Maximizing Your Breeding Season

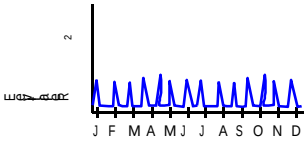
Jose Arceo N. Bautista, DVM, PhD.
Federation of Cattle Raisers' Associations of the Philippines
2013 Convention-General Assembly,
Hotel Valencia, Valencia Bukidnon
February 2-3, 2013

Learning Objectives:

- To be able to review the phenomenon of heat in cattle,
- Understand the cyclicity of heats in relation to known literature vis-à-vis Philippine experience,
- Discuss possible steps to maximize efficiency in reproductive management of cattle herds.

Types of Cyclicity

Polyestrus



- Queen
- Cow
- Sow

Types of Cyclicity

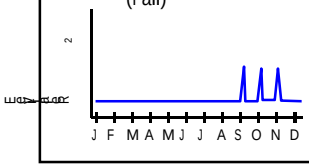
Seasonally Polyestrus

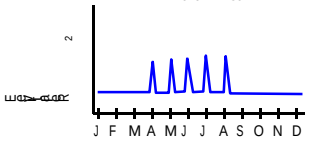
Short day breeders

(Fall)

Long day breeders

(Spring)



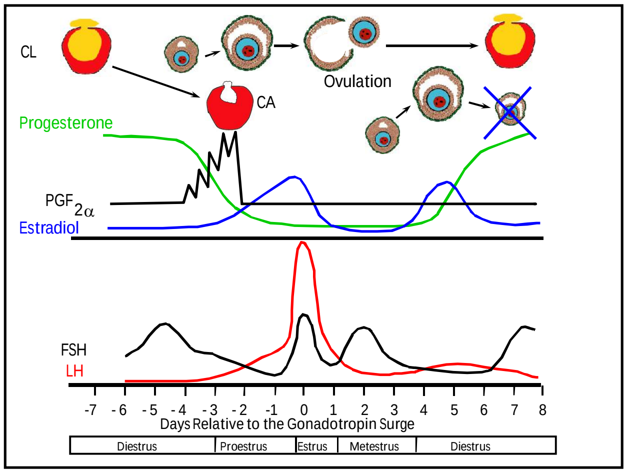


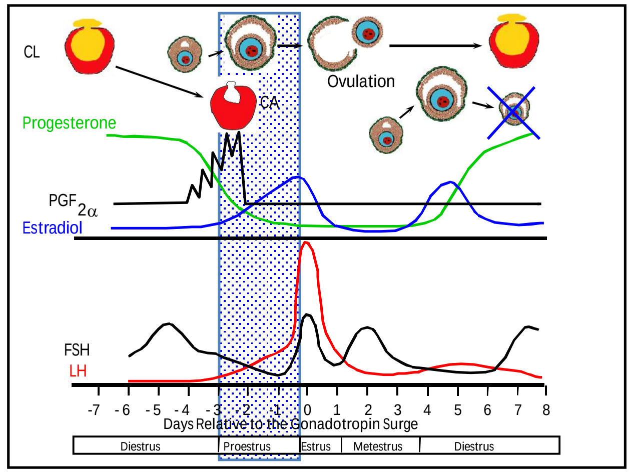
