

# Applied Reproductive Strategies in Beef Cattle

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# Background









# Impacts of Reproduction to the Poultry Industry

YEAR

**1957**



**Day 43**

**Day 57**

**Day 71**

**Day 85**

**2010**



(Miles et al., 2011)

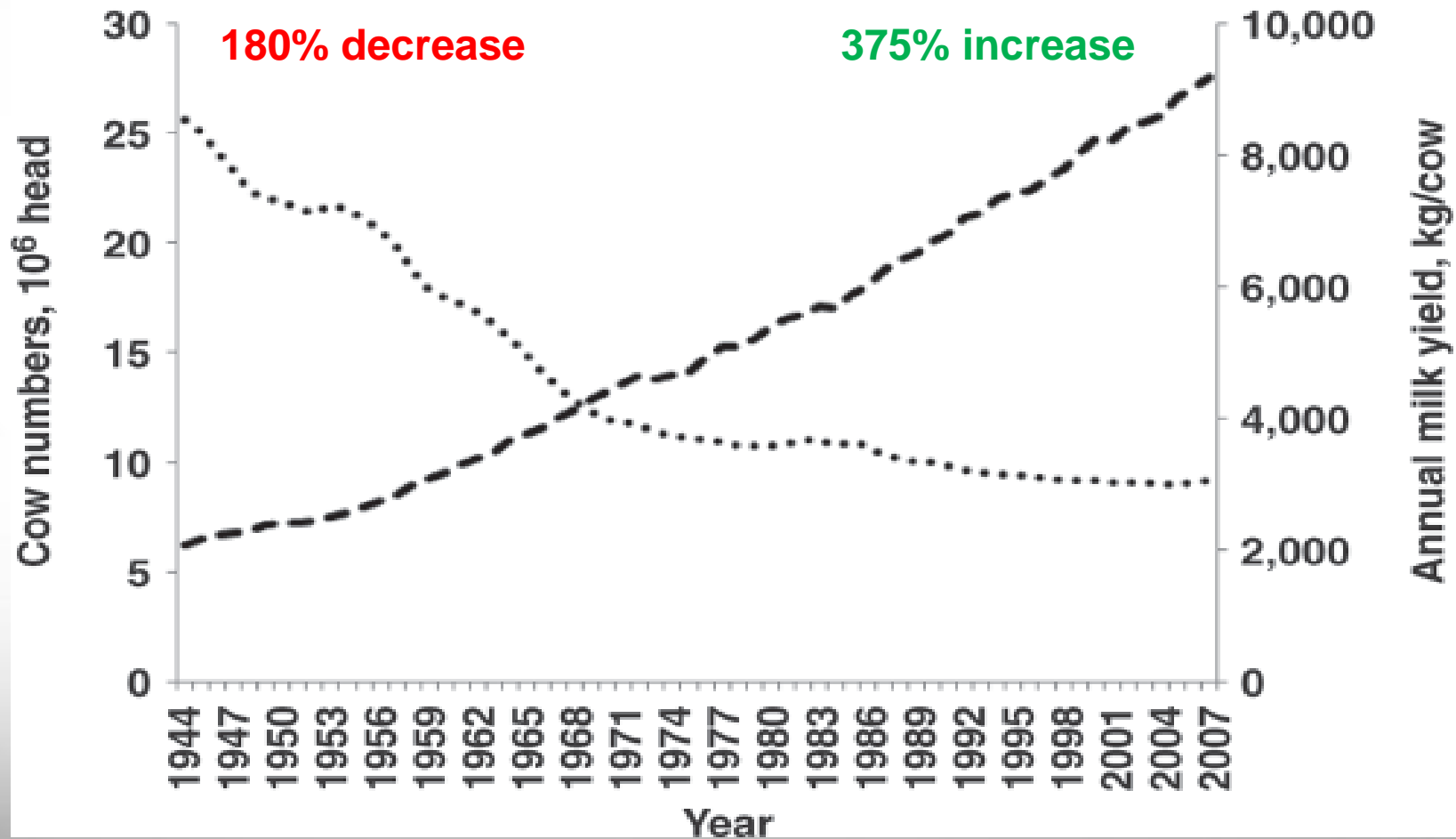


# Impacts of Reproduction to the Swine Industry

85% of operations with >500 sows use AI



# Impacts of Reproduction to the Dairy Industry

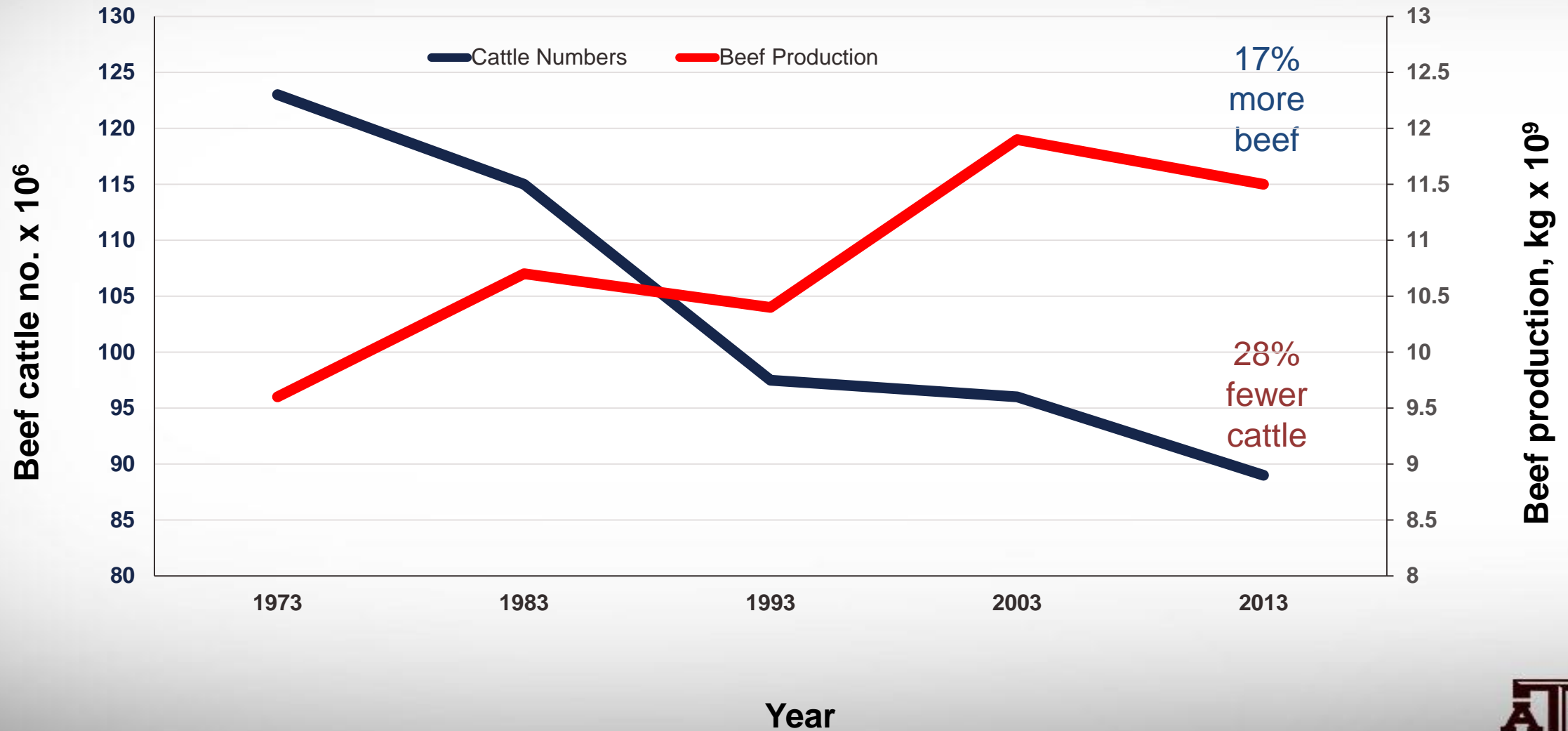


(Capper et al., 2009)





# The US Beef Industry



## Time course of early bovine embryo development

Event	Day	% Pregnant
Estrus	0	
Ovulation and fertilization	1	95-100
First cell division	2	
8-cell stage	3	
Migration to uterus	5-6	
Blastocyst	7-8	75-80
Hatching	9-11	
Maternal recognition of pregnancy	15-17	70-80
Attachment to the uterus	19	
Placentation	25	65-75
Definitive attachment of the embryo to the uterus	42	
Birth	285	55-70

Data adapted from (Shea, 1981; Flechon and Renard, 1978; Peters, 1996; Telford et al., 1990)





**WHAT IS THE MOST IMPORTANT  
REPRODUCTIVE BENCHMARK IN A BEEF  
OPERATION?**

**The % of cows calving  
early in the calving  
season!**

# UF-NFREC Case Study





**Pregnancy has 4 times  
greater economic  
impact than any other  
production trait!**



**We are trying to build a  
better, more productive  
cow!**





# Can We Predict Which Heifers will Make Great Cows?



?????



