



# REPRODUCTION IN BEEF CATTLE

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Schrick, Hopkins, & Rhinehart

# REPRODUCTION IS THE MOST ECONOMICALLY IMPORTANT TRAIT IN BEEF CATTLE!



- THE SORRIEST CALF YOU EVER SELL IS WORTH MORE THAN A DEAD ONE!
- REPRODUCTION IS ESTIMATED TO BE WORTH:
  - 10 TIMES MORE THAN GROWTH TRAITS
  - 20 TIMES MORE THAN CARCASS TRAITS

# EVALUATION OF REPRODUCTION IN THE BEEF HERD



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- CALF CROP PERCENTAGE
- DISTRIBUTION OF CALVING DATES
- POUNDS OF CALF PRODUCED PER COW EXPOSED



# CALF CROP PERCENTAGE

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- **NUMBER OF CALVES WEANED  
DIVIDED BY THE NUMBER OF COWS  
EXPOSED TIMES 100.**
- **30 CALVES WEANED DIVIDED BY 40  
COWS EXPOSED TIMES 100 EQUALS  
75 PERCENT CALF CROP.**
- **THE TENNESSEE AVERAGE IS ABOUT  
76-80% AND THE GOAL SHOULD BE  
MORE THAN 90%**



# REPRODUCTIVE GOALS FOR THE BEEF HERD

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- 90 TO 95% IN HEAT THE FIRST 21 DAYS OF THE BREEDING SEASON
- 70% CONCEIVE ON FIRST BREEDING
- LESS THAN 5% DIFFICULT CALVINGS
- 90% OF COWS BRED WEAN A CALF

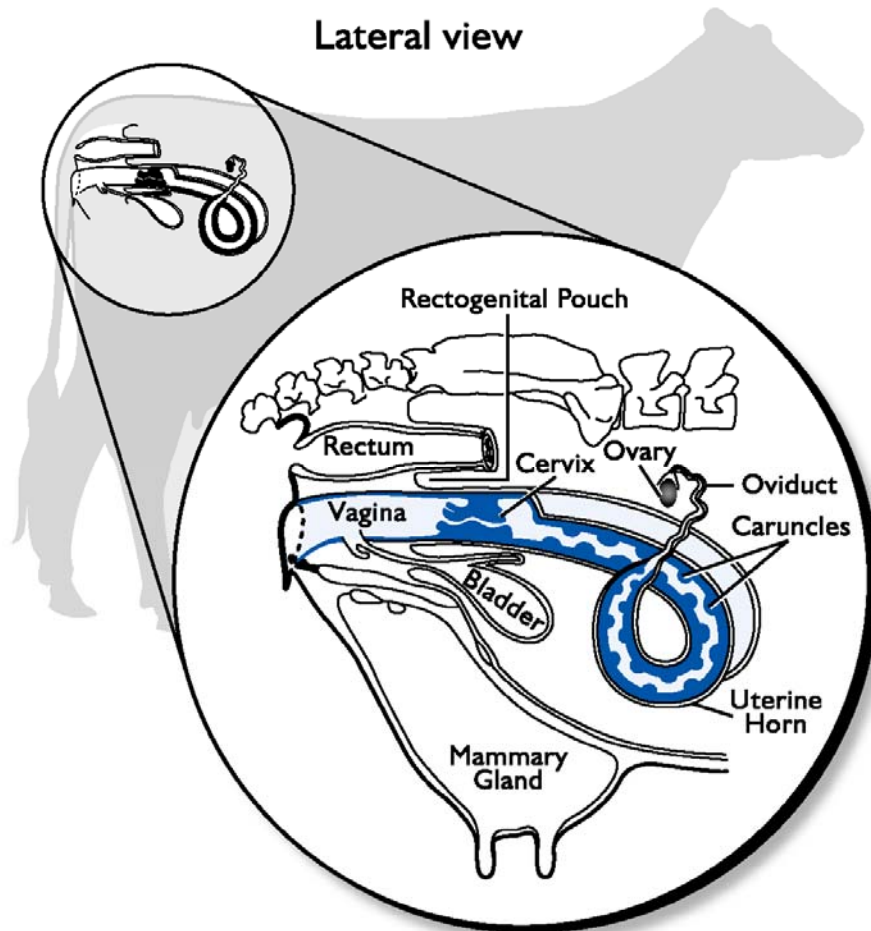
# THE STRUCTURE AND FUNCTION OF THE REPRODUCTIVE SYSTEM OF THE COW AND BULL



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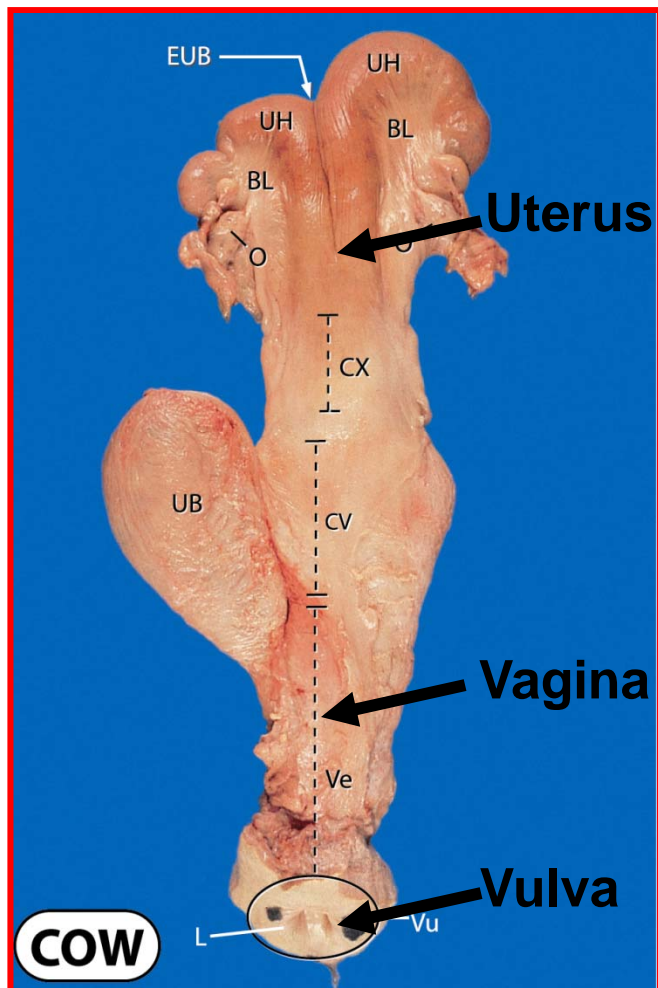
UNDERSTANDING HOW IT WORKS  
RESULTS IN BETTER  
REPRODUCTIVE MANAGEMENT

# THE REPRODUCTIVE SYSTEM OF THE COW



- THE VULVA
- THE VAGINA
- THE CERVIX
- THE UTERUS
- THE OVARIES

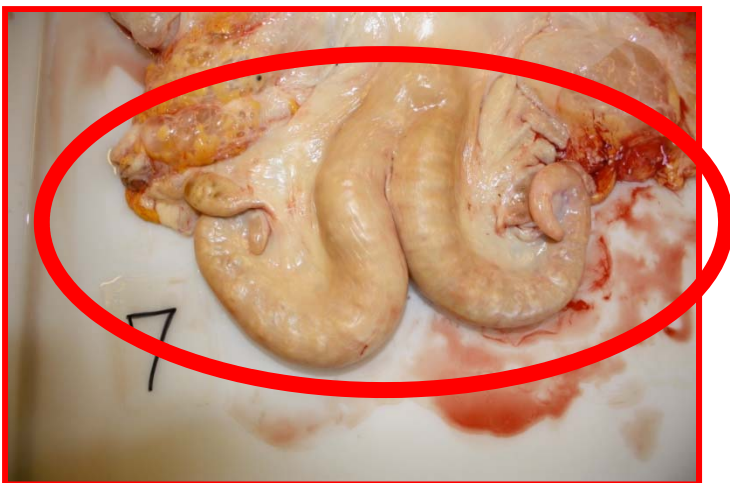
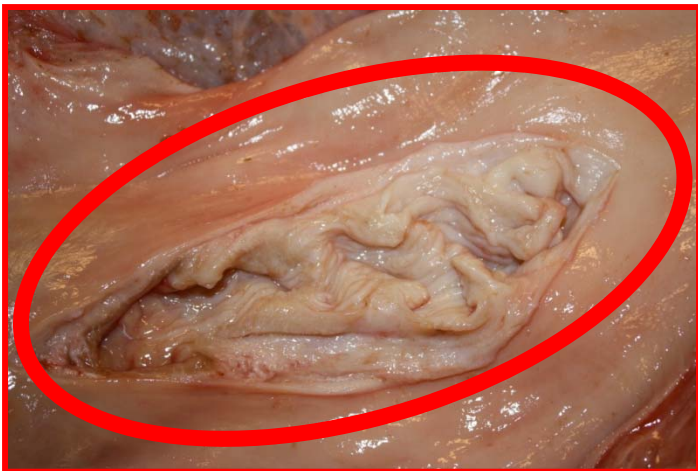
# THE VULVA AND VAGINA



- THE VULVA IS THE OUTSIDE OPENING AND INJURY CAN RESULT IN LOWER FERTILITY
- THE VAGINA IS WHERE SEMEN IS DEPOSITED AT BREEDING AND SERVES AS THE BIRTH CANAL