Average Reproductive Cycles

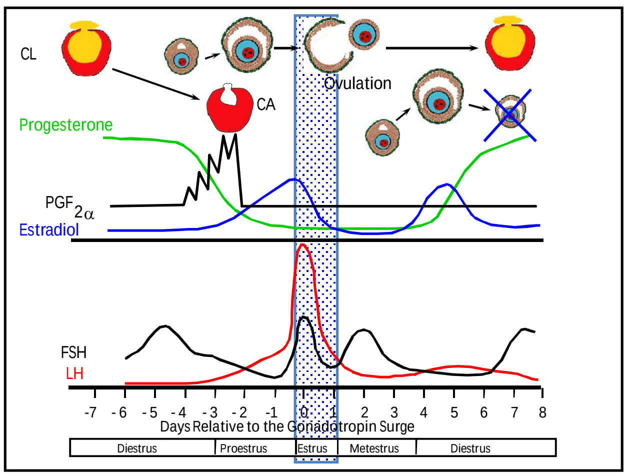
Species	Length of Estrous Cycle	Length of Estrus	Ovulation	Length of Pregnancy
cow	21 days polyestrus	18 hr	11 hr after end estrus	282 days
ewe	17 days seasonal (fall)	29 hr	near end estrus	148 days
sow	21 days polyestrus	48-72 hr	35-45 hr after start estrus	115 days
mare	21 days seasonal (spring) polyestrus	4-8 days	3-6 day of estrus (1-2 days before end of estrus)	335 days

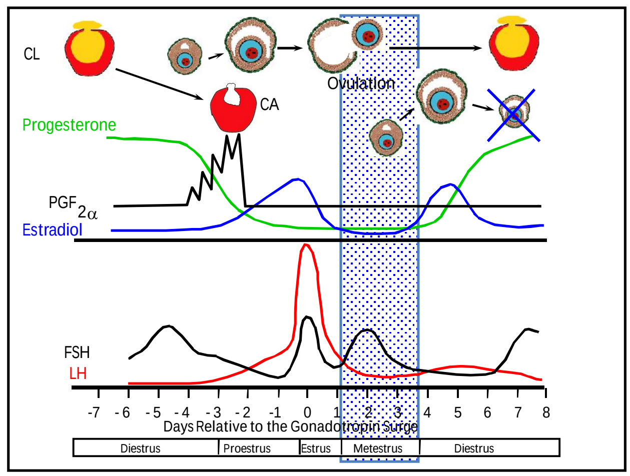
Variation in Cycle Types

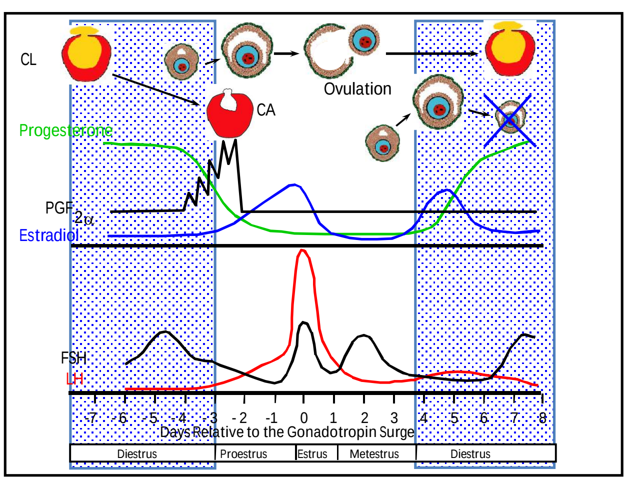
Example	Type of Cycle	Follicular Development	Ovulation & CL Formation	CL Function
Cow, ewe, sow, mare	Long	Spontaneous	Spontaneous	Spontaneous
rats, mice, hamsters	Short (4 days)	Spontaneous	Spontaneous	Induced (prolactin)
rabbit, cat, mink, ferret, otter, alpaca	Induced	Spontaneous	Induced (LH surge)	Induced