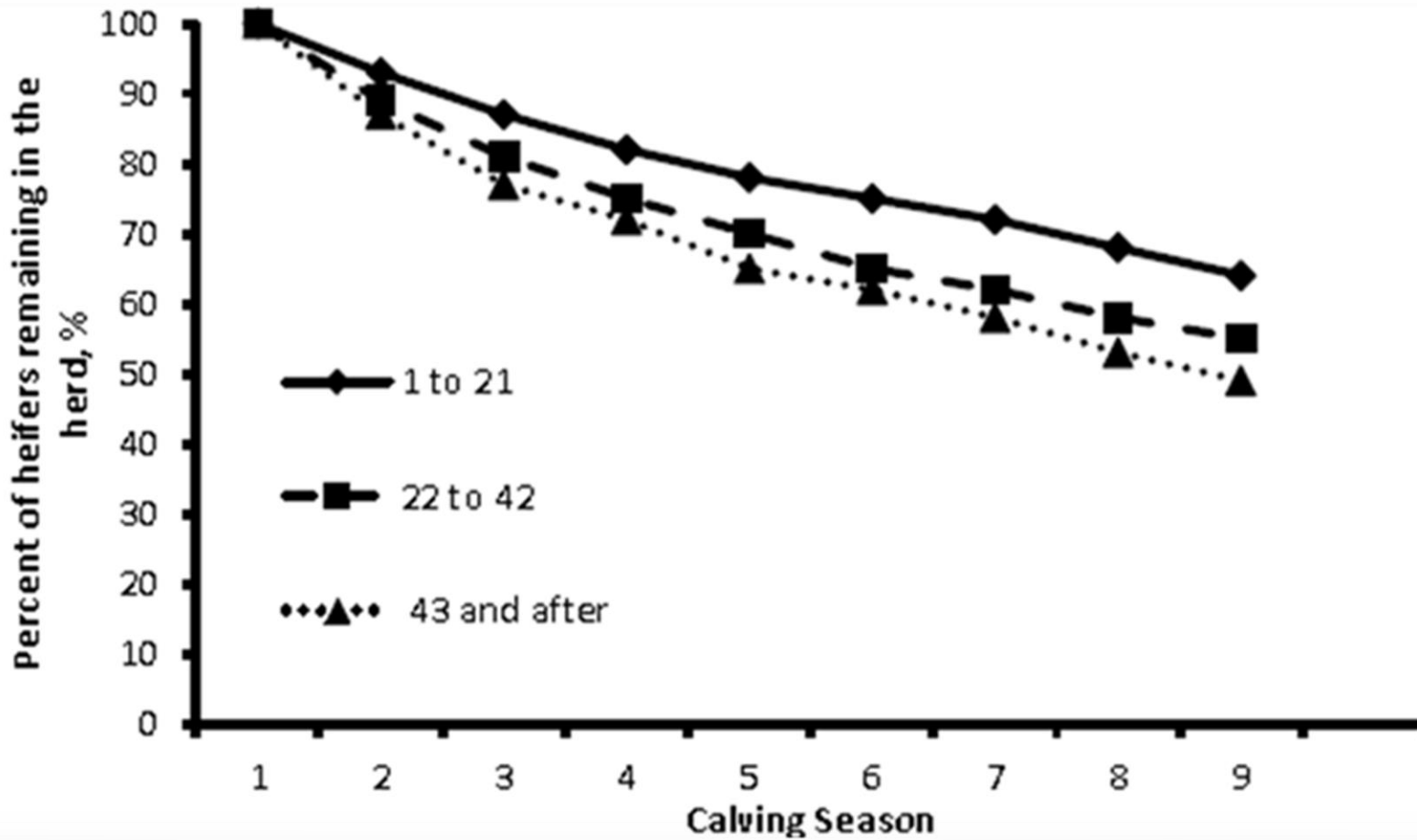


# My Expectations for EVERY Female in the Herd

- Must calve by 24 months of age
- Cow must have a calf every 365 days
- Cow must calve without assistance
- Cow must provide sufficient resources for the calf to reach it's genetic potential
- Calf must be genetically capable to perform
- Cow must maintain their body condition score for my conditions
- Must not be crazy (disposition)



# Influence of Calving Period on Reproductive Longevity

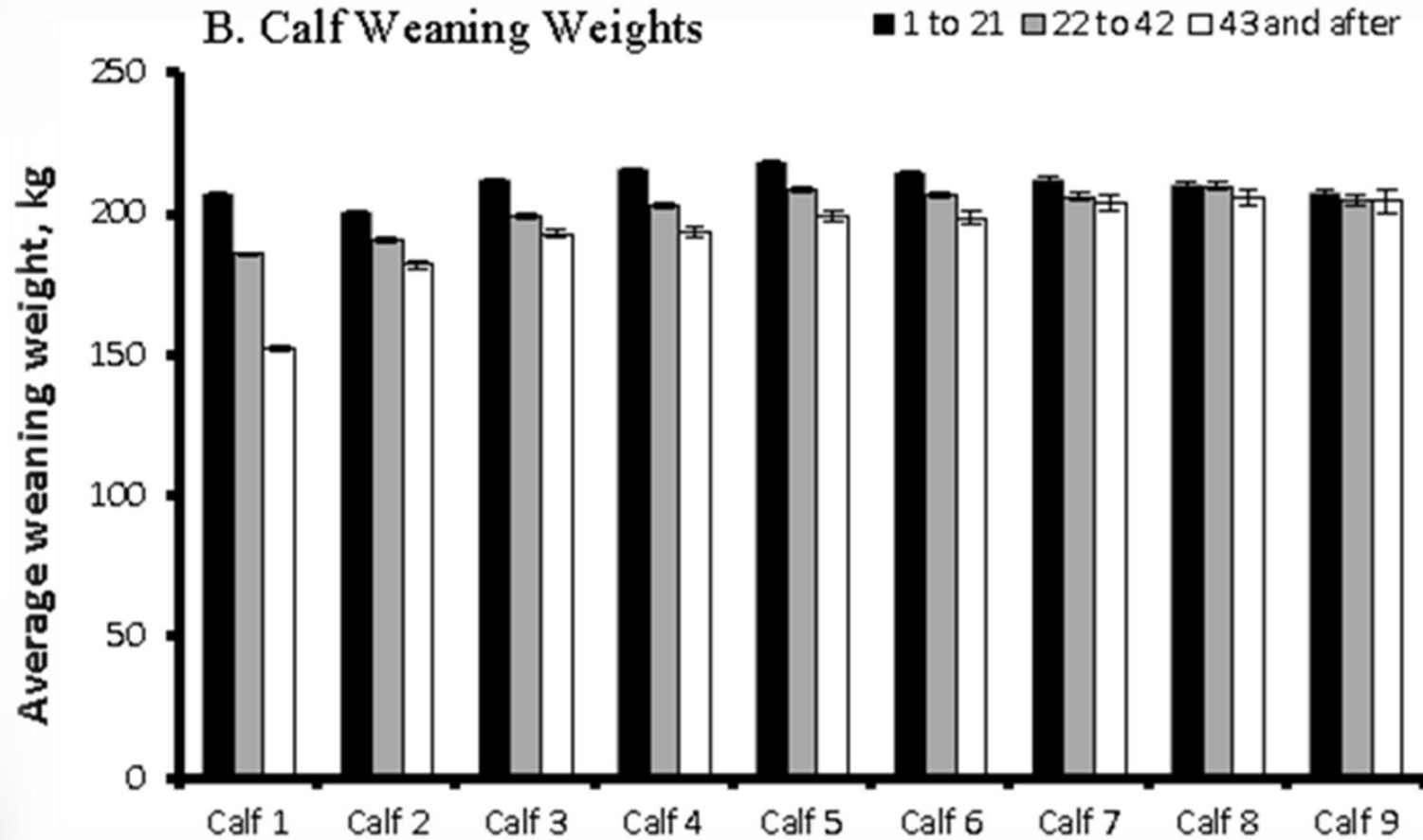


(Cushman et al., 2012)





# Influence of Calving Period on Weaning Weights



(Cushman et al., 2012)



**We know how to  
synchronize  
cattle!**



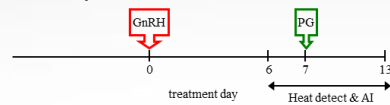


# Estrus Synchronization and AI in Beef Cattle

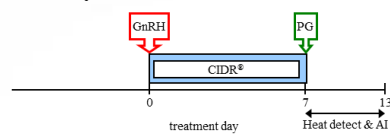
## BEEF COW PROTOCOLS - 2016

### HEAT DETECTION

#### Select Synch

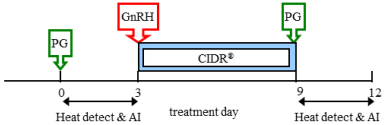


#### Select Synch + CIDR®



#### PG 6-day CIDR®

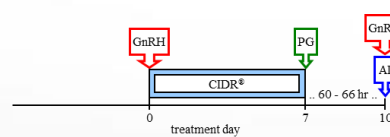
Heat detect and AI days 0 to 3. Administer CIDR to non-responders and heat detect and AI days 9 to 12. Protocol may be used in heifers.