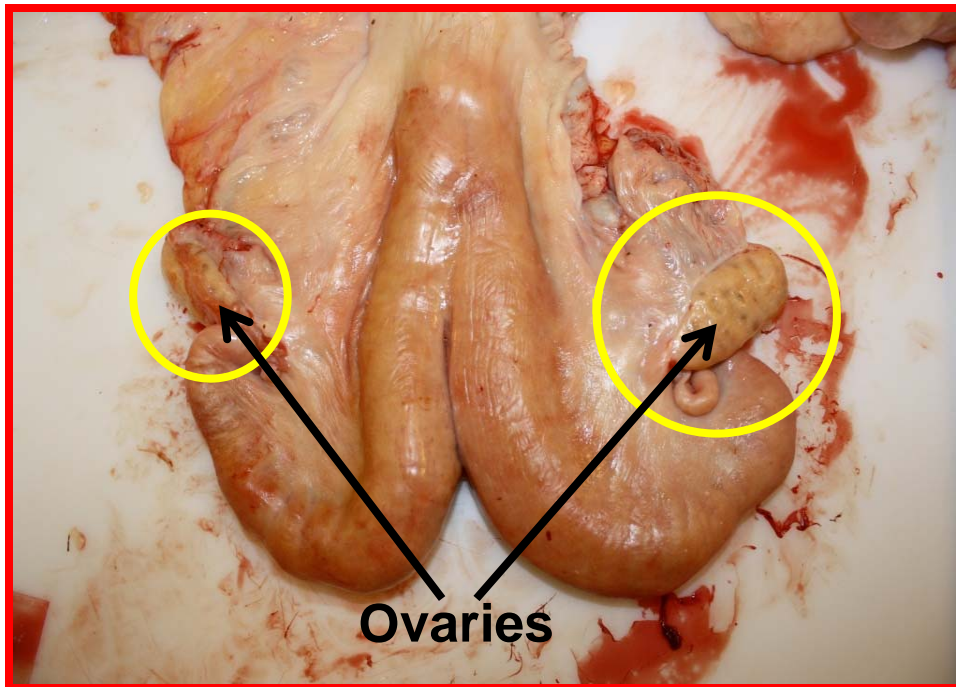


# THE CERVIX AND UTERUS



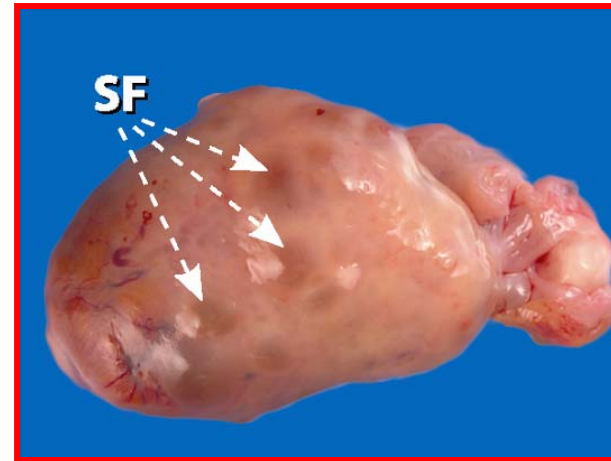
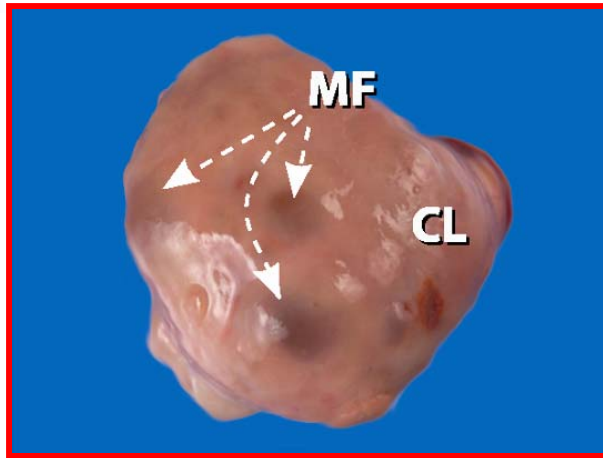
- THE CERVIX ACTS AS THE DOOR TO THE UTERUS AND MUST OPEN UP AT THE BEGINNING OF CALVING
- THE UTERUS IS "Y" SHAPED AND THIS IS WHERE THE CALF IS CARRIED

# THE OVARIES



- ARE ABOUT THE SIZE OF A PECAN
- THEY PRODUCE EGGS TO BE FERTILIZED BY THE BULL AND SEX HORMONES SUCH AS ESTROGEN AND PROGESTERONE

# THE OVARIES



# ABNORMAL OVARY

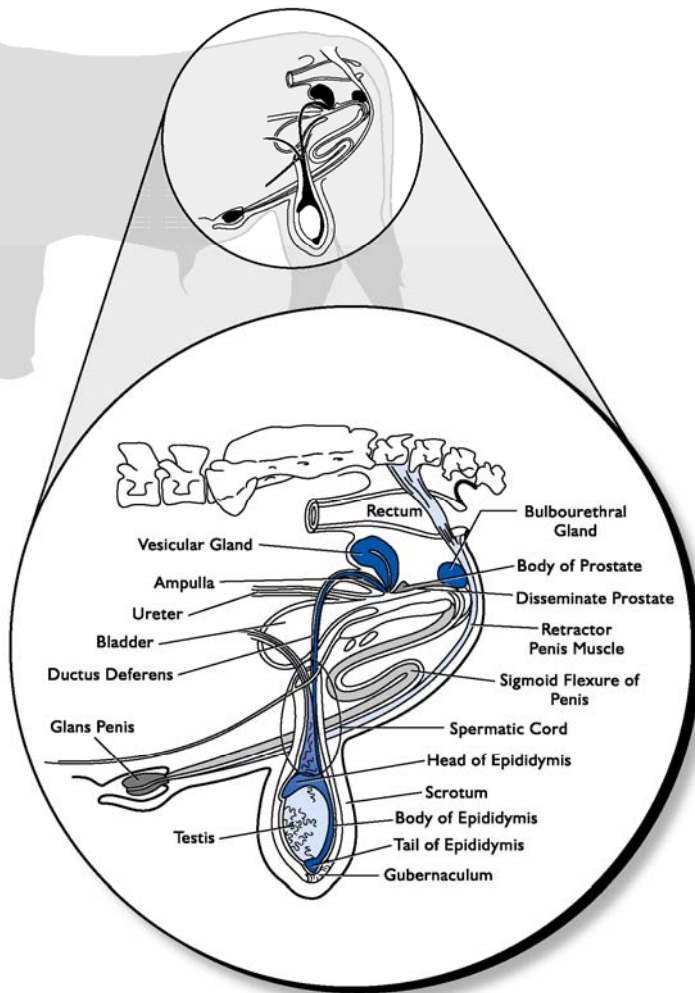


- Sometimes, Ovaries have abnormalities which causes issues with cyclicity and pregnancy maintenance.

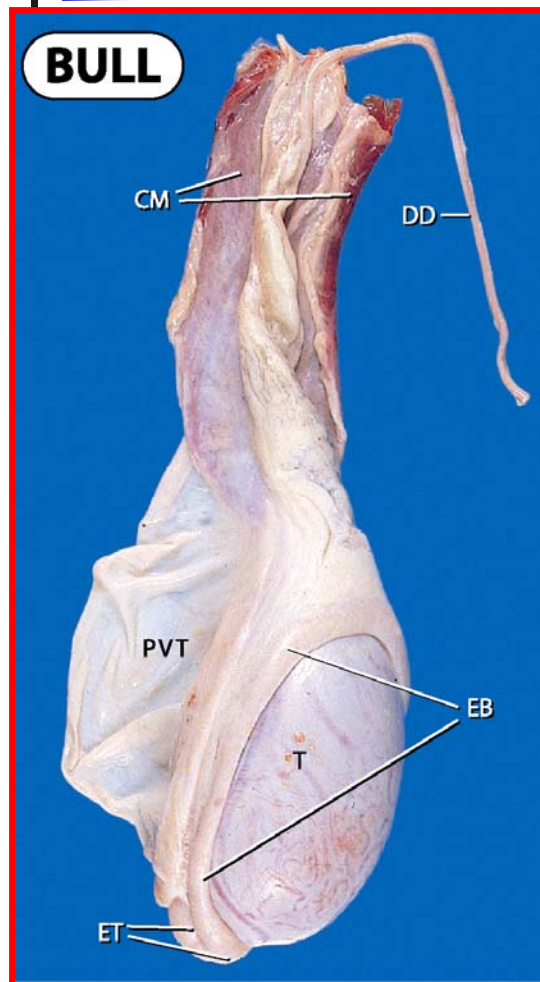


# THE REPRODUCTIVE SYSTEM OF THE BULL

- TESTICLES
- EPIDIDYMYMUS
- ACCESSORY SEX GLANDS
- PENIS



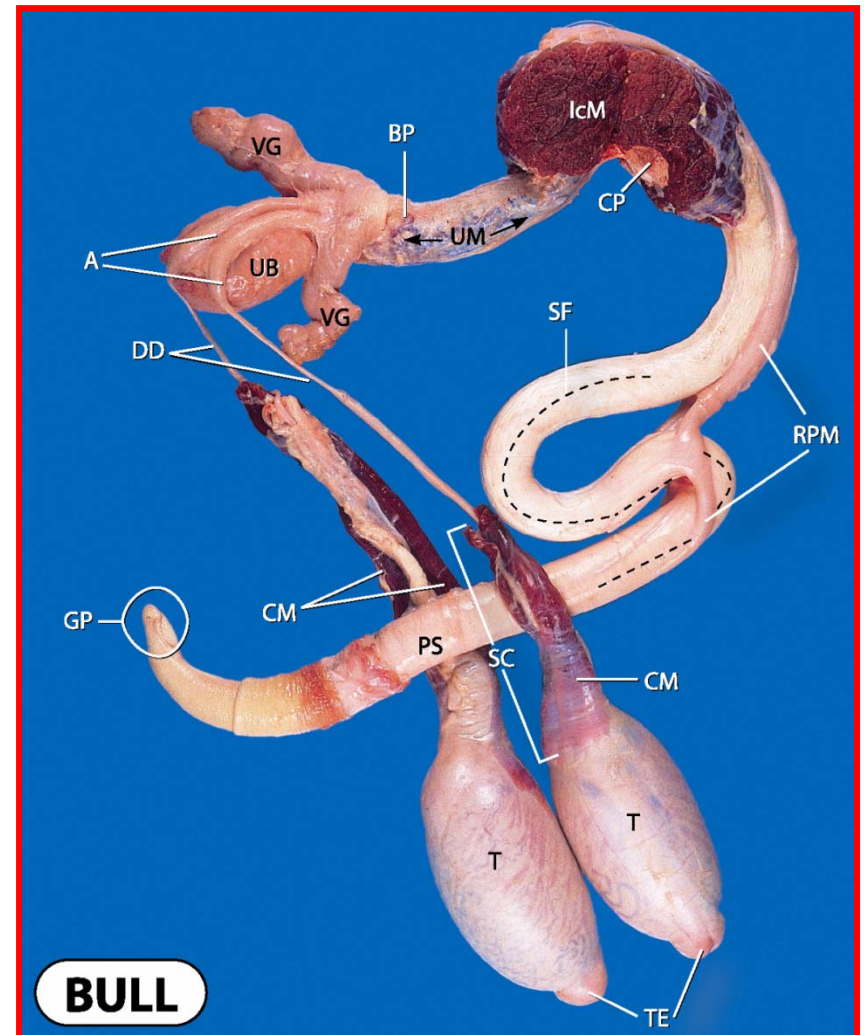
# THE TESTICLES AND EPIDIDYMYMUS

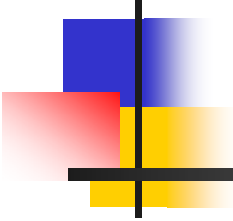


- THE TESTICLES PRODUCE SPERM AND THE MALE SEX HORMONE TESTOSTERONE
- THE EPIDIDYMYMUS IS A SMALL TUBE THAT CARRIES SPERM FROM THE TESTICLES TO THE PENIS

# THE ACCESSORY SEX GLANDS AND THE PENIS

- THE ACCESSORY SEX GLANDS PRODUCE MOST OF THE FLUID THAT IS EJACULATED
- THE PENIS DELIVERS SPERM INTO THE COW'S VAGINA





# THE SELECTION AND DEVELOPMENT OF REPLACEMENT HEIFERS

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THESE ARE YOUR GENETIC  
FUTURE!





