **Progesterone**
- **Prostaglandin**

Hormones of Reproduction

- **GnRH**

- Gonadotropin Releasing Hormone
- Produced in hypothalamus
- Stimulates secretion of FSH/LH from anterior pituitary

Hormones of Reproduction

- **GnRH**

- Gonadotropin Releasing Hormone
- Estrus Synchronization Protocol
 - Synchronize follicular waves
 - Induce ovulation
 - Induce formation of CL

Hormones of Reproduction

- **GnRH**

- Gonadotropin Releasing Hormone
 - Cystorelin
 - OvaCyst
 - Factrel
 - Fertagyl
 - GONAbreed (1 cc)
- Estrus Synchronization Protocol
 - 2 cc
 - IM
 - 18 g 1 ½ needle

Hormones of Reproduction

- **Progesterone**

- Progesterone secreted by CL
 - Inhibit ovulation
 - Prepare reproductive tract for pregnancy
 - Maintain pregnancy

Hormones of Reproduction

- **Progesterone**

- Estrus Synchronization Protocol
 - Suppress estrus
 - Suppress ovulation
 - Induce estrus and ovulation in noncycling heifers and cows

Hormones of Reproduction

- **Progesterone**

- Progestin
 - Melengestrol Acetate (MGA)
 - MGA 200 Premix
 - MGA 500 Liquid Premix
 - .25 to .50 mg/head/d
 - 14 d
- Progesterone
 - Controlled Internal Drug Release (CIDR)
 - 1.38 g P4
 - Administered vaginally
 - 5, 7, 14 d

Hormones of Reproduction

- **Prostaglandin**

- Produced by endometrium of uterus
- Regress CL
 - Between days 5-6 and 16-18 of estrous cycle
- Abortion before 180-200 days

Hormones of Reproduction

- **PG**

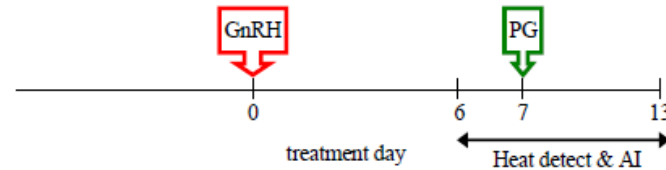
- Prostaglandin
 - Lutalyse or ProstaMate 5 cc
 - EstroPLAN 5cc
 - Synchsure 5cc
 - Luytalyse HighCon 5cc (IM or Sub-Q)
 - Estrumate 2 cc
- Estrus Synchronization Protocol
 - IM
 - 18 1 ½ g needle

Estrous Synchronization Protocols

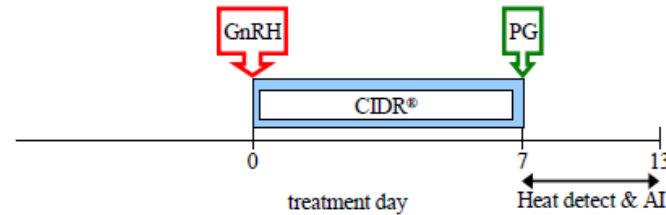


Protocols for **cows** using *heat detection*

Select Synch

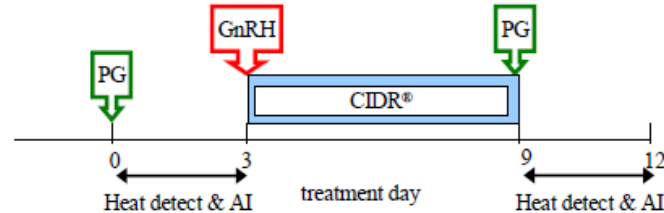


Select Synch + CIDR®



PG 6-day CIDR®

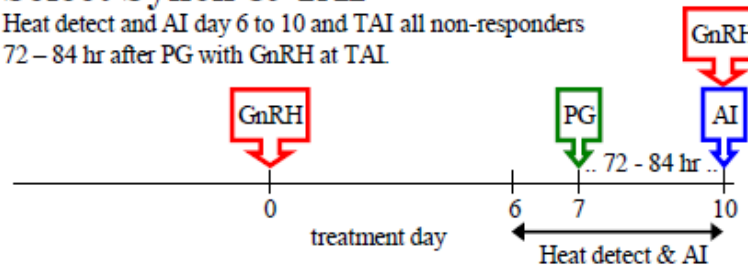
Heat detect and AI days 0 to 3. Administer CIDR to non-responders and heat detect and AI days 9 to 12. Protocol may be used in heifers.