### FIXED-TIME AI (TAI)\*

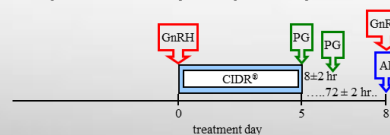
#### 7-day CO-Synch + CIDR®

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



#### 5-day CO-Synch + CIDR®

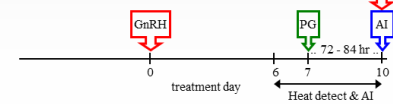
Perform TAI at 72 ± 2 hr after CIDR removal with GnRH at TAI. Two injections of PG 8 ± 2 hr apart are required for this protocol.



### HEAT DETECT & TIME AI (TAI)

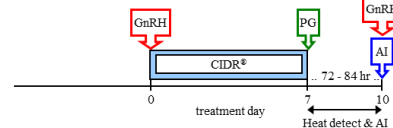
#### Select Synch + TAI

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



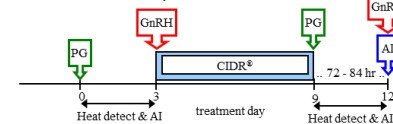
#### Select Synch + CIDR® + TAI

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 and 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.

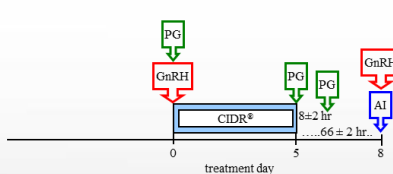


### FIXED-TIME AI (TAI)\*

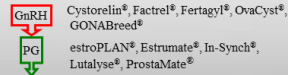
#### for *Bos Indicus* cows only

#### 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.



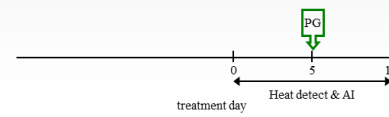
\* The time listed for "Fixed-time AI" should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.



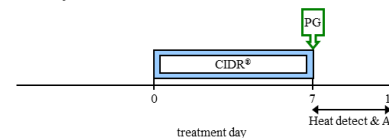
## BEEF HEIFER PROTOCOLS - 2016

### HEAT DETECTION

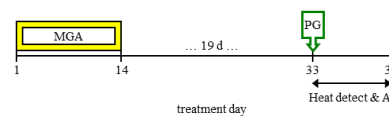
#### 1 Shot PG



#### 7-day CIDR®-PG



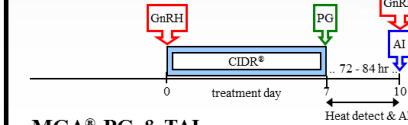
#### MGA®-PG



### HEAT DETECT & TIME AI (TAI)

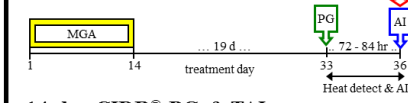
#### Select Synch + CIDR® + TAI

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



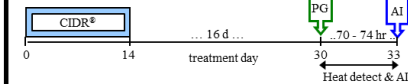
#### MGA®-PG + TAI

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.

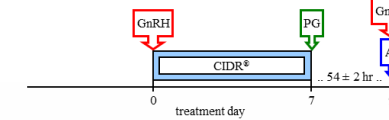


### FIXED-TIME AI (TAI)\*

#### Short-term Protocols

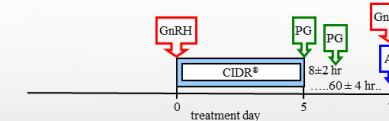
#### 7-day CO-Synch + CIDR®

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



#### 5-day CO-Synch + CIDR®

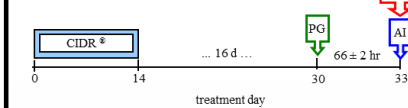
Perform TAI at 60 ± 4 hr after CIDR removal with GnRH at TAI. Two injections of PG 8 ± 2 hr apart are required for this protocol.



#### Long-term Protocols

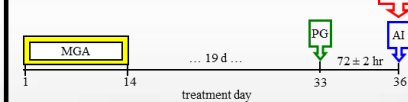
#### 14-day CIDR®-PG

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

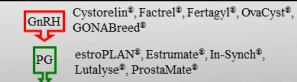


#### MGA®-PG

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.