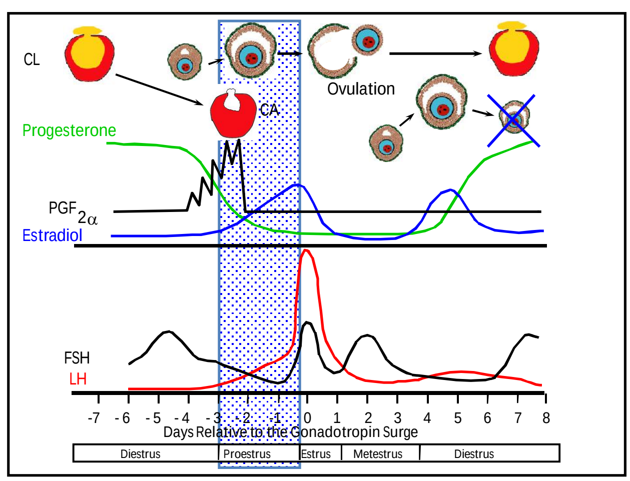

CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus

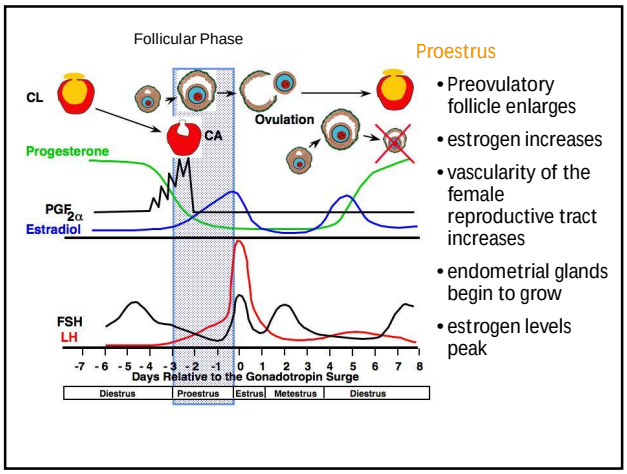

CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus


CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus


CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus

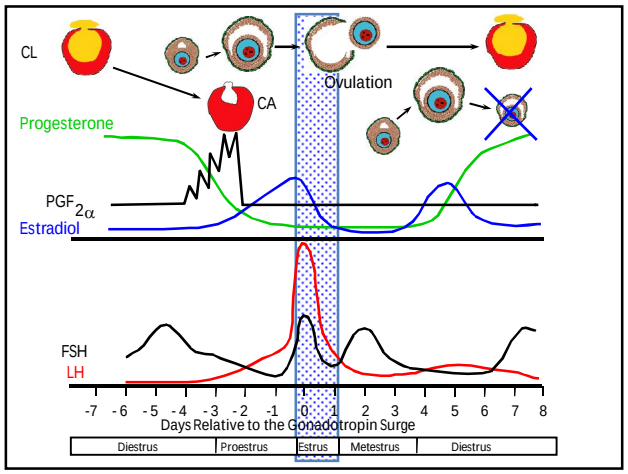

CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus

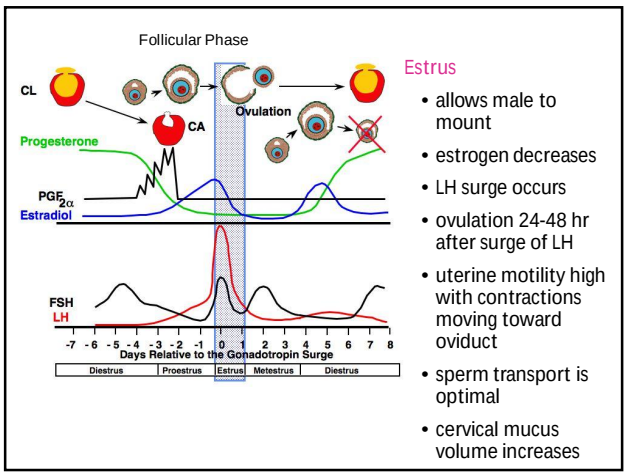

CL
CA
Ovulation
Progesterone
PGF2α
Estradiol
FSH
LH
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
Days Relative to the Gonadotropin Surge
Diestrus
Proestrus
Estrus
Metestrus
Diestrus