Protocols for **cows** using *heat detect + timed AI*

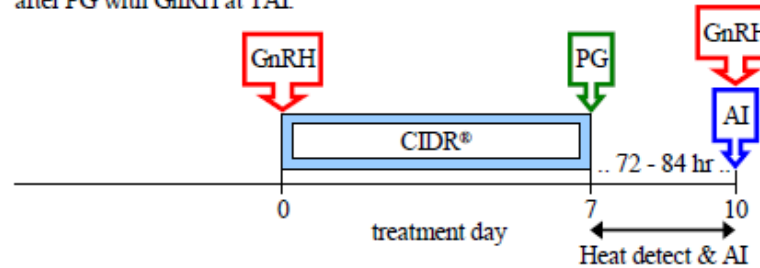
Select Synch & TAI

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



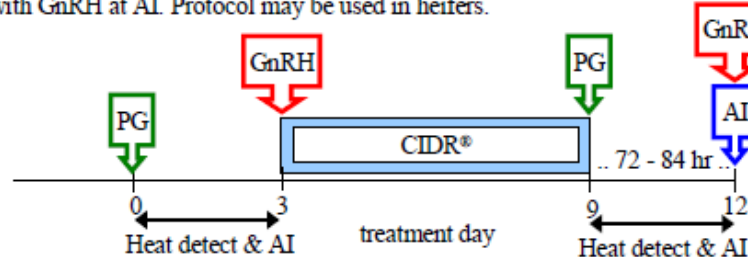
Select Synch + CIDR® & TAI

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

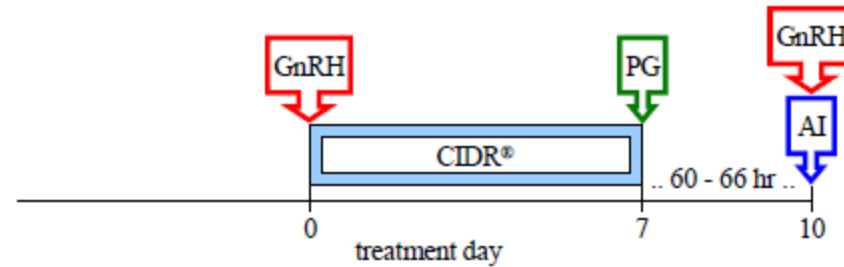
Heat detect & AI days 0 to 3. Administer CIDR to non-responders & heat
detect and AI days 9 to 12. TAI non-responders 72 - 84 hr after CIDR removal
with GnRH at AI. Protocol may be used in heifers.



Protocols for **cows** using *fixed timed AI only*

7-day CO-Synch + CIDR®

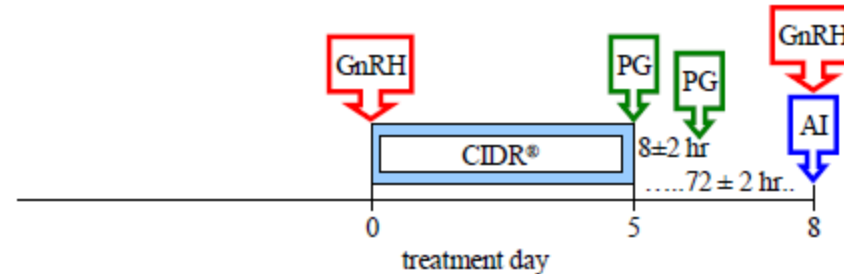
Perform TAI at 60 to 66 hr after PG with GnRH at TAI.