# UF-NFREC Case Study

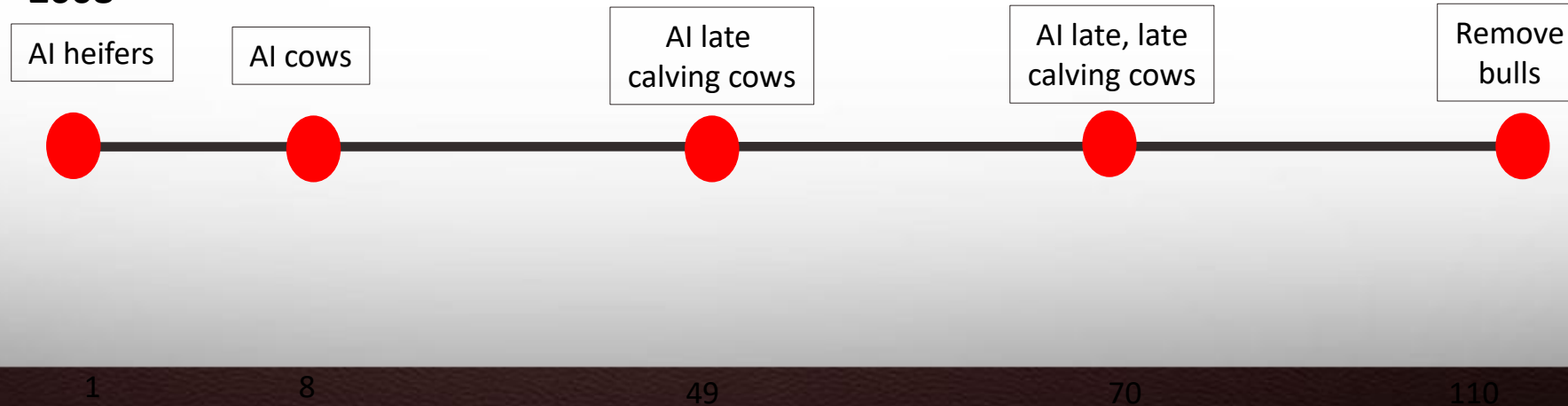
**2006**



**2007**



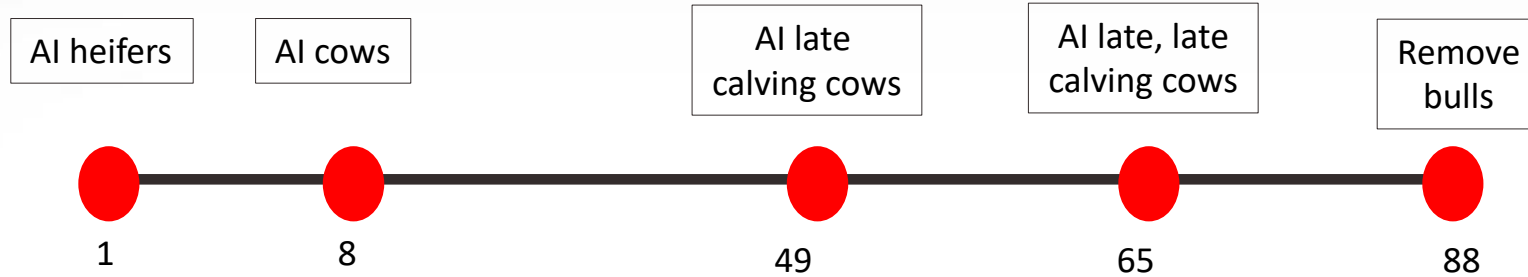
**2008**



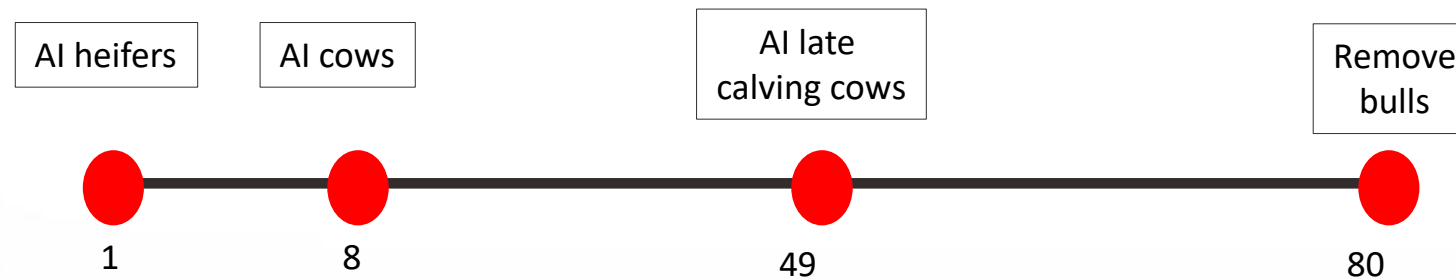


# UF-NFREC Case Study

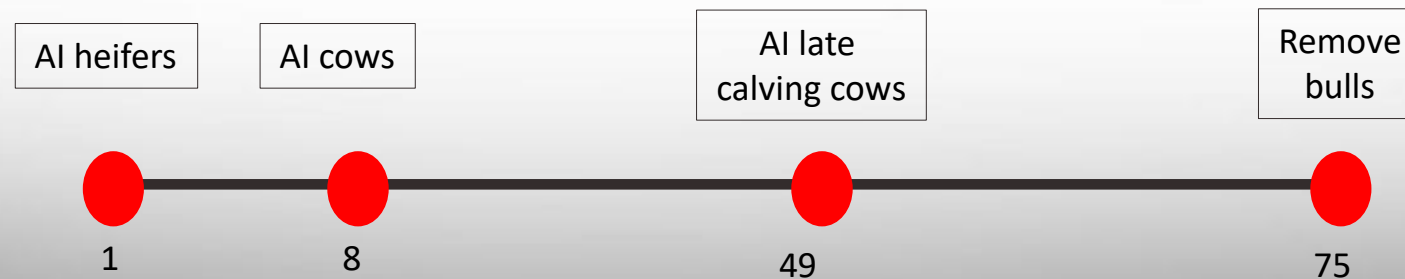
**2009**



**2010**



**2011**



# UF-NFREC Case Study

**2012**

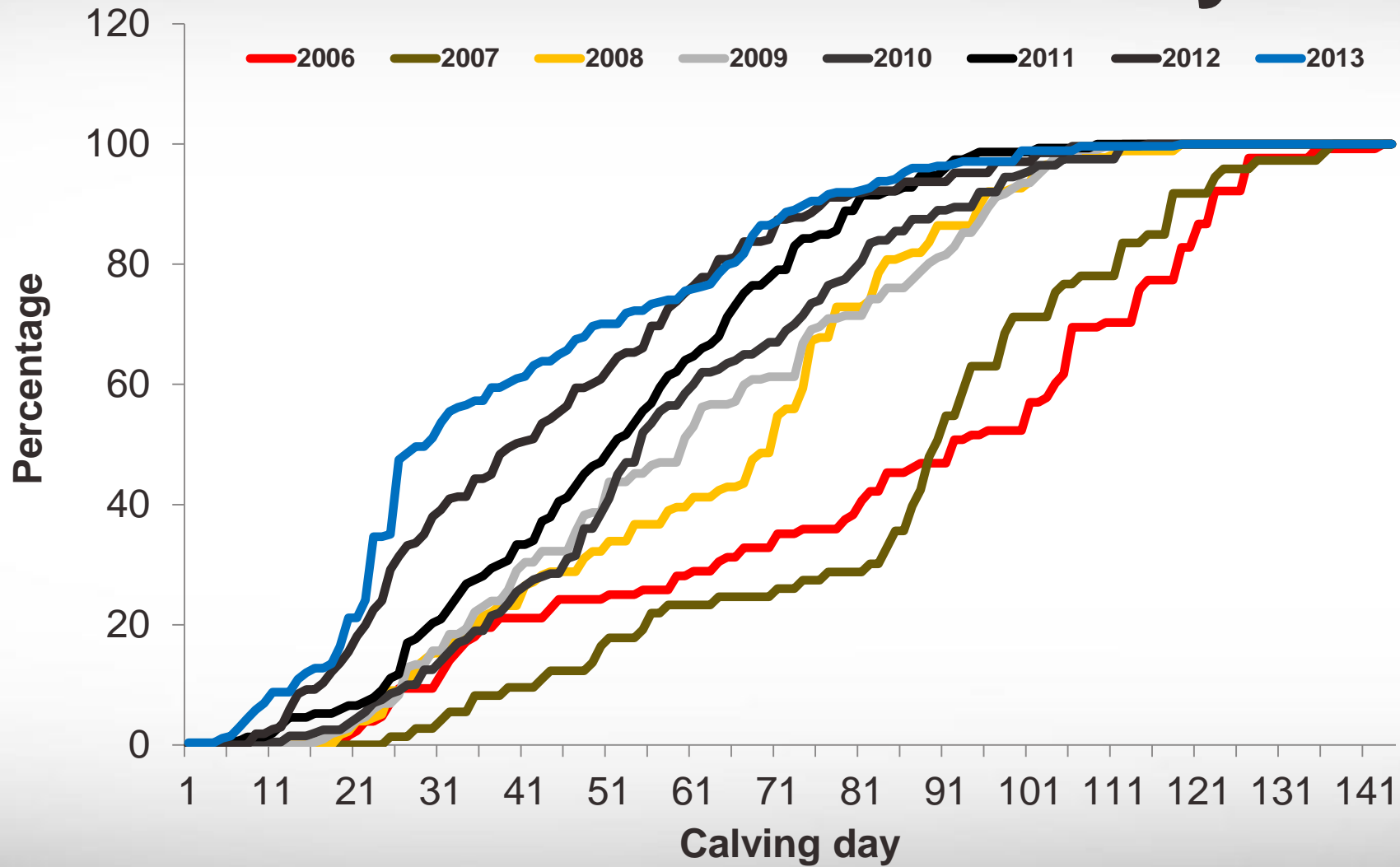