# RETAIN 20 TO 25% OF HEIFERS AT WEANING

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- GROWTH, STRUCTURAL SOUNDNESS, FRAME SCORE
- WEANING WEIGHTS, GENETIC BACKGROUND
- OTHER THINGS AS APPROPRIATE TO YOU AND YOUR GOALS

# BREED HEIFERS TO CALVE AT 24 MONTHS OF AGE



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- HAVE HEIFERS AT 2/3 OF MATURE BODY WEIGHT BEFORE BREEDING AT 15 MONTHS OF AGE
- THIS REQUIRES THAT SHE GAIN ABOUT 1 AND  $\frac{1}{2}$  POUNDS PER DAY UP TO BREEDING
- WEIGHT GAIN SHOULD CONTINUE SO THAT THEY CALVE IN MODERATE BODY CONDITION
- HAVE HEIFERS PREGNANCY CHECKED AND CULL THE EXTRAS

# BREED HEIFERS TO CALVE EARLIER THAN THE COW HERD



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- **ALLOWS BETTER CALVING  
SUPERVISION**
- **ALLOWS MORE TIME FOR  
THEM TO START CYCLING  
AND GET BRED BACK**

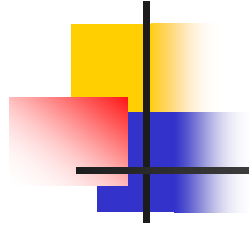


# REPLACEMENT HEIFER SELECTION

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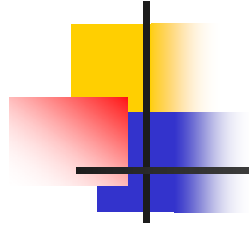
- REPRODUCTIVE TRACT SCORES
- SCROTAL CIRCUMFERENCE IN SIREs
- CALVING PROBLEMS
- PELVIC AREA
- BREED OF BULL

# REPRODUCTIVE TRACT SCORES



- RECTAL PALPATION  
AT A YEAR OF AGE
- EXAMINATION OF  
OVARIES AND  
UTERUS FOR  
MATURITY
- WEIGHING WORKS  
AS WELL

# SCROTAL CIRCUMFERENCE OF SIRE



- BIGGER TESTICLES  
MAKE MORE SPERM
- DAUGHTERS OF  
THESE BULLS REACH  
SEXUAL MATURITY  
EARLIER

# CALVING DIFFICULTIES

- LIGHTER CALVES ARE BORN EASIER THAN HEAVIER ONES AND BIGGER HEIFERS CALVE MORE EASILY THAN SMALLER ONES
- GENERALLY, USING GENETICALLY LOW BIRTH WEIGHT SIRES IS THE EASIEST WAY TO PREVENT CALVING DIFFICULTIES
- RESEARCH HAS NOT SHOWN SHAPE OF CALF TO PREDICT CALVING PROBLEMS





# MEASURING PELVIC AREA TO PREVENT DIFFICULT BIRTHS



- MEASURING THE WIDTH AND HEIGHT OF THE BIRTH CANAL
- MAY HELP TO FIND THE EXTREMELY SMALL ONES, BUT IS NOT AS HELPFUL AS USING CALVING EASE BULLS



# BREED OF BULL

- THERE IS MORE VARIATION BETWEEN BULLS THAN BETWEEN BREEDS
- HOWEVER, LOW BIRTH WEIGHT ENGLISH BREEDS MAY HAVE AN ADVANTAGE OVER CONTINENTAL BREEDS FOR USE ON HEIFERS



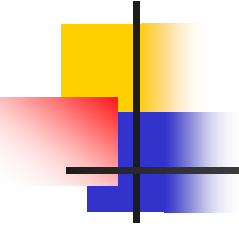


# POSTPARTUM INTERVAL

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- THE PERIOD BETWEEN CALVING AND THE ANIMAL'S FIRST HEAT
- 2 TO 4 WEEKS LONGER FOR HEIFERS THAN COWS
- DUE TO THE HEIFER'S NEED TO GROW AND GIVE MILK IN ADDITION TO MAINTAINING HERSELF.
- HEIFERS IN BCS 5 OR MORE AT CALVING WILL CYCLE EARLIER THAN THINNER ONES.

# REDUCING POSTPARTUM INTERVAL



- EARLY WEANING OF CALVES MAY NOT BE PRACTICAL
- BIOSTIMULATION
- BODY CONDITION SCORE AT MIDPREGNANCY AND FEED TO GAIN OR MAINTAIN AN ADEQUATE BCS

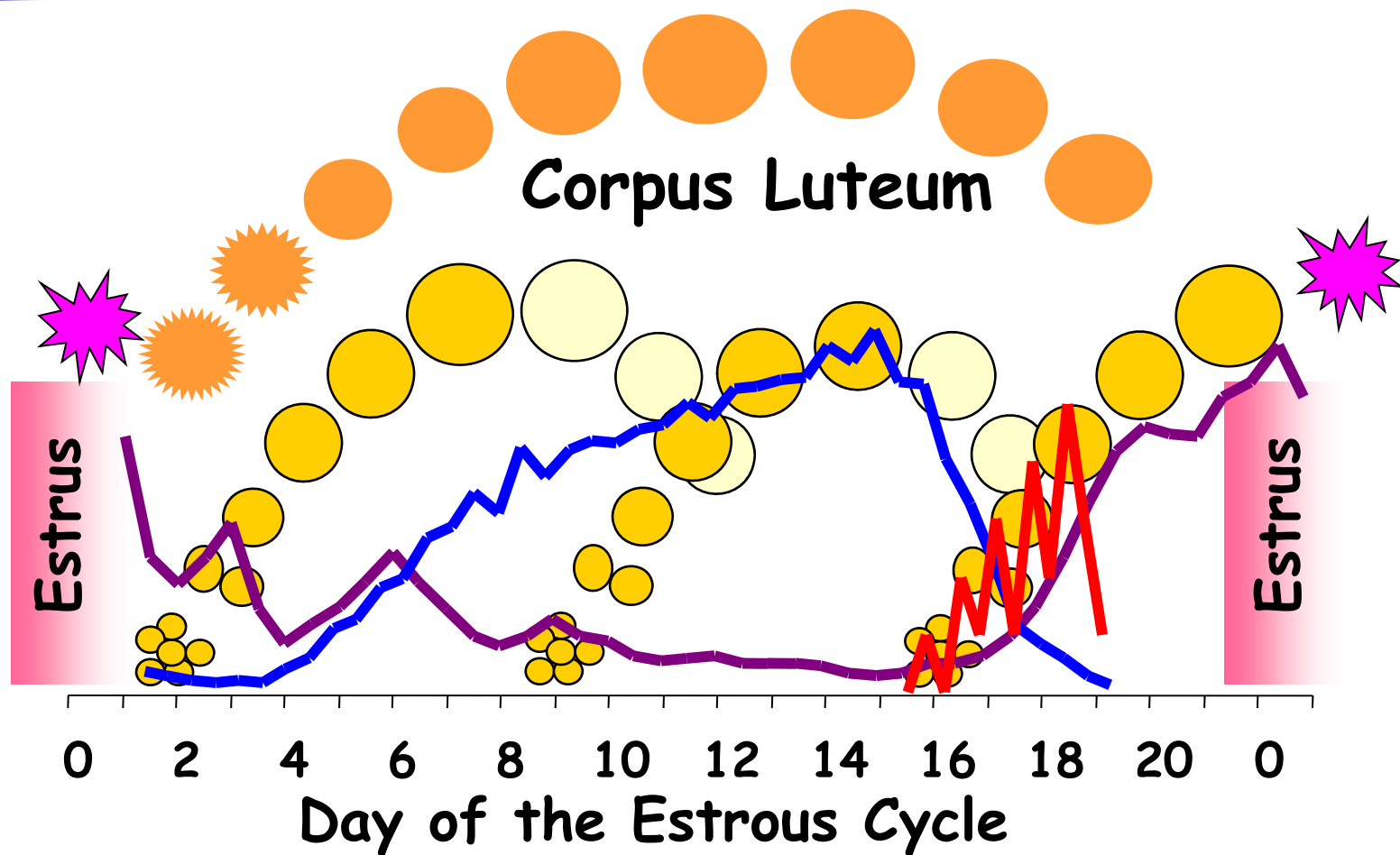
# THE ESTROUS (Heat) CYCLE OF THE COW



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A REGULAR SERIES OF REPRODUCTIVE  
EVENTS WHERE THE COW IS RECEPTIVE  
TO MATING AT THE SAME TIME THAT  
SHE IS MOST LIKELY TO BECOME  
PREGNANT

# Physiology of the Estrous Cycle





# FACTS ABOUT THE COW'S REPRODUCTIVE CYCLE

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- THE CYCLE IS NOT AFFECTED BY SEASON OR WEATHER
- NORMALLY, LASTS AN AVERAGE OF 21 DAYS (16 TO 24 days)
- HEIFER'S CYCLE IS ABOUT A DAY SHORTER THAN COW'S
- COWS ARE SEXUALLY RECEPTIVE FOR AN AVERAGE OF ABOUT 12 HOURS (6 TO 30)



# HEAT DETECTION IN COWS

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- FOR AI OR TO MAKE SURE NATURALLY BRED COWS ARE GETTING PREGNANT
- THE BEST SIGN OF HEAT IS A COW STANDING STILL TO BE MOUNTED BY ANOTHER COW
- OTHER SIGNS INCLUDE BELLOWING, MUCOUS DISCHARGE, NERVOUSNESS, AND MOUNTING OTHERS



# SYSTEMS OF HEAT DETECTION

- VISUAL OBSERVATION FOR FOR 20 MINUTES OR MORE TWICE A DAY OR MORE
- HEAT PATCHES
- TEASER BULLS, STEERS OR COWS







# COW PREGNANCY FACTS

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- PREGNANCY LASTS AN AVERAGE OF 282 DAYS BUT CAN NORMALLY VARY FROM 265 TO 300 DAYS
- PREGNANCY TESTING IS A COST EFFECTIVE WAY TO KNOW WHO WILL NOT HAVE A CALF AND CAN BE DONE AS EARLY AS 35 DAYS AFTER BREEDING. MORE COMMONLY IT IS DONE 45 TO 60 DAYS AFTER THE END OF THE BREEDING SEASON

# ABORTION IN THE COW

- 2 TO 5 PERCENT OF PREGNANCIES ARE LOST IN NORMAL COWS
- DIAGNOSING ABORTION REQUIRES THE AID OF A DIAGNOSTIC LAB



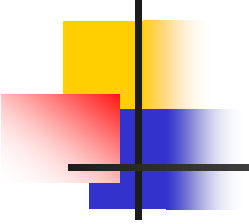


# BODY CONDITION SCORING OF CATTLE

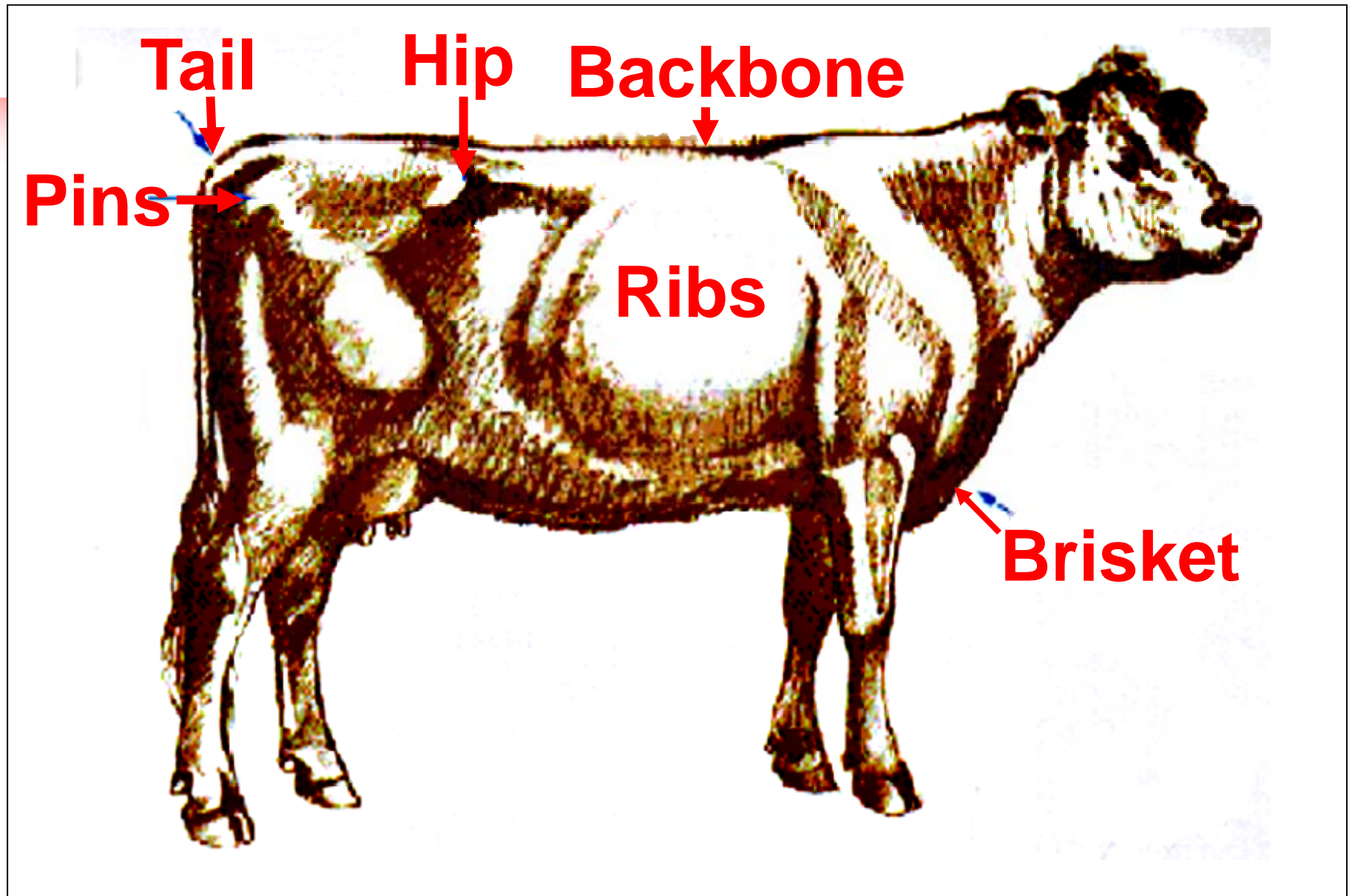
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- AN ADEQUATE BODY CONDITION SCORE (BCS) IS REQUIRED FOR THE COW TO CYCLE AND GET PREGNANT AS SOON AS SHE CAN AFTER CALVING
- COWS CAN BE BODY CONDITION SCORED:
  - BEFORE CALVES ARE WEANED OR AT WEANING
  - AT MID PREGNANCY
  - AT CALVING