5-day CO-Synch + CIDR®

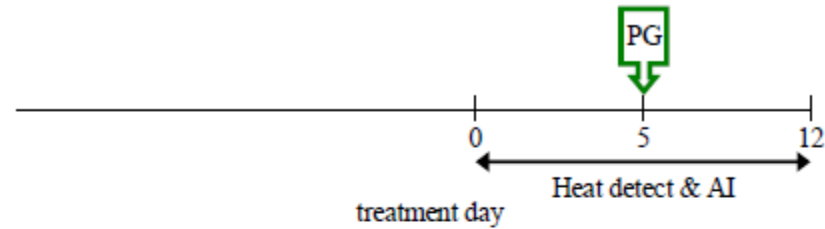
Perform TAI at 72 ± 2 hr after 1st PG with GnRH at TAI.

Two injections of PG 8 ± 2 hr apart are required for this protocol.

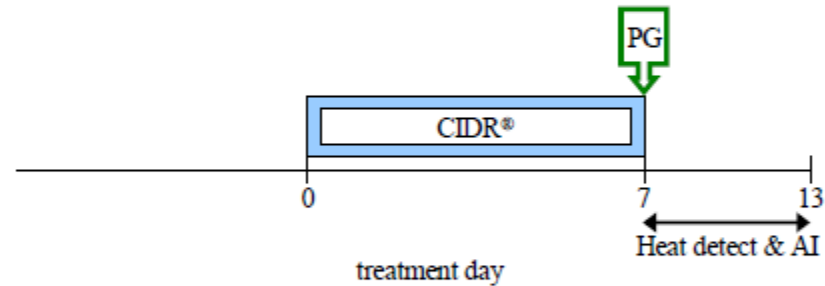


Protocols for **heifers** using *heat detection*

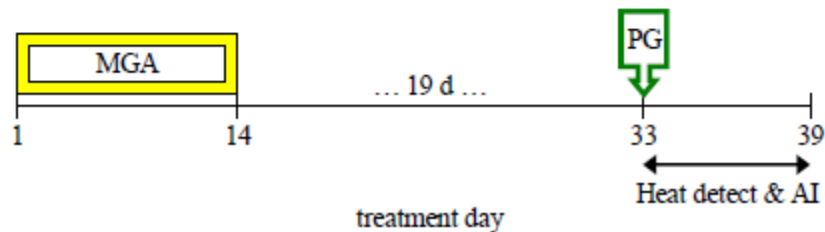
1 Shot PG



7-day CIDR®-PG



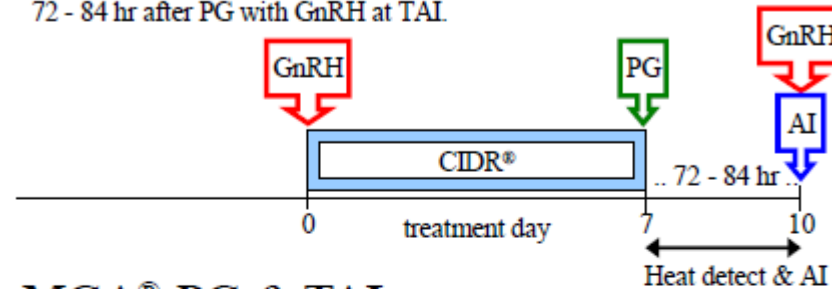
MGA®-PG



Protocols for heifers using *heat detect + timed AI*

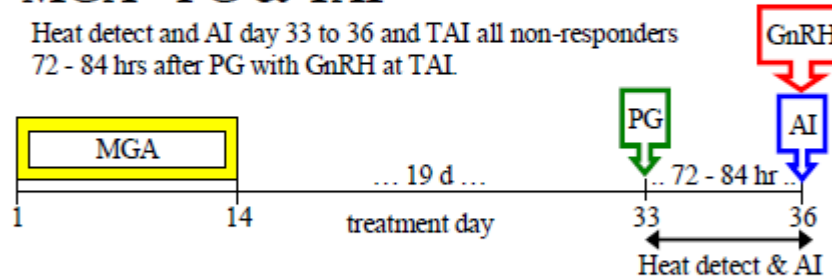
Select Synch + CIDR® & TAI