**2013**





# UF-NFREC Case Study



# UF-NFREC Case Study

Breeding season pregnancy rates:

Year	2006	2007	2008	2009	2010	2011	2012	2013
PR	81%	86%	84%	86%	82%	94%	92%	93%
Mean calving day	79.2	80.9	59.2	56.2	53.7	47.2	39.5	38.7
BS length	120	120	110	88	80	75	70	72



# UF-NFREC Case Study

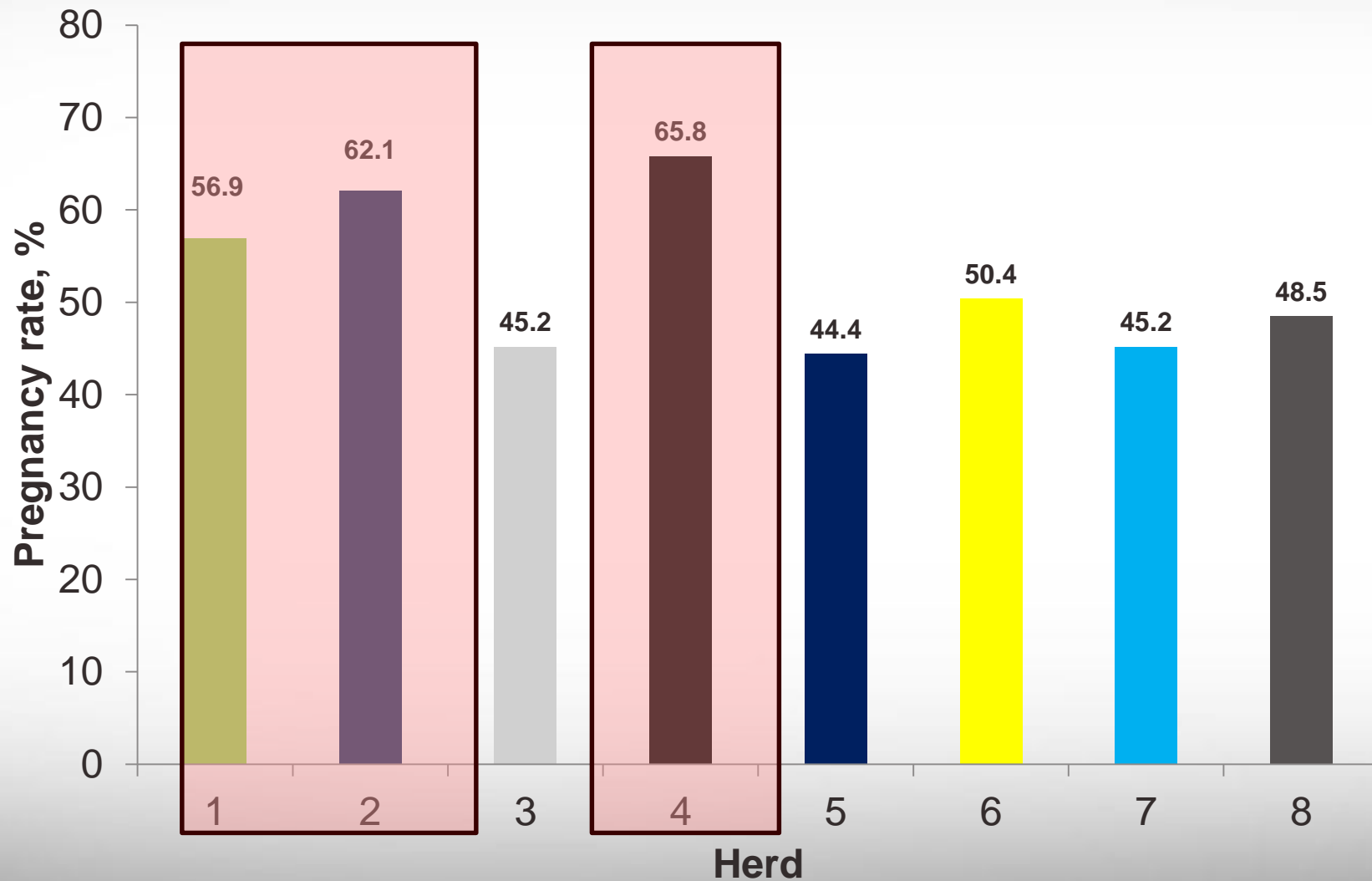
Change in calf value:

Year	2006	2007	2008	2009	2010	2011	2012	2013
Mean calving day	79.2	80.9	59.2	56.2	53.7	47.2	39.5	38.7
Difference from 2006/2007	0	0	21.7	24.7	27.2	33.7	41.4	42.2
Per calf increase in value	0	0	\$87	\$99	\$109	\$135	\$166	\$169
Herd increase in value	0	0	\$19,100	\$29,700	\$32,700	\$40,500	\$49,800	\$50,700



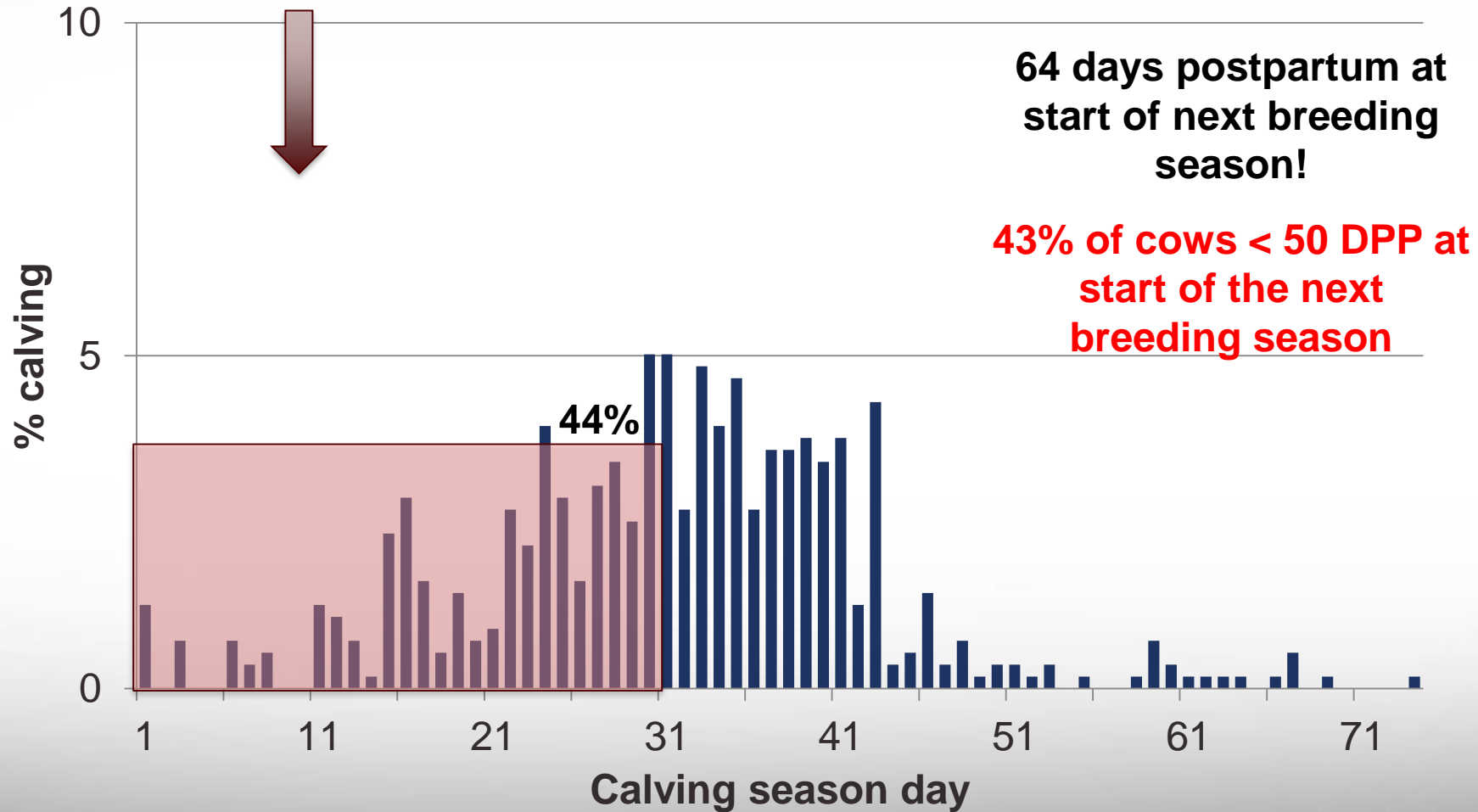


# Pregnancy Rate by Herds



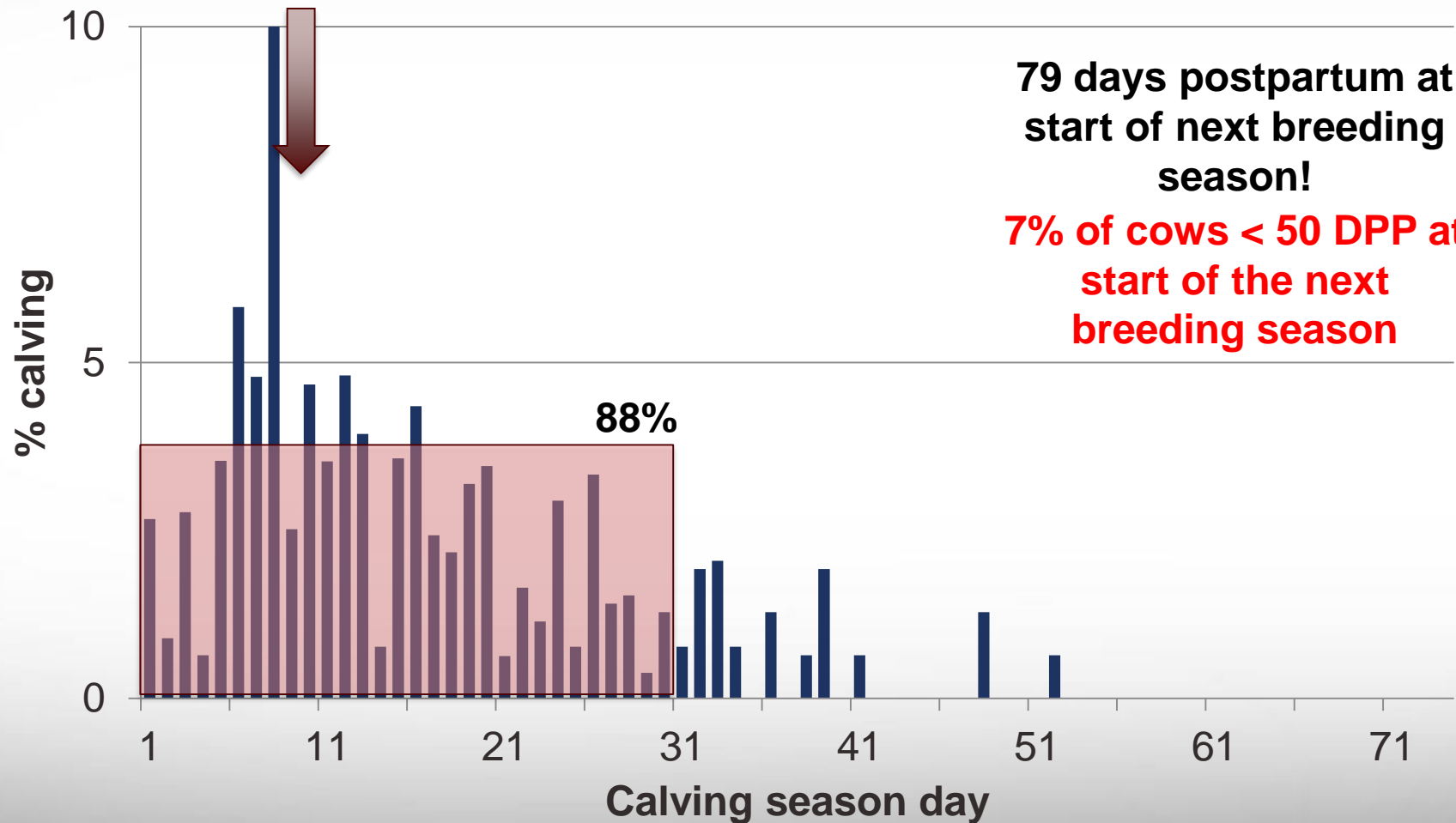
# Calving Distribution After Exposure to Bull

Planned 1<sup>st</sup> day of calving season



# Calving Distribution After Exposure to AI and ES

Planned 1<sup>st</sup> day of calving season







**INTERNATIONAL  
BEEF CATTLE ACADEMY**

TEXAS A&M UNIVERSITY  
DEPARTMENT OF ANIMAL SCIENCE



# Department of Animal Science


**INTERNATIONAL BEEF CATTLE ACADEMY**  
 TEXAS A&M UNIVERSITY  
 DEPARTMENT OF ANIMAL SCIENCE



**International Beef Cattle Academy**

- » [IBCA Home](#)
- » [Welcome Letter](#)
- » [Application](#)
- » [Tuition Costs](#)
- » [Course Descriptions](#)

**UPCOMING EVENTS**

- MAR  
12

**[Equine Reproductive Management Short Course](#)**

March 12 @ 8:00 am - March 14 @ 5:00 pm
- MAR  
19

**[Aggieland Lamb & Goat Camp Registration Opens](#)**

March 19
- MAR  
24

**[Livestock Judging Clinic](#)**

March 24


**INTERNATIONAL BEEF CATTLE ACADEMY**  
 TEXAS A&M UNIVERSITY  
 DEPARTMENT OF ANIMAL SCIENCE

**APPLICATION**

Step 1 of 4

0%

**Contact Information**

**Name \***

As it appears on your passport or driver's license.

**Email \***

**Address \***

Street Address

Address Line 2

City State / Province / Region