# STEPS IN BODY CONDITION SCORING CATTLE

- 
- VIEW THE ANIMAL FROM THE FRONT, THE SIDES AND THE REAR
  - LOOK TO SEE IF THE ANIMAL LOOKS BONY OR SMOOTH
  - LOOK AT THE BRISKET, THE RIBS AND THE TAILHEAD FOR SIGNS OF FAT
  - IF YOU CAN SEE RIBS THE ANIMAL IS LIKELY TOO THIN, THOUGH SOME WILL BE FAT EVERYWHERE BUT OVER THE RIBS

# Body Condition Scoring





BCS 1 -4  
(THIN)

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THESE WILL BE SLOW TO  
CYCLE AFTER CALVING

# BCS 1



- BONES ARE SHARP TO THE TOUCH
- NO BODY FAT FOUND
- COW IS EMACIATED AND WEAK
- MAY NOT BE ABLE TO GET UP IF SHE LAYS DOWN



# BCS 2



- LITTLE EVIDENCE OF BODY FAT
- SEVERE MUSCLE LOSS
- SPINOUS PROCESS FEEL SHARP AND CAN EASILY BE SEEN
- COW IS NOT WEAK



# BCS 3



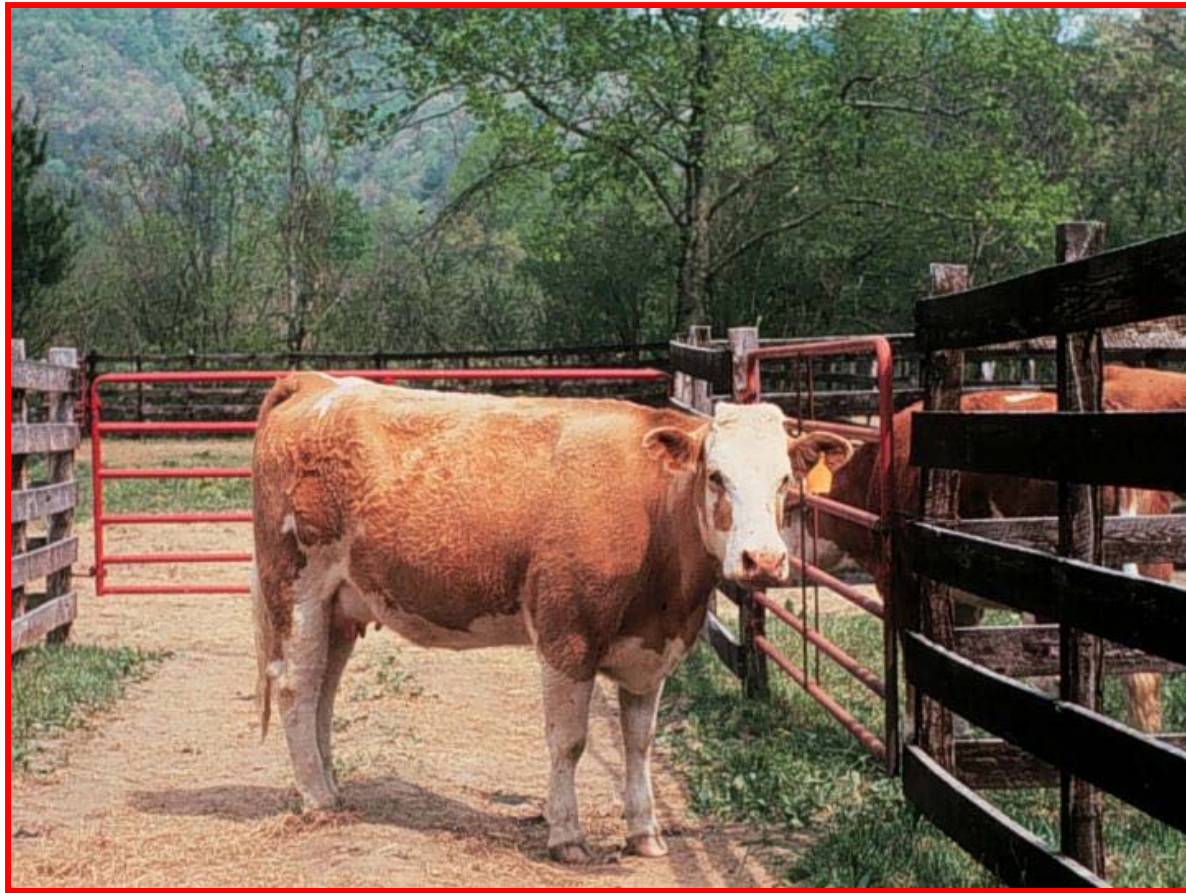
- A LITTLE FAT COVER OVER LOIN , BACK AND FORERIBS
- BACKBONE IS VISIBLE ABOVE HIDE
- INDIVIDUAL BACKBONES NOT VISIBLE

# BCS 4



- FORERIBS CANNOT BE SEEN
- LAST 2 RIBS CAN BE SEEN
- INDIVIDUAL PARTS OF BACKBONE CAN BE FELT BUT NOT SEEN
- ADEQUATE MUSCLING OF HIND QUARTERS

**IF YOU CAN SEE 2 OR MORE RIBS,  
THE COW WILL BE SLOW TO CYCLE  
AND BECOME PREGNANT**





## BCS 5, 6 AND 7 (JUST RIGHT)

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IT TAKES ABOUT 70  
POUNDS WEIGHT GAIN TO  
MOVE FROM ONE BODY  
CONDITION SCORE TO  
ANOTHER



# BCS 5

- RIBS AND BACKBONE CANNOT BE SEEN AND CAN ONLY BE FELT WITH FIRM PRESSURE
- AREAS ON EITHER SIDE OF THE TAIL HEAD WELL FILLED



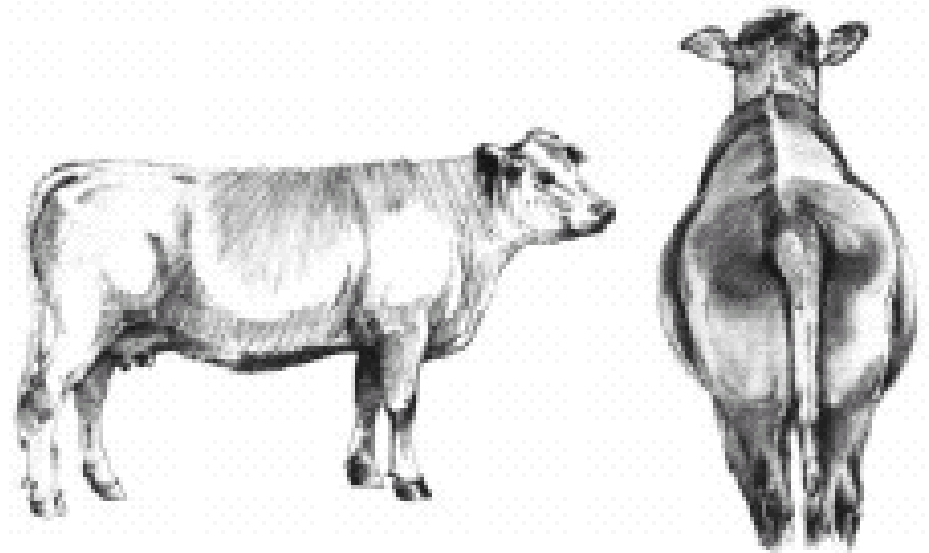
# BCS 6

- RIBS NOT SEEN AND HARD TO FEEL
- HINDQUARTER PLUMP AND FULL
- SPONGINESS TO COVERING OF FORE RIBS AND BESIDE TAIL



# BCS 7

- ENDS OF THE SPINOUS PROCESS CAN ONLY BE FELT WITH VERY FIRM PRESSURE
- ABUNDANT FAT ON EITHER SIDE OF TAIL HEAD
- COW APPEARS IN VERY GOOD FLESH





**COWS SHOULD CALVE IN BCS  
5 AND HEIFERS IN BCS 6**





## BCS 8 AND 9 (FAT)

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THESE COWS MAY BE  
INEFFICIENT, NOT  
PREGNANT OR DID NOT  
CALVE LAST YEAR

# BCS 8

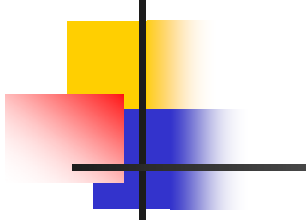


- ANIMAL HAS A SMOOTH, BLOCKY APPEARANCE
- BONES ARE HARD TO SEE AND FEEL ANYWHERE
- THIS ANIMAL WOULD BE CONSIDERED OBESE

# BCS 9



- FAT EVERYWHERE WITH TAILHEAD BURIED IN FAT
- ANIMALS ABILITY TO MOVE AROUND MAY BE IMPAIRED



**Break Time!!!**

# Why a Defined Calving Period?



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- ✓ Uniformity in age (size?)
- ✓ Improve Marketing Potential
- ✓ Reduce "Year-a-Round" Labor!
- ✓ Aid in Herd Health Management
- ✓ Nutritional Management (Pastures)
- ✓ Did I say increase \$\$\$?