Proestrus

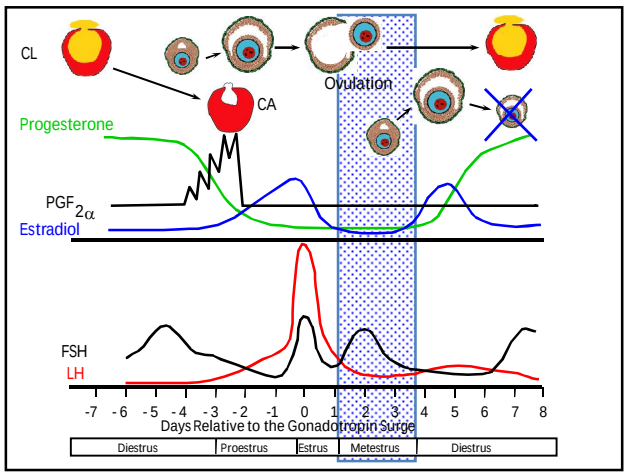
- Preovulatory follicle enlarges
- estrogen increases
- vascularity of the female reproductive tract increases
- endometrial glands begin to grow
- estrogen levels peak

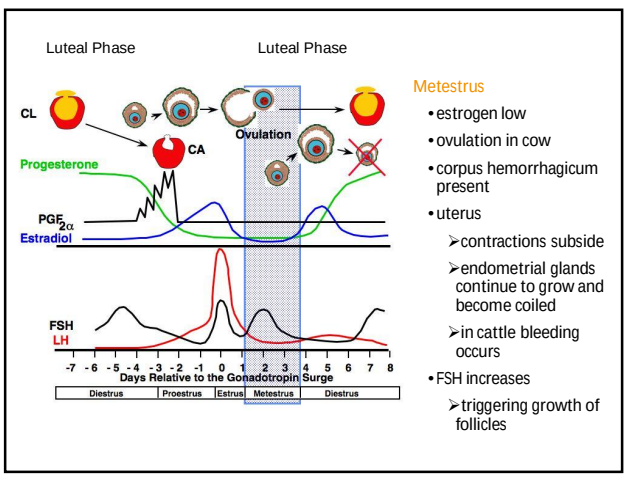




Estrus

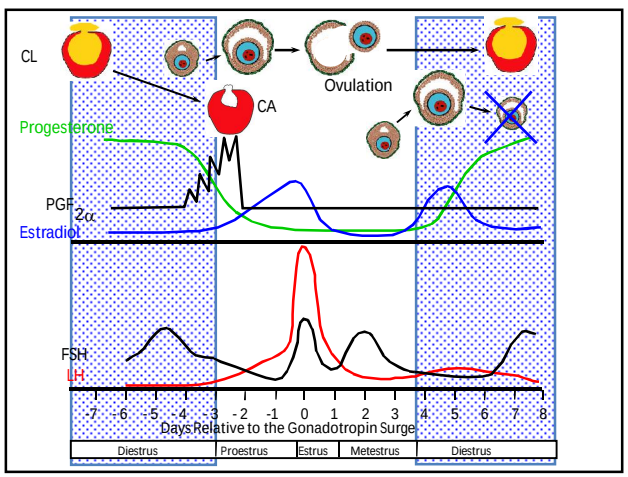
- allows male to mount
- estrogen decreases
- LH surge occurs
- ovulation 24-48 hr after surge of LH
- uterine motility high with contractions moving toward oviduct
- sperm transport is optimal
- cervical mucus volume increases

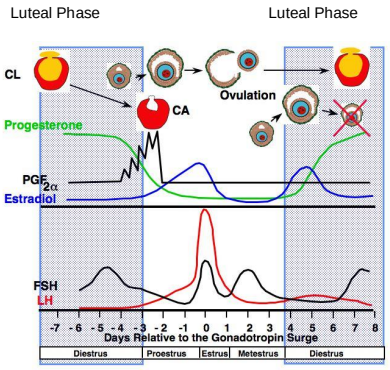




Metestrus

- estrogen low
- ovulation in cow
- corpus hemorrhagicum present
- uterus
  - ➢contractions subside
  - ➢endometrial glands continue to grow and become coiled
  - ➢in cattle bleeding occurs
- FSH increases
  - ➢triggering growth of follicles