ZIP / Postal Code Country

<https://animalscience.tamu.edu/ibca/>





# International Beef Academy

- Program Curriculum
  - 9 cores online courses / 6 required for certificate
    - 30 h / course in 6 weeks
    - 12-month cycles – September to August
  - Global Beef Production | Sept/Oct
  - Cattle Welfare/Behavior | Oct/Nov
  - Forage Management | Nov/Dec
  - Nutritional Management | Jan/Feb
  - Cattle Reproduction | Feb/Mar
  - Breeding and Genetics | Mar/Apr
  - Immunology and health | Apr/May
  - Safety of Beef products | May/June
  - Beef quality | June/July
  - Residency/Graduation | Aug





# Acknowledgements



## People

Dr. John Arthington  
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Dr. Carl Dahlen  
Dr. Alfredo DiCostanzo  
Dr. Travis Maddock  
Dr. Jeff Stevenson  
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Ms. Luara Canal  
Mr. Jim Cassady  
Ms. F. Ciriaco  
Mr. Pedro Fontes  
Mr. Darren Henry  
Dr. Guilherme Marquezini  
Dr. Vitor Mercadante  
Ms. Nicky Oosthuizen  
Mrs. Carla Sanford  
Ms. T. Schulmeister  
Mrs. Kalyn Waters  
Graduate students  
Technical staff  
Support staff  
Collaborators  
Co-authors  
Beef cattle producers

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ABS Global, Inc.  
Blandin Foundation  
Intervet Animal Health  
IVX/Teva Animal Health  
Merial Animal Health  
MN-AURI  
NAAB  
Pfizer Animal Health  
Select Sires, Inc.  
Univ. of FL  
Univ. of MN  
OR State Univ.  
USDA-AFRI  
USDA-CSREES  
USDA-TSTAR



# Thank you!

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