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



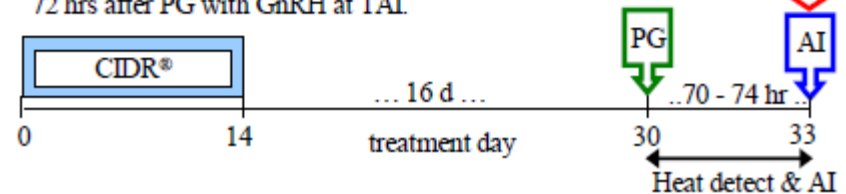
MGA®-PG & TAI

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

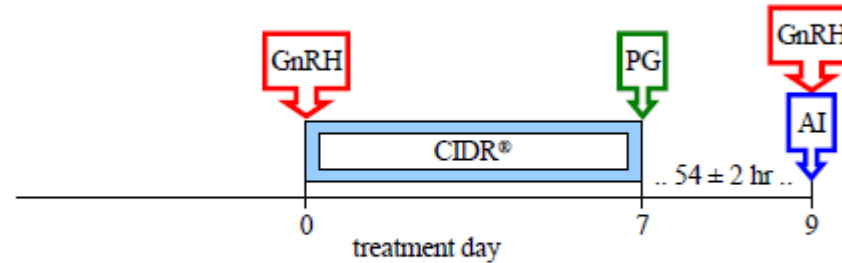
Heat detect and AI day 30 to 33 and TAI all non-responders
72 hrs after PG with GnRH at TAI.



Protocols for heifers using *timed AI only*

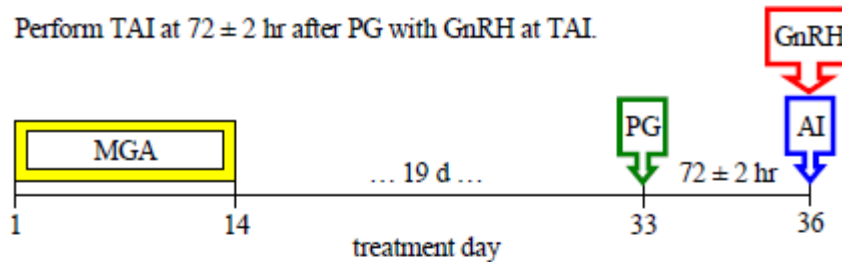
7-day CO-Synch + CIDR®

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



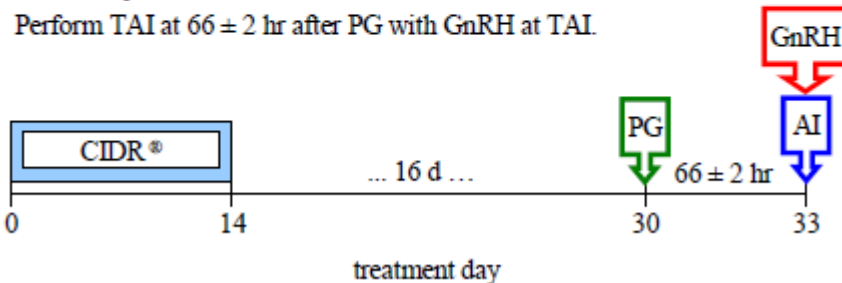
MGA®-PG

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.