# Where do I start?

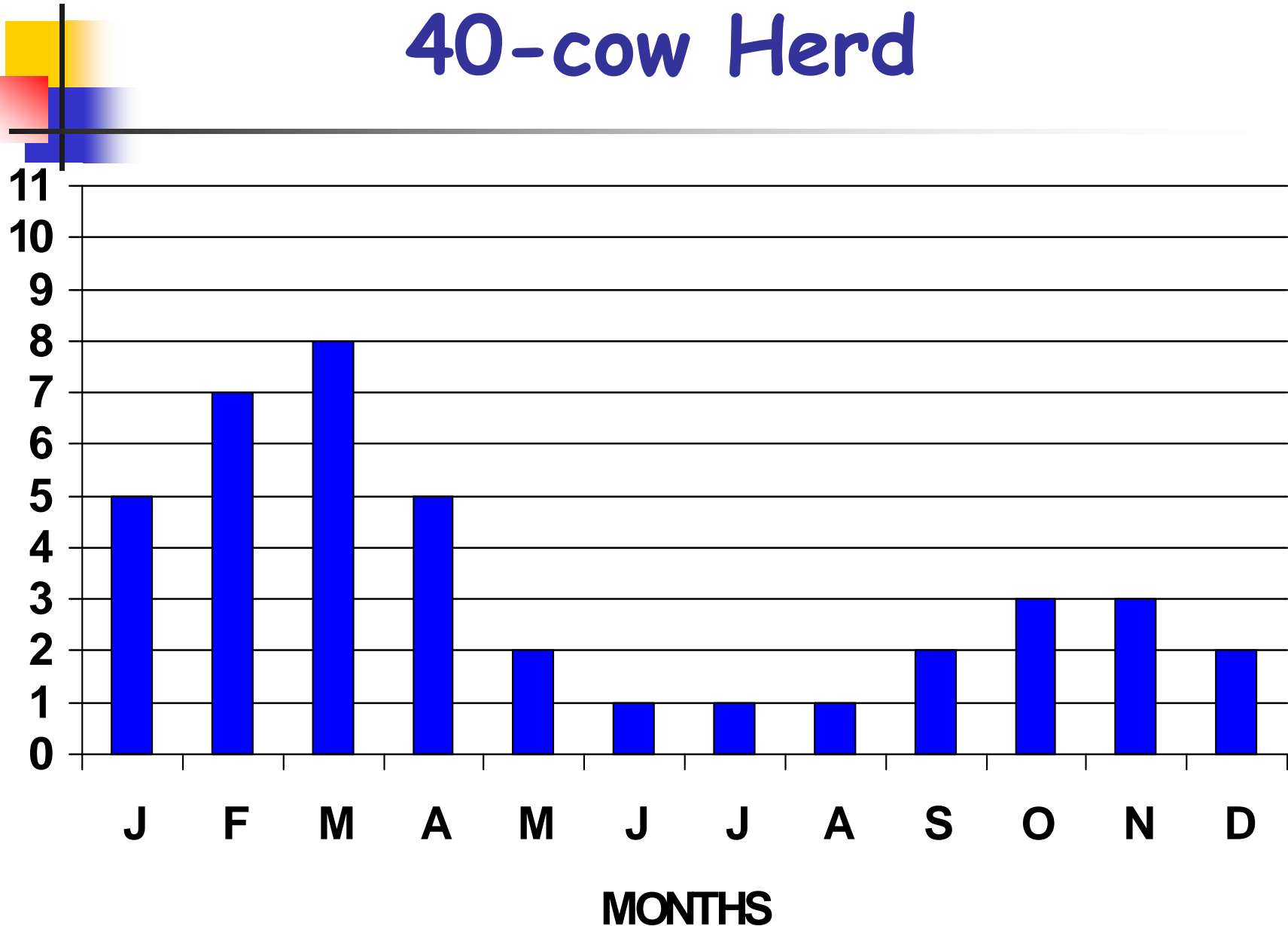


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- ✓ Marketing Date
  - ❖ One or Two or Three or ???
- ✓ Commit to Culling
  - ❖ Pregnancy Check (facilities)
- ✓ Replacement Heifers
- ✓ The BULL (where do I put him?)



# Distribution Of Calving Of A 40-cow Herd



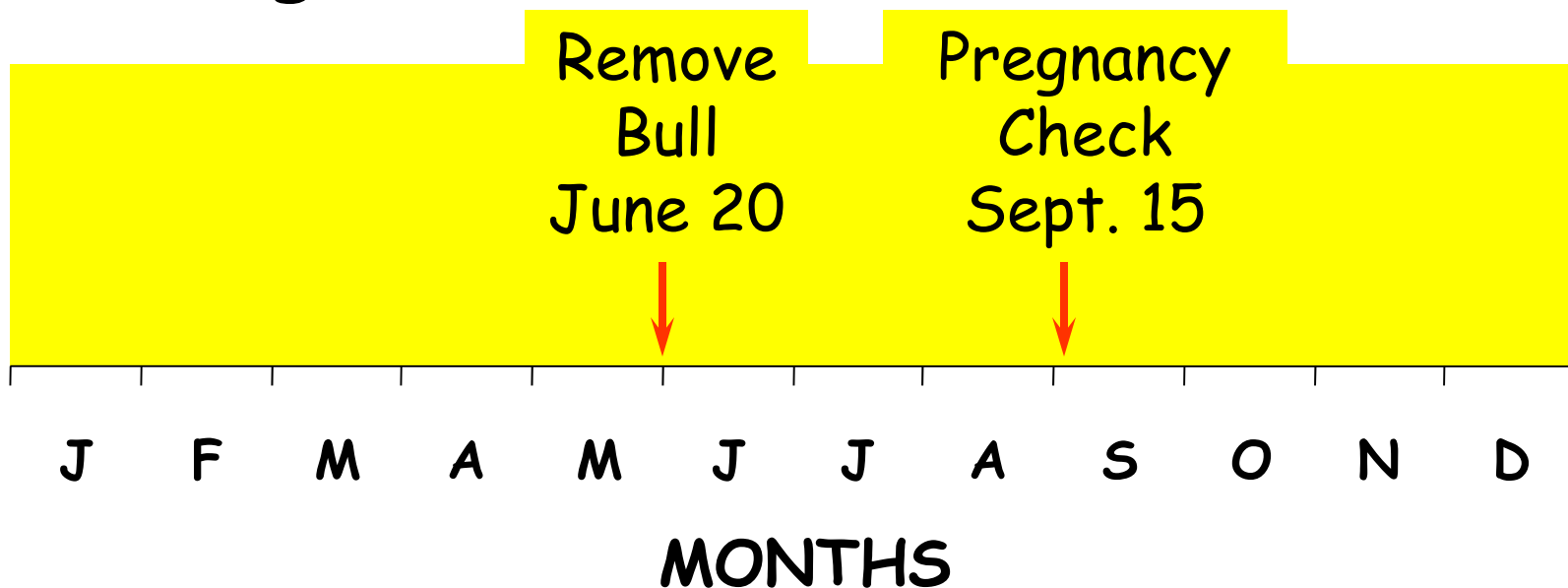
# Where do I start?