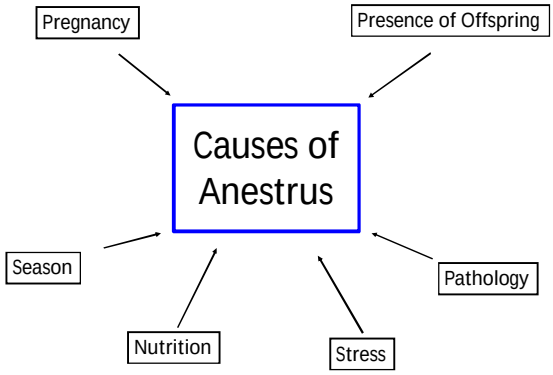


Diestrus

- progesterone high
- FSH
  - Increases at some point to cause growth of ovulatory follicle
- Uterus
  - secrets fluid but volume gradually decreases
  - contraction stop
  - CL regresses at the end of this period if female is not pregnant due to PGF release

Characteristics of Estrous Cycles

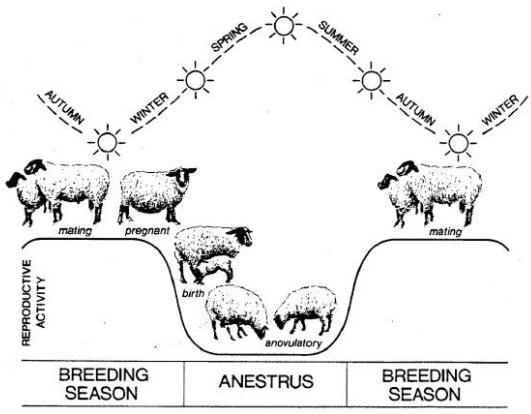
	Cow	Ewe	Sow	Mare
Estrous cycle (days)	21	17	21	21
Proestrus (days)	3-4	2-3	3-4	2-3
Estrus days	12-18 hr	24-36 hr	48-72 hr	4-8
Metestrus (days)	3-4	2-3	2-3	2-3
Diestrus (days)	10-14	10-12	11-13	10-12

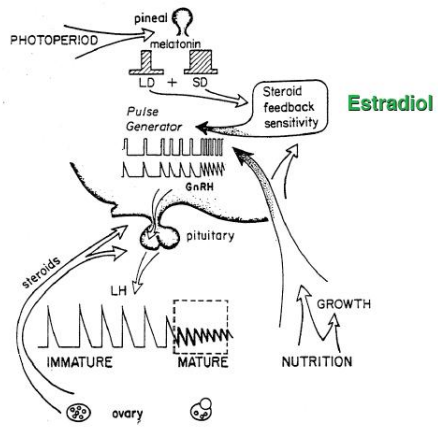


Gestational Anestrus

- Progesterone during pregnancy
  - negative feedback
- After parturition anestrus continues
  - progesterone exposure during pregnancy
  - hypothalamus
    - Lacks estradiol positive feedback
- allows time for uterine involution

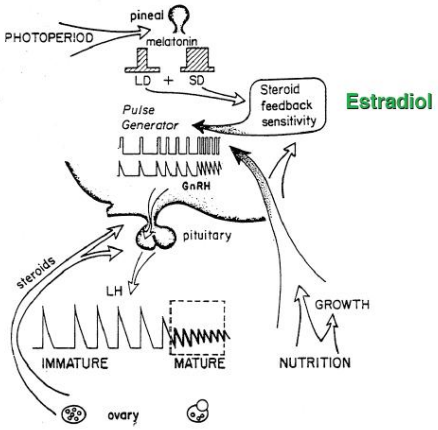
Sheep are short day breeders!