Estrus Synchronization Planner



Inputs

Breed Type	1	1= <i>Bos taurus</i> , 2= <i>Bos indicus</i> influence
Date to start breeding:	6/1/2012	(Example: 6/1/2013)
Time of day you want to breed:	9:00 AM	Last PG injection given @ 5/29/12 3:00 PM
Detection-Insemination type:	3	1 = Estrus AI, 2 = Estrus AI & Clean-up AI, 3 = Fixed-Time AI
Estrus synchronization system:	22	Select number from list of systems below.
Days from last AI to bull turn in:	9	<div>Cow Systems</div> 22 = 7 Day CO-Synch+CIDR with Fixed-Time AI - 66
Trips through the working facility:	3	

Calendar

Estrus Synchronization Planner						6/12/13	
22 = 7 Day CO-Synch+CIDR with Fixed-Time AI - 66						Producer Name:	
						Address:	
						Town:	
						Phone Number:	
						Group:	
Date to start breeding:		6/1/2012		Prepared by:			
Clean-up bull turn in date:		6/10/2012		Phone Number:			
Start of calving season:		3/9/2013					
				3:00 PM		on 5/29/2012	
				Last PG injection given @			
				Fixed time AI done @		9:00 AM on 6/1/2012	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
5/20/2012	5/21/2012	5/22/2012	5/23/2012	5/24/2012	5/25/2012	5/26/2012	
		* Insert CIDR device in all females * Inject GnRH - all females					
5/27/2012	5/28/2012	5/29/2012	5/30/2012	5/31/2012	6/1/2012	6/2/2012	
		* Remove CIDRs * Inject PG - all females				* GnRH injection & Fixed time AI (60-66 hrs after PG)	
6/3/2012	6/4/2012	6/5/2012	6/6/2012	6/7/2012	6/8/2012	6/9/2012	
6/10/2012	6/11/2012	6/12/2012	6/13/2012	6/14/2012	6/15/2012	6/16/2012	
* Turn in Bull Power							

Which Protocol?

Determine potential results and costs

- Select the best system for YOUR situation

Advantages and tradeoffs must be weighed in terms of:

- Cost
- Time
- Facilities
- Labor Requirements
- Cows



Heat Detection

- Amount needed depends on system selected
- Must be done carefully as part of the synchronization program
 - Many females exhibit heat at the same time



Labor Needs

- Insemination
 - Inseminator fatigue
- Semen thawing, preparation of insemination equipment and record keeping
- Working cattle through facilities
 - More people = better efficiency ???
- Heat detection
 - People and hours depend on selected system

Facilities

- Need to be in good repair
 - Pressure of more animals in a shorter time frame
- Fixed-time A.I. program
 - Holding pen space



Identification

- Really important for heat detection
- Essential to get maximum value from A.I. program
 - Keep “barn sheet”

Cow ID	Date/Time in heat	Date/Time A.I.'d	Sire	Tech.	Notes
133	5/13 6:00AM	5/13 6:00PM	HCC Hero	LJ	Good Tone
169	5/14 6:00PM	5/15 6:00AM	HCC Firecracker	LJ	Showed no signs of heat

Conditions Affecting Cycling

Beef Virgin Heifers

- 3 factors affect when cycling begins
 - Age
 - Weight
 - Breed
- Inseminate 2 to 3 weeks ahead of cows
 - Provides more time for recovery before rebreeding
- Nutrition must be carefully watched to ensure:
 - High percentage are cycling
 - Heifers respond to synchronization drugs

Conditions Affecting Cycling

- **Beef First Calf Heifers**

- Take longer to begin cycling than cows
- Higher nutritional demands
 - Must support their growth and milk production for calf
- Good nutrition can shorten recovery time after calving
 - Require special attention to improve cycling rate
 - Separate heifers from cows several months before calving
 - Feed with goal of heifers being in moderate to good condition
- As virgin heifers, inseminate 2 to 3 weeks before older COWS

Selection

- **Genetic**
 - Expected progeny differences of heifers utilized to meet herd goals for mature size, growth rate, milking ability, and calving ease.
- **Conformation**
 - **Feet and legs**
 - **Frame**
 - **Femininity**