Changing From Year Round Calving to  
January, February, March

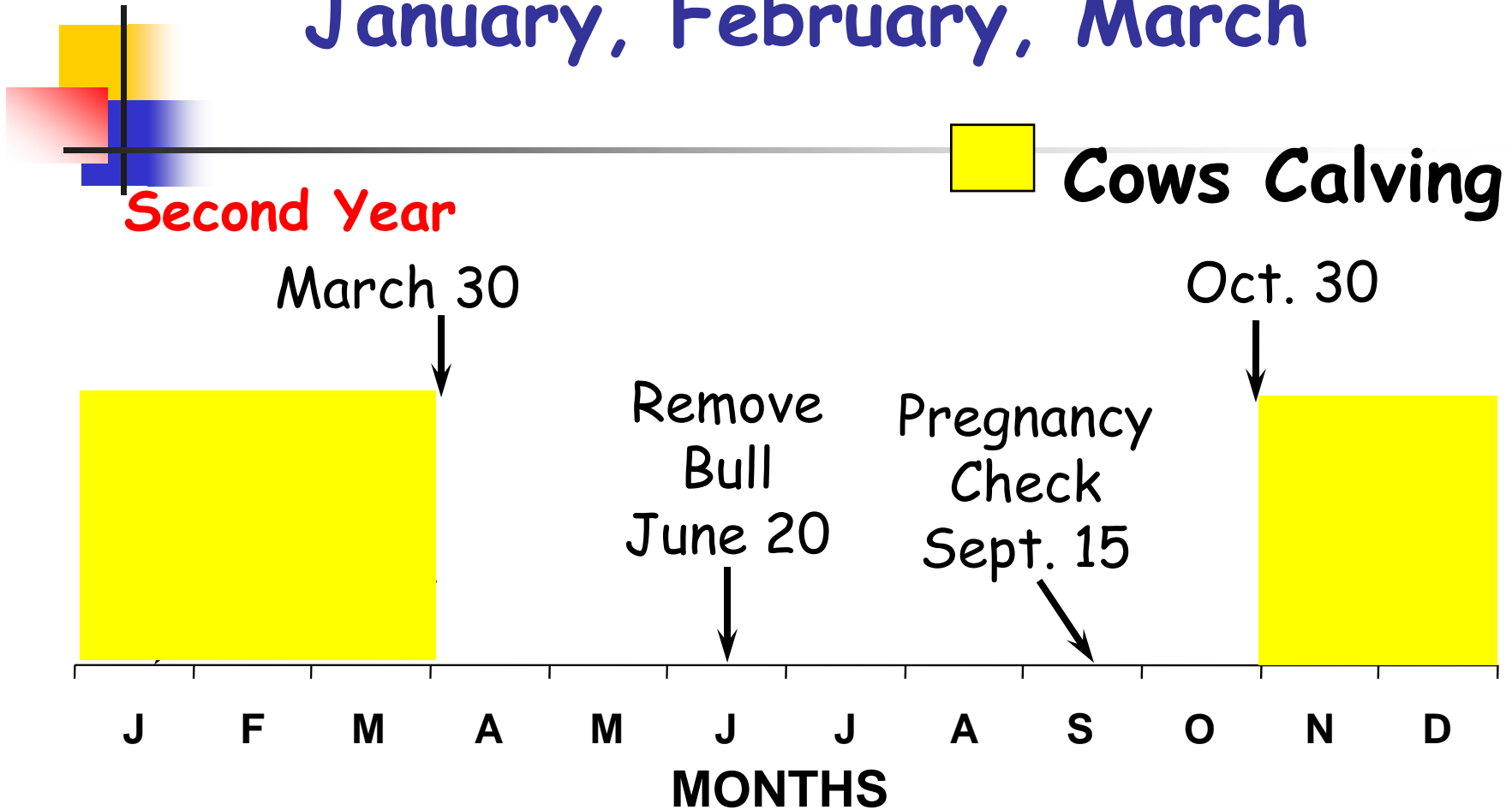
Year One

 Cows Calving

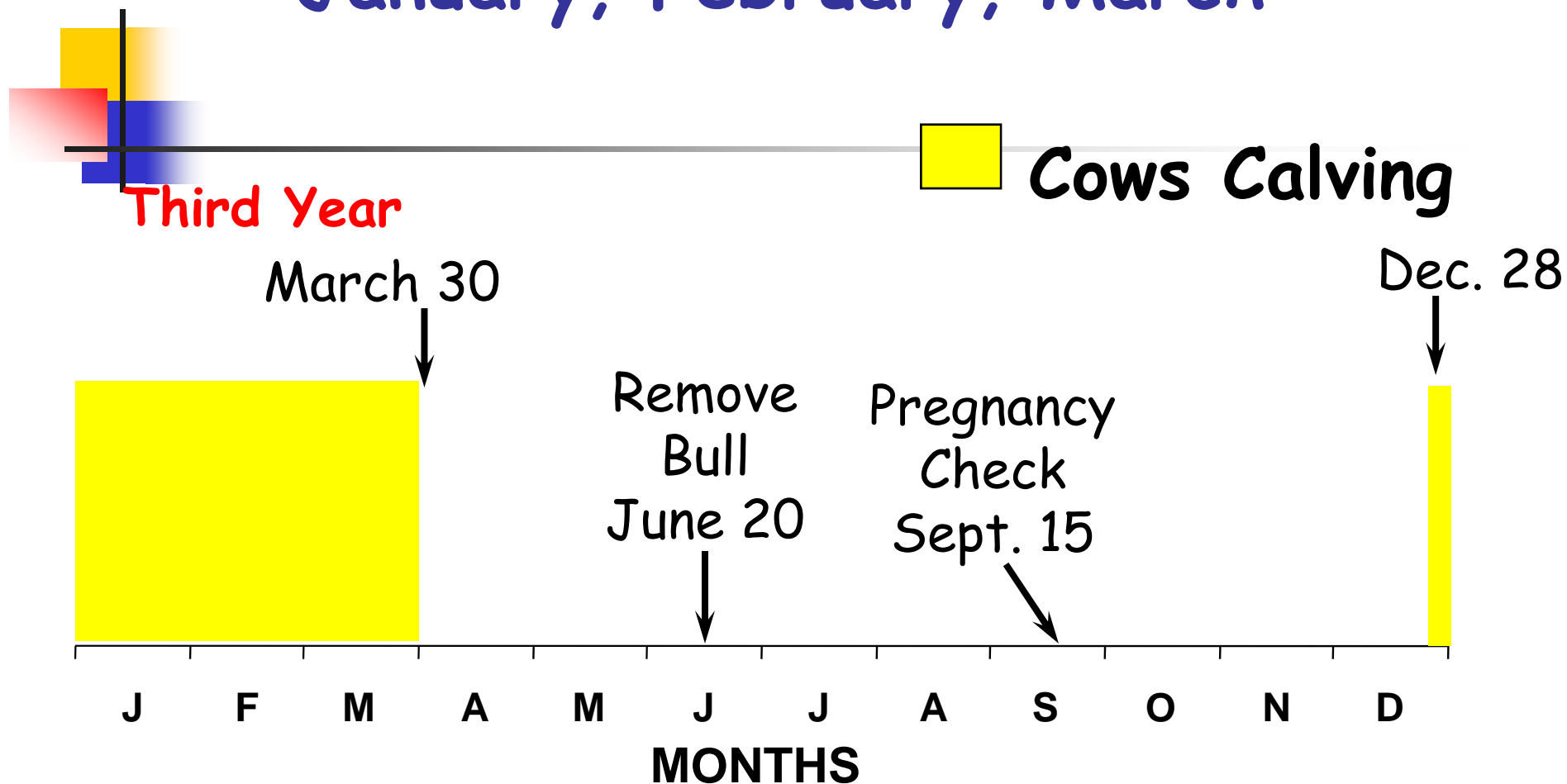
Calving Year Round



# Changing From Year Round Calving to January, February, March



# Changing From Year Round Calving to January, February, March





# SELECTION FOR REPRODUCTION

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- THE HERITABILITY OF REPRODUCTIVE TRAITS IS LOW AND CHANGES IN REPRODUCTIVE EFFICIENCY ARE MOST EASILY MADE BY MANAGEMENT CHANGES OR CROSSBREEDING
- HOWEVER, OVER TIME, PROGRESS CAN BE MADE BY SELECTING AND CULLING FOR REPRODUCTION

# CULLING FOR REPRODUCTIVE REASONS



- THE MOST POWERFUL TOOL IS TO CULL HEIFERS NOT BECOMING PREGNANT IN A CYCLE OR 2 (45-60 days) AND COWS NOT BECOMING PREGNANT SOON ENOUGH TO HAVE A CALF A YEAR



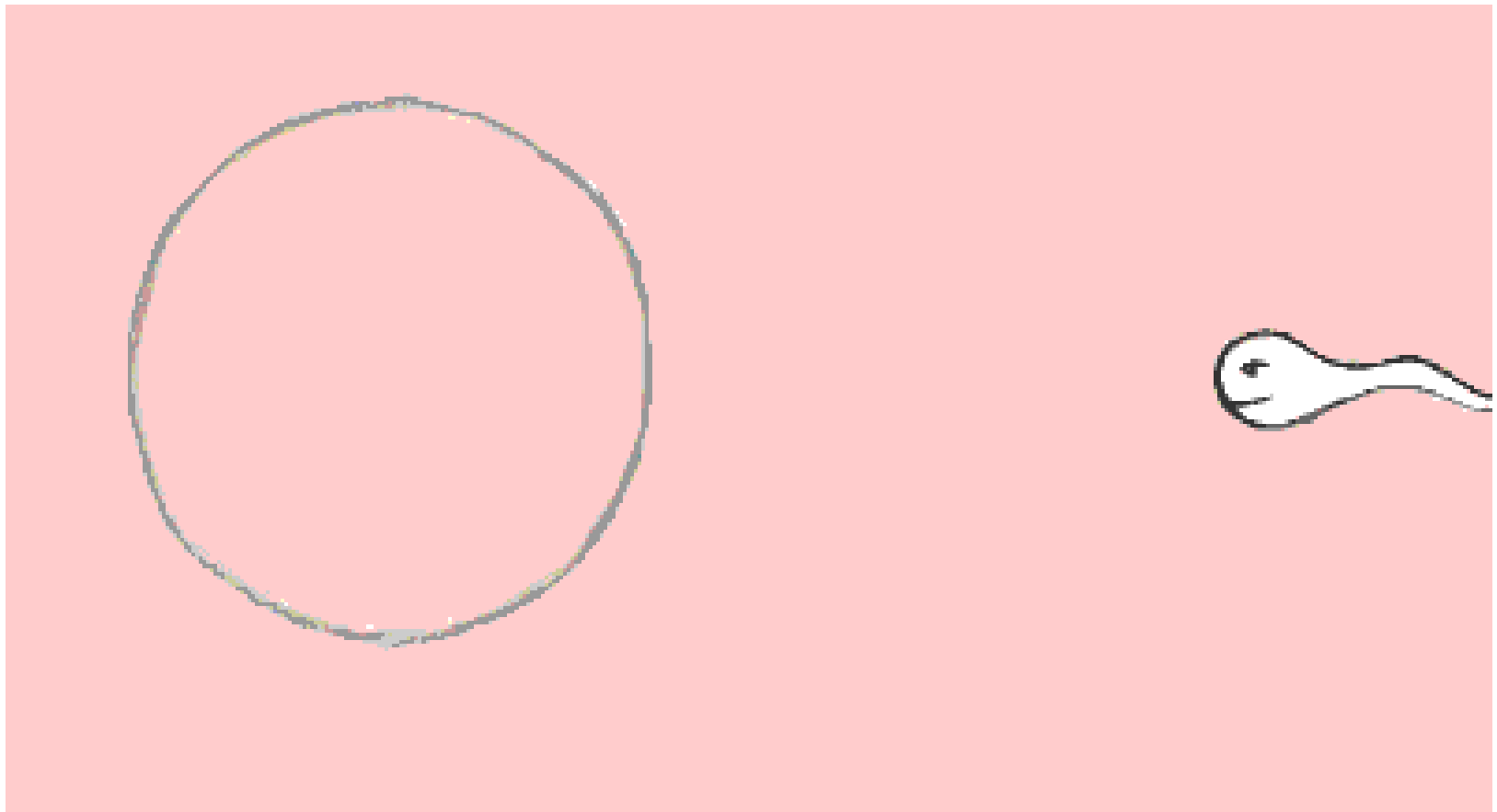


# THE EFFECTS OF EXTREME SELECTION FOR OTHER TRAITS ON REPRODUCTION

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- SELECTING FOR EXTREME GROWTH MAY RESULT IN LARGER MATURE SIZE AND OLDER AGE AT PUBERTY. CALVES MAY BE HEAVIER AT BIRTH.
- SELECTING FOR MILK PRODUCTION WITHOUT ADEQUATE FEED SUPPLIES TO SUPPORT IT MAY RESULT IN LONGER INTERVAL TO CALVING
- SELECTION FOR CERTAIN CARCASS TRAITS MAY RESULT IN LATER SEXUAL MATURITY

# What about the Bulls!!!





# BREEDING SOUNDNESS EVALUATION OF BULLS

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- ABOUT 20% OF BULLS HAVE A PROBLEM THAT REDUCES THEIR FERTILITY
- IF A BULL BREEDS A COW AND SHE FAILS TO BECOME PREGNANT THAT CYCLE DUE TO A BULL PROBLEM, THE CALF WILL BE BORN 21 DAYS LATER AND WEIGH 30+ POUNDS LESS AT WEANING AND SALE

# WHAT IS A BREEDING SOUNDNESS EVALUATION?



- A BSE IS A SYSTEMATIC VETERINARY EXAMINATION OF THE BULL RESULTING IN A PREDICTION OF HIS POTENTIAL FERTILITY



# BSE FACTS

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- BEST DONE 30 TO 60 DAYS BEFORE USE
- OFTEN DONE AFTER A PROBLEM IS NOTED
- A BSE IS NOT:
  - A FERTILITY CHECK
  - JUST A SPERM CHECK
  - A MEASURE OF SEXUAL DESIRE
  - A PERFECT SYSTEM

# PARTS OF A COMPLETE BSE



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- PHYSICAL EXAM-IF THE BULL DOESN'T MATE, SEMEN QUALITY DOESN'T MATTER
- EXAM OF THE REPRODUCTIVE SYSTEM-IF THE PARTS AREN'T THERE OR ARE NOT NORMAL, HE HAS A PROBLEM
- SEMEN ANALYSIS - THERE MUST BE ENOUGH SPERM ALIVE AND NORMAL FOR AN OPTIMUM PREGNANCY RATE





# PHYSICAL EXAM



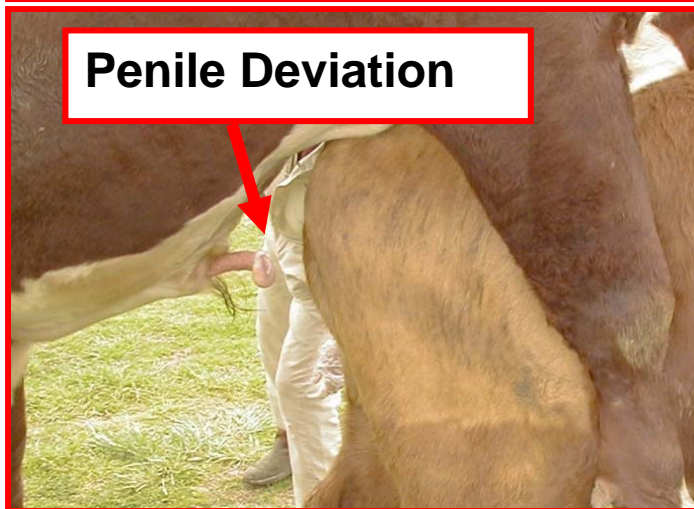
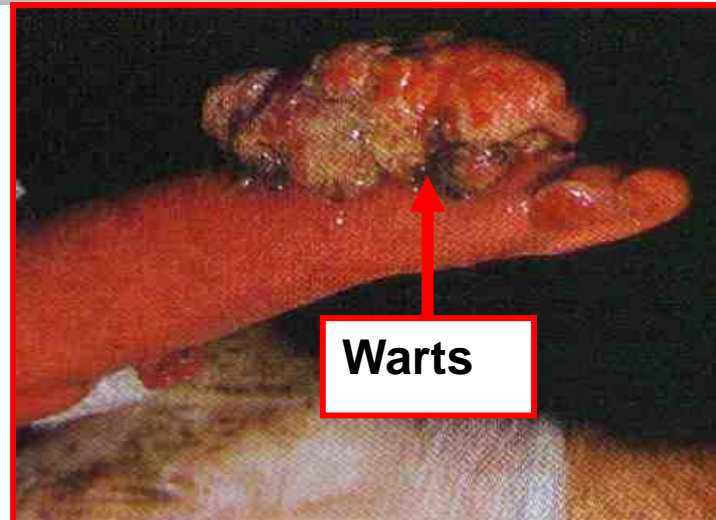
- **STRUCTURE AND GAIT**
- **BODY CONDITION**
- **VISION**
- **ANYTHING THAT AFFECTS THE BULLS GENERAL HEALTH WILL AFFECT HIS FERTILITY**

# EXAM OF THE REPRODUCTIVE SYSTEM

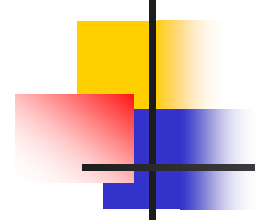
- PENIS PROBLEMS
- MISSING PARTS
- INFECTIONS
- \*SCROTAL CIRCUMFERENCE MEASUREMENT