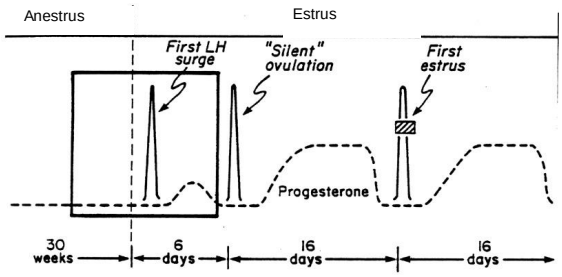


Seasonal Anestrus

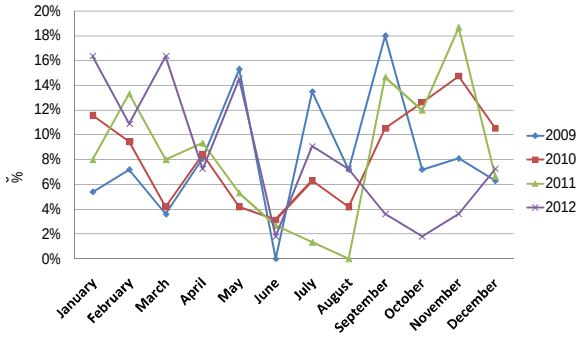
- just like entering puberty
- silent ovulation