Calculating ADG

Desired
breeding date

Count days from
weaning til desired
breeding date

Days until start of
breeding

Expected mature weight

x

65%

=

Target weight

Target weight

-

Starting weight

=

Lbs. of gain needed

Lbs. of gain
needed

÷

Days until start of
breeding

=

Required ADG

Example

Heifer birthdate: February 1, 2018

Weaning date: August 25, 2018

Weaning weight: 500 pounds

Expected mature weight: 1200 pounds

Desired breeding date: April 2019

65% of mature weight= $.65 \times 1200 = 780$ pounds

Weight gain needed= $780 - 500 = 280$ pounds

ADG = $280 \text{ pounds} / 240 \text{ days} = 1.17 \text{ pounds/day}$

Take Home Points

- ✓ **Have goals in mind**
- ✓ **Establish bull and heifer selection criteria**
- ✓ **Isolate from mature cows**
 - 🐄 Feed separately
 - 🐄 Breed 3 to 4 weeks early
- ✓ **Feed to target weight**
 - 🐄 65% of mature weight at breeding
- ✓ **Evaluate pregnancy**
- ✓ **Review program**

Resources

- Select Sires (AI Training)
- UW-Extension
- Beef Reproduction Task Force

BCS



Body Condition Scoring of Beef Cattle

Lyssa Seefeldt, UW-Extension, Marquette County Agriculture Agent

Katie Pfeiffer, UW-Extension, Sauk County Agriculture Agent



Body condition scoring (BCS) is the numerical (1-9) scoring system that visually evaluates the amount of condition (subcutaneous fat) an animal is carrying. It is an evaluation of the nutritional status of an animal. Body condition scoring allows you to coordinate feed resources with animals that need supplemental feed or restrict intake in those animals that need less feed. Most Midwest cattle herds maintain BCS ranging between 4-7. Most producers use a modified system that categorizes animals as thin, moderate, or heavy.

Why should I monitor body condition?

Body condition scoring is an easy process that anyone can learn to do. Monitoring BCS can help you ensure that each animal is getting adequate nutrition. Body condition is an indicator of the nutritional status of each animal. Low BCS in cows leads to longer calving intervals, which in turn leads to decreased income per cow.

Strategic times to body condition score

60 days prior to weaning: make early weaning decisions if cows are thin

Weaning: heifers & older cows may have trouble gaining, keep watch to ensure there is condition gain

100 days prior to calving: last chance to gain condition in a reasonable manner

Calving: thin cows need to gain, but gain will be expensive at this point since nutrient demand is the highest at this stage of production

Breeding: thin cows need to gain, but gain will still be expensive; you will lengthen the breeding season by having to gain at this stage

Body Condition in Cows Affects

- Calving interval (longer post-partum interval)
- Lactation performance
- Pregnancy rate
- Health/vigor of calf
- Supplemental feed costs
- Dystocia in heifers

BCS

Strategic locations to evaluate body condition

When determining body condition, there are several areas to evaluate including the brisket, ribs, backbone, flank, hips, and tail head. As cattle lay down fat, they tend to follow a certain order. First fat is laid on the back and loin area (1), followed by the ribs (2). Next to fill in will be the tail head area (3) followed by the brisket area (4) getting filled in with fat. After the brisket, the flank (5) will fill in, then the vulva/rectal region will flesh out. Once all of these areas have filled in, fat will accumulate in the udder and mammary region. To help you distinguish

differences between scores, refer to the chart at the right for what you should be seeing in various parts of the animal when checking for condition.