# Reproductive Problems in Bulls



# SCROTAL CIRCUMFERENCE MEASUREMENT



- MEASURES SPERM OUTPUT
- MEASURE AT WIDEST WIDTH AND SNUGGLY
- MINIMUMS:
  - 30CM AT 12-15 MO
  - 31CM AT 15-18 MO
  - 32CM AT 18-21 MO
  - 33CM AT 21-24 MO
  - 34CM AT 24+ MO





# SEMEN ANALYSIS

- MOTILITY IS % MOVING AND THE MINIMUM FOR BULLS IS 30%
- MORPHOLOGY IS SHAPE AND FORM AND 70% SHOULD BE NORMAL





# CLASSIFICATION OF BULLS

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- UNSATISFACTORY MEANS SOMETHING WAS FOUND THAT WOULD AFFECT POTENTIAL FERTILITY
- SATISFACTORY MEANS THAT NOTHING WAS FOUND THAT WOULD AFFECT POTENTIAL FERTILITY
- CLASSIFICATION DEFERRED MEANS THAT SOMETHING WAS FOUND THAT MAY IMPROVE WITH TIME OR MATURITY AND A RECHECK AT A LATER DATE IS RECOMMENDED





# CARING FOR THE YEARLING BULL

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- BULLS ARE RESPONSIBLE FOR MOST GENETIC PROGRESS IN THE HERD AND HALF OF ALL REPRODUCTIVE SUCCESS OR FAILURE
- MOST BULLS ARE PURCHASED AS YEARLINGS AND THEIR PROPER CARE IS ALL IMPORTANT FOR A GOOD START IN THEIR BREEDING LIFE



# THE THREE BASIC PERIODS OF BULL MANAGEMENT

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- PREBREEDING OR CONDITIONING PERIOD-2 MONTHS
- BREEDING SEASON-2 OR 3 MONTHS
- POST-BREEDING SEASON-7 OR 8 MONTHS

# PRE-BREEDING OR CONDITIONING MANAGERMENTS



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- GIVE BULLS TIME TO OVERCOME STRESS OF TRANSPORT AND ADAPT TO NEW ENVIRONMENT
- HAVE A BREEDING SOUNDNESS EXAM DONE
- PROVIDE HEALTH CARE SUCH AS VACCINATIONS AND DEWORMING
- ADJUST FEEDING AND PROVIDE EXERCISE SO THAT THE BULL ENDS UP IN A BODY CONDITION SCORE OF 5



# BREEDING SEASON MANAGEMENT

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- BULL TO FEMALE RATIO
- FEEDING MANAGEMENT
- CHECKING HEATS IN THE COWS

# BULL TO FEMALE RATIO

- VARIES WITH NATURE OF PASTURE, THE BULL'S AGE AND CONDITION, AND LENGTH OF THE BREEDING SEASON AND OTHERS
- "ONE FEMALE PER MONTHS OF THE BULL'S AGE UP TO 36" IS A USEFUL RULE OF THUMB



# BULL FEEDING MANAGEMENT

- BULLS CAN LOSE UP TO 3 LBS A DAY DURING THE BREEDING SEASON, SO PROPER BODY CONDITION BEFORE THE SEASON STARTS IS VITAL.

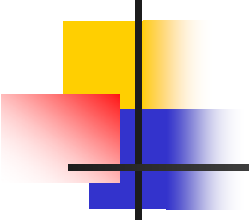




# HEAT CHECKING COWS



- THIS IS A GOOD WAY TO MONITOR THE BULLS REPRODUCTIVE SUCCESS
- RECORD COW HEATS. THEY SHOULD OCCUR HALF AS FREQUENTLY THE 2<sup>ND</sup> 21 DAYS



# POST-BREEDING MANAGEMENT OF BULLS

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- RESTORE BODY CONDITION, IF NECESSARY
- ALLOW CONTINUED GROWTH TOWARDS MATURE SIZE
- PREVENT INJURY



# MATING BEHAVIOR IN BULLS

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- MATING BEHAVIOR IS PARTLY INHERITED AND PARTLY LEARNED
- SEX DRIVE VARIES A LOT AND ABOUT 8% OF BULLS HAVE SEX DRIVES LOW ENOUGH TO EFFECT PREGNANCY RATES



# FACTORS EFFECTING SEX DRIVE IN BULLS

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- GENETICS
- AGE-YOUNGER BULLS ARE LESS EFFICIENT BUT ARE OFTEN MORE INTERESTED
- BREED OF BULL
- CHANGE IN ENVIRONMENT
- NEARBY SEXUAL ACTIVITY
- DISEASE
- BODY CONDITION



# IDENTIFYING COWS IN HEAT

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- ALL MALE MAMMALS USE A COMBINATION OF SENSES TO IDENTIFY POTENTIAL MATES
- SEEING MOUNTING ACTIVITY SEEMS TO BE THE MOST IMPORTANT ONE IN BULLS IN MOST SITUATIONS
- TOUCH, SOUND AND SMELL ARE ALSO USED

# THE MATING PROCESS



- AN AROUSED WILL BULL ATTEMPT TO MOUNT ANYTHING THAT LOOKS LIKE A COW'S REAR END
- USUALLY A COUPLE OF FALSE MOUNTS PRECEDES THE TRUE MOUNT
- THE NERVES IN THE BULLS PENIS FIND THE WARM AND MOIST VULVA.
- THE BULL THRUSTS AND INSERTS HIS PENIS
- EJACULATION OCCURS A COUPLE OF SECONDS LATER
- THE BULL WILL LIKELY NOT WANT TO MATE AGAIN FOR  $\frac{1}{2}$  HOUR



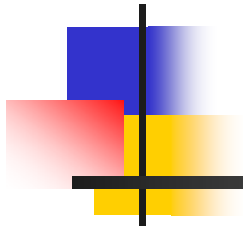


# THE EFFECT OF DOMINANCE

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- WHEN MORE THAN ONE BULL IS WITH A HERD, ONE IS LIKELY DOMINANT
- THIS BULL IS USUALLY THE OLDEST AND BIGGEST
- HE WILL LIKELY BE RESPONSIBLE FOR MOST BREEDING AND PREGNANCIES AND BUT MAY EXHAUST HIMSELF KEEPING OTHER BULLS FROM MATING

# ARTIFICIAL INSEMINATION IN THE COW



**CALVES FROM BETTER BULLS  
BUT WITH MORE WORK!**



# ADVANTAGES OF AI

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- WIDER AND CHEAPER USE OF BETTER BULLS
- FASTER GENETIC PROGRESS
- BETTER RECORDS

# DISADVANTAGES OF AI



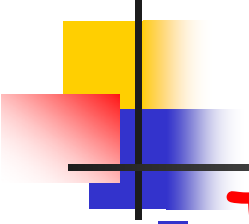
- **DISADVANTAGES**
  - **LOWER PER SERVICE CONCEPTION RATE THAN BULLS**
  - **NEED FOR ESTRUS SYNCHRONIZATION OR HEAT DETECTION**
  - **NEED FOR TRAINING, PRACTICE AND EQUIPMENT**



# ESTRUS SYNCHRONIZATION

---

IN HEAT ALL AT ONCE!  
(SORT OF)

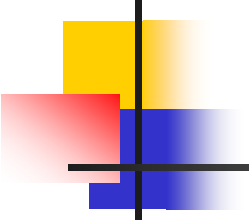


# ESTRUS SYNCHRONIZATION

---

- THE USE OF HORMONES OR OTHER MEANS TO CAUSE FEMALES TO REACH HEAT AT ABOUT THE SAME TIME.
- ES IS USED MOSTLY WITH AI PROGRAMS.
- WITH SOME SCHEMES FEMALES MAY BE BRED AT A FIXED TIME.

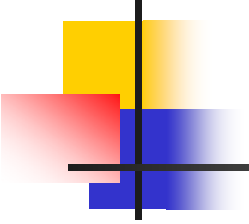




# ESTRUS SYNCHRONIZATION

---

- SEVERAL PROGRAMS AVAILABLE  
(EXAMPLES AND SCENARIOS FOLLOW)
- SELECT THE ONE THAT FITS YOUR  
SITUATION AND PROGRAM NEEDS.
- TALK WITH YOUR EXTENSION  
PERSONNEL, SEMEN SALESPERSON, OR  
VETERINARIAN BEFORE STARTING.



# ESTRUS SYNCHRONIZATION

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## ■ ADVANTAGES

- MORE CONCENTRATED CALVING
- LESS TIME SPENT AT HEAT DETECTION

## ■ DISADVANTAGES

- DRUG EXPENSE AND LABOR
- MANAGEMENT AND FACILITIES NEEDED
- GOOD BODY CONDITION AND CYCLING NEEDED FOR BEST RESULTS



# ES PROGRAMS USING PROSTAGLANDINS

---

- ANIMALS MUST BE CYCLING
- WORKS WITH COWS AND HEIFERS
- FIXED TIME BREEDING IS NOT USUALLY RECOMMENDED
- PROSTAGLANDINS (Lutalyse, Estrumate, EstroPLAN) ARE AVAILABLE BY PRESCRIPTION ONLY AND ARE GIVEN BY INJECTION

# Prostaglandins

"One Shot Method"



(1)

PG

Insert Bull\*

0

Heat  
Detect/  
Breed AI

5

Heat  
Detect/  
Breed AI

10

# Prostaglandins

## "Two Shot Method - Modified"

(3)

PG

PG

Insert Bull\*

0

Heat  
Detect/  
Breed AI

11-14

Heat  
Detect/  
Breed AI

16-19



# SYSTEMS USING PROGESTERONE AND LIKE COMPOUNDS



---

- THESE PRODUCTS (MGA, CIDR) MAY CAUSE SOME FEMALES NEARLY READY TO BEGIN CYCLING THOUGH THEIR FERTILITY WILL BE LOWER
- CAN BE USED WITH COWS AND HEIFERS
- FIXED TIME BREEDING IS POSSIBLE WITH CERTAIN COMBINATIONS
- PROGESTERONES ARE NOT PRESCRIPTION DRUGS

# MGA + Prostaglandins

Feed  
MGA\*

End  
MGA

Inject  
PG

Insert Bull\*

0

14

31

36

DO NOT BREED!

Heat Detect/  
Breed AI



\* 0.5 mg/hd/d





# CIDR INTRAVAGINAL DEVICES



- CIDR'S ARE EASY TO USE
- THE CIDR IS PUT IN THE COW'S VAGINA
- ON THE 7<sup>TH</sup> DAY THE CIDR IS REMOVED and THE COW IS GIVEN AN INJECTION OF PROSTAGLANDIN.
- COWS ARE BRED ON DETECTED HEAT



# "SYNCH" PROGRAMS

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- USE THE HORMONES GnRH AND PROSTAGLANDIN
- WORK WITH COWS BETTER THAN HEIFERS
- SOME ANIMALS WILL BE INDUCED TO CYCLE
- BOTH PRODUCTS ARE AVAILABLE BY PRESCRIPTION ONLY

# The Sync Programs

## "Select Sync"

GnRH

PG

Insert Bull\*

0

7

12

Heat Detect/  
Breed AI



# The Sync Programs

"Co-Sync"