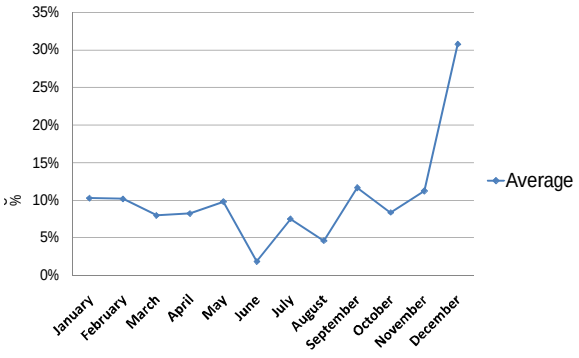
Silent Ovulation



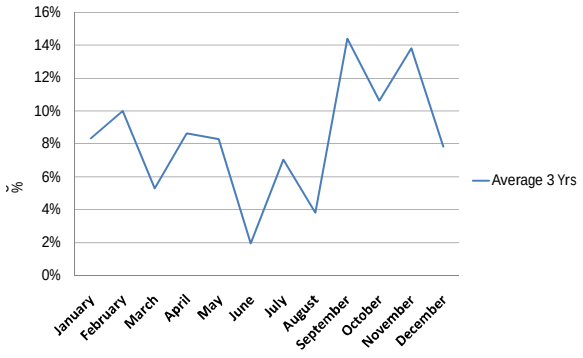
Distribution of Heats
DTRI 2009-2012

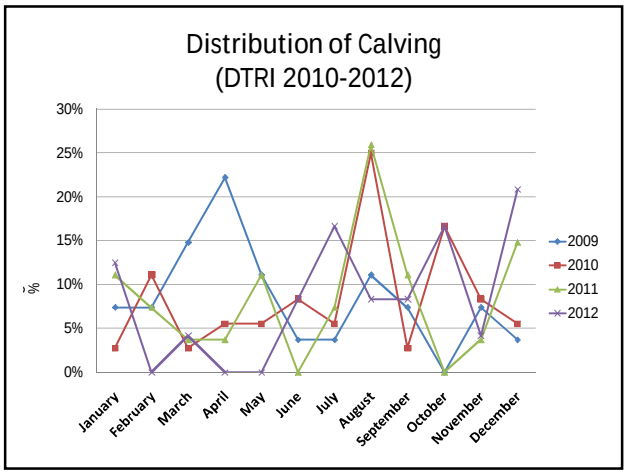


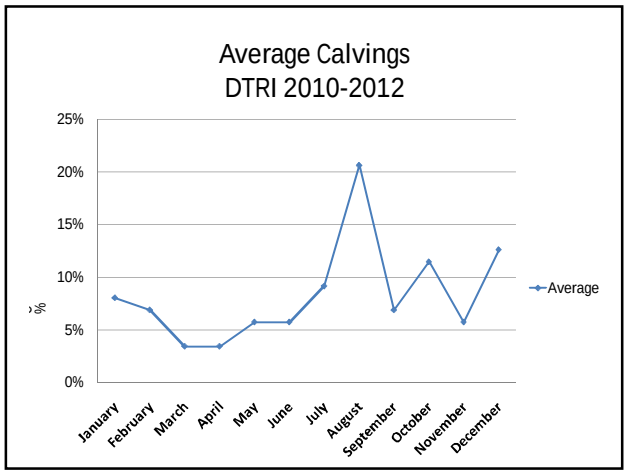
4-Year Average
(DTRI 2009-2012)

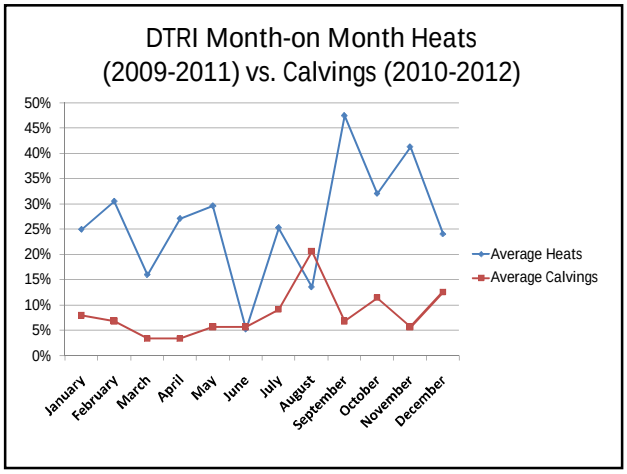


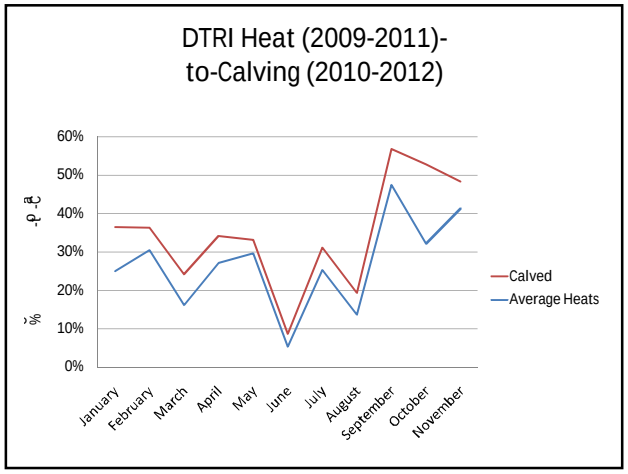
3-Year Average Heats
DTRI 2009-2011











Recommendations:

1. Establish your breeding season by looking at the record of heat distribution vis-à-vis distribution of calving.
2. If it is too difficult to establish heat distribution, look at the calving record and plot 3 months from the peak of calving, the start of your breeding season.
3. Keep records religiously, systematically and efficiently.
4. Look at the seasonal meteorological data of your area, particularly the length of day versus night.
5. Remember that cows' seasonal cyclicity also correspond to seasonality of fertility in males, thus, practice controlled or seasonal breeding.
6. Remember too that hormones are not a panacea. These are also affected by physiological states and responses.

References:

- Animal Science 434 Lecture No. 9. John J. Parish. University of Wisconsin. Fall, 2008 (With Permission)
- Pathways to Pregnancy and Parturition. P.L. Senger, 2nd revised edition. 2003

JOSE ARCEO N. BAUTISTA, DVM, PhD

For Inquiries:
Send a message to jobau57@yahoo.com