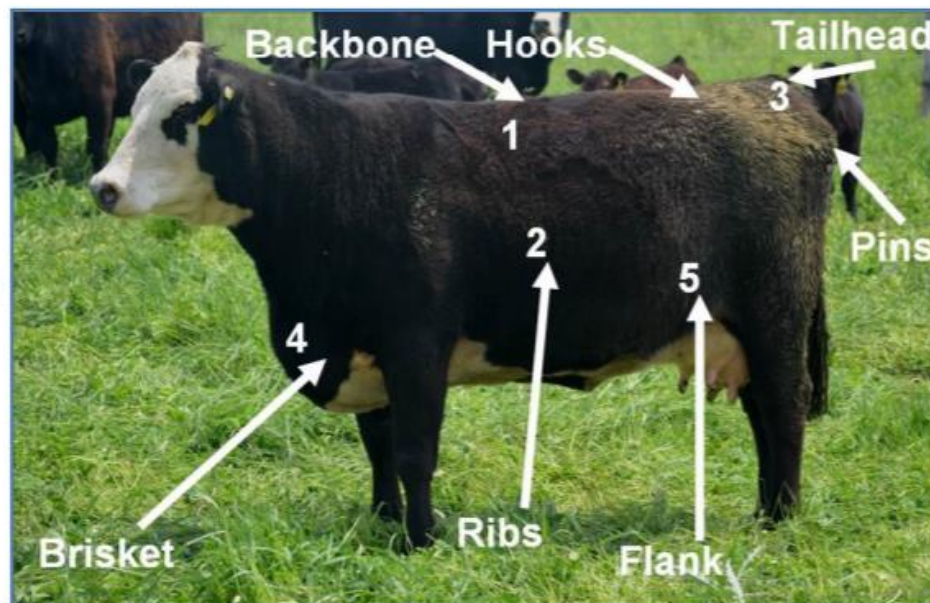


Photo ©Lyssa Seefeldt

	Body Condition Score					
	3	4	5	6	7	8
Fat in brisket and flank	No	No	No	Some	Full	Full
Outline of ribs visible	All	3 to 5	1 to 2	0	0	0
Outline of spine visible	Yes	Slight	No	No	No	No
Outline of hip visible	Yes	Yes	Yes	Yes	Slight	No
Fat udder and tailhead	No	No	No	No	No	Slight

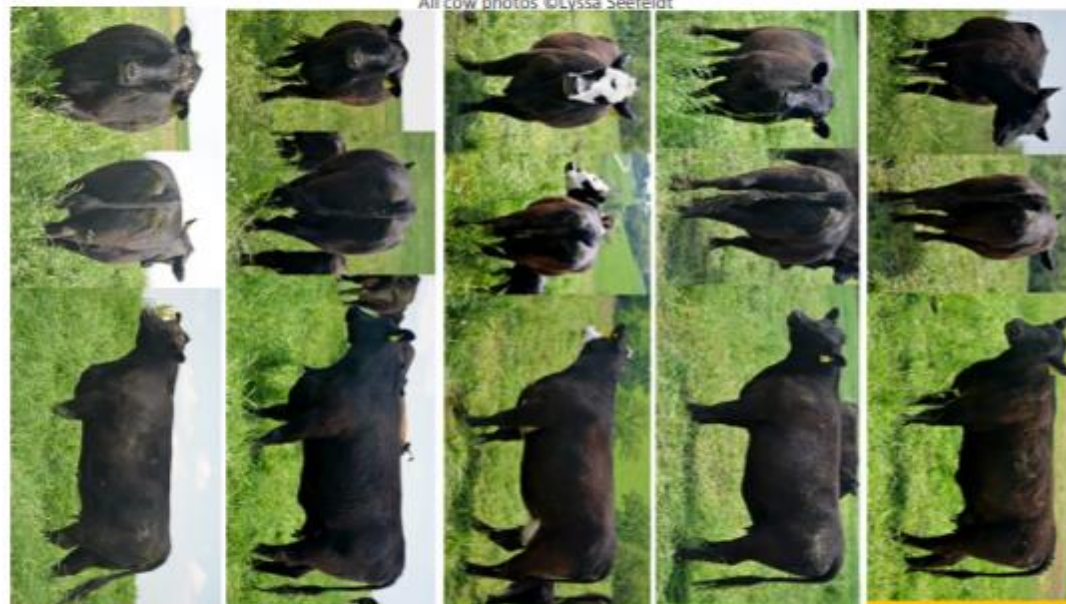
Reference points for body condition scoring cattle.

Adapted from Momont, P.A. and R.J. Pruitt, 1998. Condition scoring of beef cattle. Cow-Calf Management Guide and Cattle Producer's Library. CL-720.

BCS



All cow photos ©Lyssa Seefeldt



BCS 8

BCS 7

BCS 6

BCS 5

BCS 4