Sustainable Resources 11 Animal Husbandry Dairy Lesson 3

Dairy Production and Lactation





Getting Cows Pregnant

A cow has a choice...

Get Pregnant Or DIE!!!







Calving ~24 Months

Terminology

calving interval: The average time interval between successive calvings.

DIM: Days in Milking

Dry Period: No Milking. Cow is dried up so that no milk is produced. Resting period.



Calving ~24 Months

DIM

3 years old

Terminology

Days Open: Not with calf or pregnant.

Gestation: The period of development in the uterus from conception until birth; pregnancy



Age at First Calving ~24 Months

DIM

3 years old

Terminology

Voluntary Waiting Period: Time that a farmer decides to wait before breeding a cow.

Female Reproductive System

Anatomy

Vagina Cervix Uterus Ovaries

Cycle about 21-23 days between heats or "estrus"



Uterus

Horns
Ovary
Corpus
Luteum



Ovary produces:

- Eggs (ova)
- Hormones
 - Estrogen from follicle
 - Progesterone from corpus
 luteum (CL) – "yellow body"

 Normally about 21-23 day estrous cycle



Female Reproductive System Key Points about the Cow's Estrous Cycle 1. Measured from one heat to the next heat

2. Length of cycle about 21-23 days

3. All the eggs that will develop during a cow's life are present at birth

Key Points about the Cow's Estrous Cycle

4. Dominant follicles are able to mature and release their ovum (egg) shortly after the "heat"

5. The egg must be fertilized within the oviduct within 6 hours

6. The unfertilized egg is gathered up into the uterine tube (fallopian tube, oviduct)

Conception and Gestation

Getting sperm to the egg...

Natural vs. Artificial Insemination (AI)

Natural Service

Advantages

- Bull does heat detection
- Large numbers of fresh sperm cells
- Disadvantages
 - Must purchase, feed and maintain bull
 - Soundness evaluation
 - Tend to get fat and lame
 - Need multiple bulls
 - Dangerous!!!





Artificial Insemination (AI)

Advantages

- Best sires
- Many offspring allows for trait testing
- Can store for years
- Disadvantages
 - Heat detection!
 - Must learn proper insemination technique
 - Proper on farm storage of semen
 - Smaller number of sperm cells



How do we get cows pregnant?

BREED THEM WHEN THEY ARE IN HEAT

 How many breedings does a cow require to become pregnant?



Conception Rate: CR # of pregnancies # of breedings

i.e. 50 pregnancies after a 120 cows are breed gives a CR of ????? Try it!

Answer: 50 / 120 = 42%

CR = 50%			
AI	# Bred	# Pregnant	Total Pregnant
1	100	50	50
2	50	25	75
3	25	13	88
4	13	6	94



Fertile life of frozen-thawed sperm in female reproductive tract (~24h)

Heat Detection Rate: HDR

 % of eligible cows detected in heat within a 21 day cycle
% of cows you see in heat

Pregnancy Rate: PR % of eligible cows pregnant in a 21 day cycle Measures how fast cows get pregnant

HDR x CR = PR 50% x 35% = 17.5%

Good Rate Vs. Bad Rate

Good Rate = Above 20% Bad Rate = below 15%

Homework:

Do the Dairy Production – Lactation Cycles worksheet.

Estrogen

- produced by the ovarian follicle
- sexual receptivity \rightarrow estrus "in heat"
- secondary female sexual characteristics
 - wider pelvis, mammary glands, and lighter features

- Progesterone
 - produced primarily by the CL
 - prepares the uterus for pregnancy
 - Elevated between "heats" and during pregnancy
 - Low during estrus

Prostaglandin F2α (PG)

- hormone released by the uterine muscle to restart the estrous cycle
- Acts on the corpus luteum to remove it (regression)
 - CL responds from day 7-18 of cycle
 - Cows will display "heat" usually in 2-4 days (range 1-7 days)
- Estrumate, Lutalyse
 - Synthetic PG



gonadotrophin releasing hormone (GnRH)

- decapeptide hormone produced in the brain (hypothalamic area)
- causes release of 2 hormones from the anterior pituitary (brain)
 - FSH (follicle stimulating hormone)
 - Stimulation of a new follicular wave
 - LH (luteinizing hormone)
 - Causes ovulation and helps form the CL



- Factrel, Fertiline, Fertagyl, Cystorelin
 - Synthetic GnRH
 - Ovulation occurs in 24 to 30 hours after injection if a responsive follicle is present (LH)
 - Also starts a new follicular wave (FSH)