GnRH

PG

GnRH

Insert Bull\*

0

7

9

Time Breed  
@ Injection



# The Sync Programs

## "Ov-Sync"



GnRH

PG

GnRH

Insert Bull\*

0

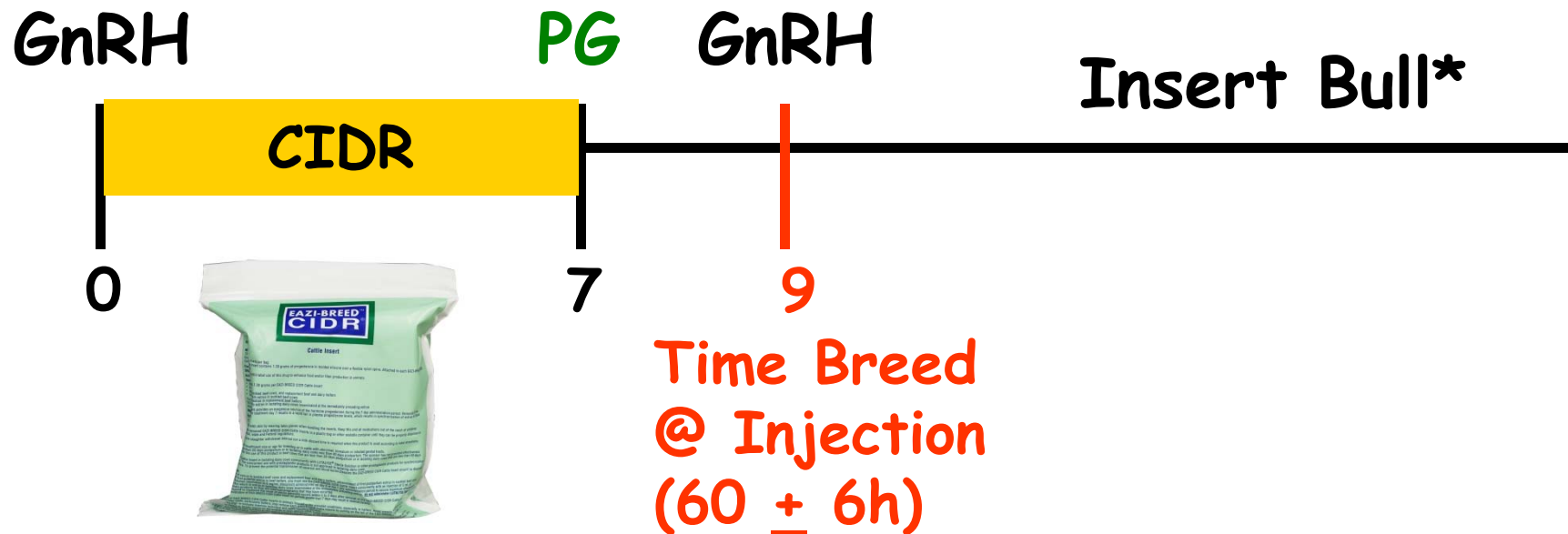
7

9

Time Breed 16 h  
after GnRH



# "Co-Sync with CIDR" for Timed AI

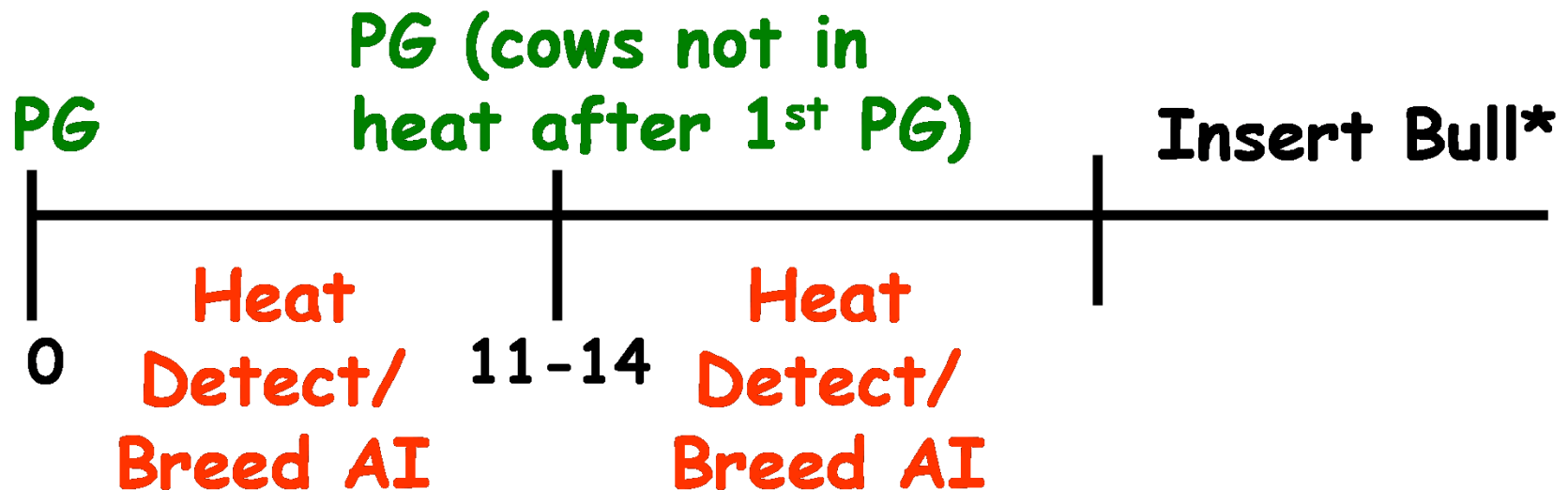


Works especially well in 1<sup>st</sup> and 2<sup>nd</sup> Calvers and "Late" Cows

# Which Sync Protocol should I USE?

Semen Expensive, Can Heat Check and AI

## "Two Shot Method - Modified"



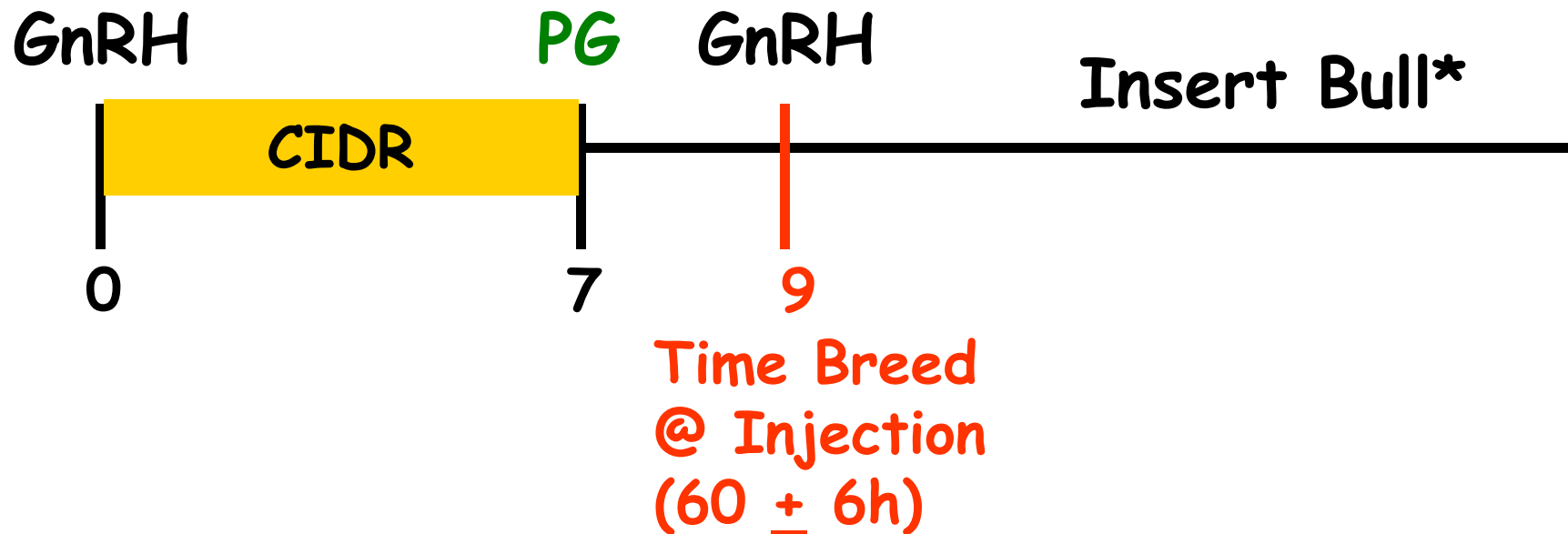
Cows in good body condition!!!



# Which Sync Protocol should I USE?

Semen Inexpensive, Can NOT Heat Check or AI

“Co-Sync with CIDR” for Timed AI



Unsure of Cow Reproductive Status!!!



# EMERGING TECHNOLOGIES IN CATTLE REPRODUCTION

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NEWER STRATEGIES FOR  
ASSISTED REPRODUCTION

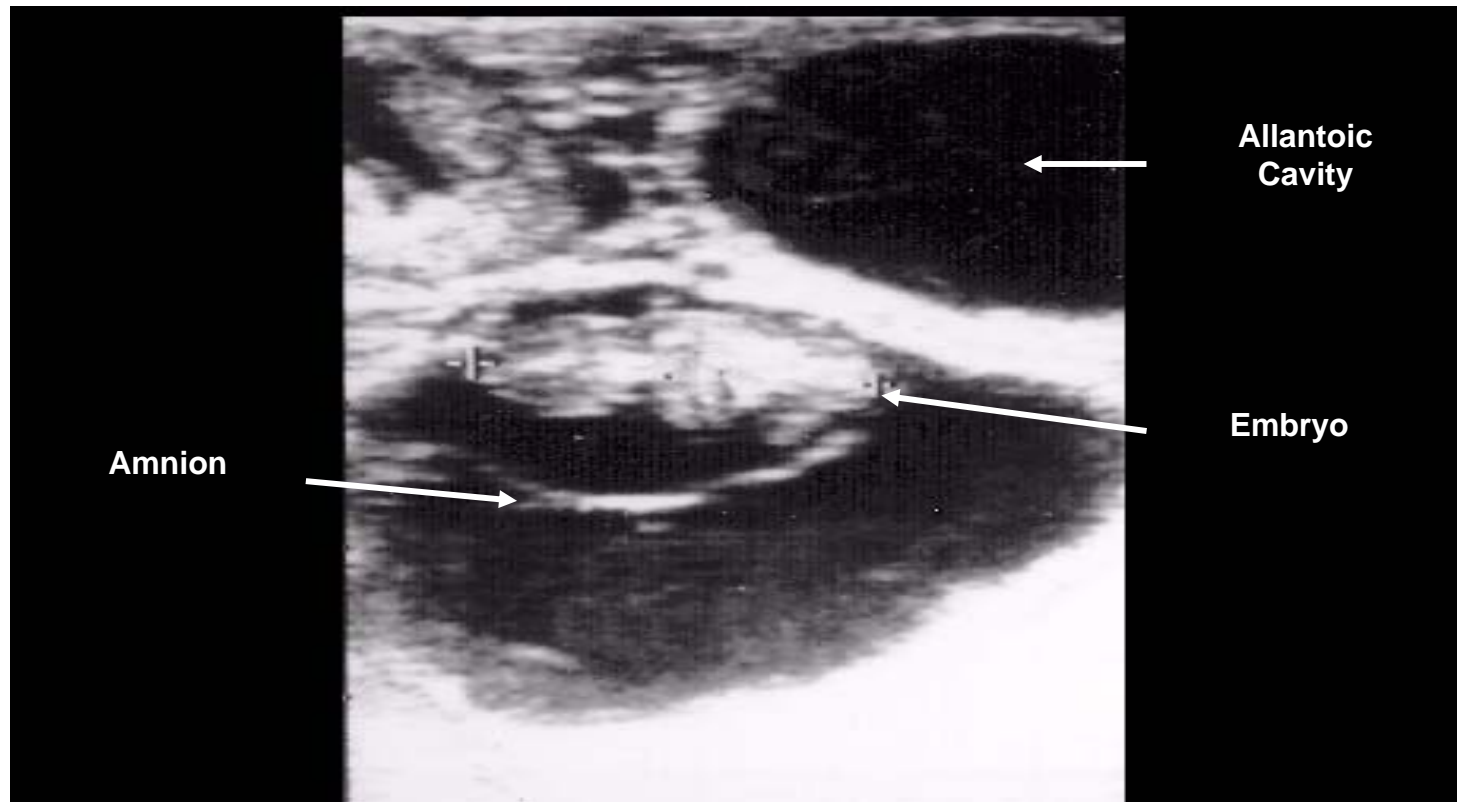


# ULTRASONOGRAPHY IN COWS

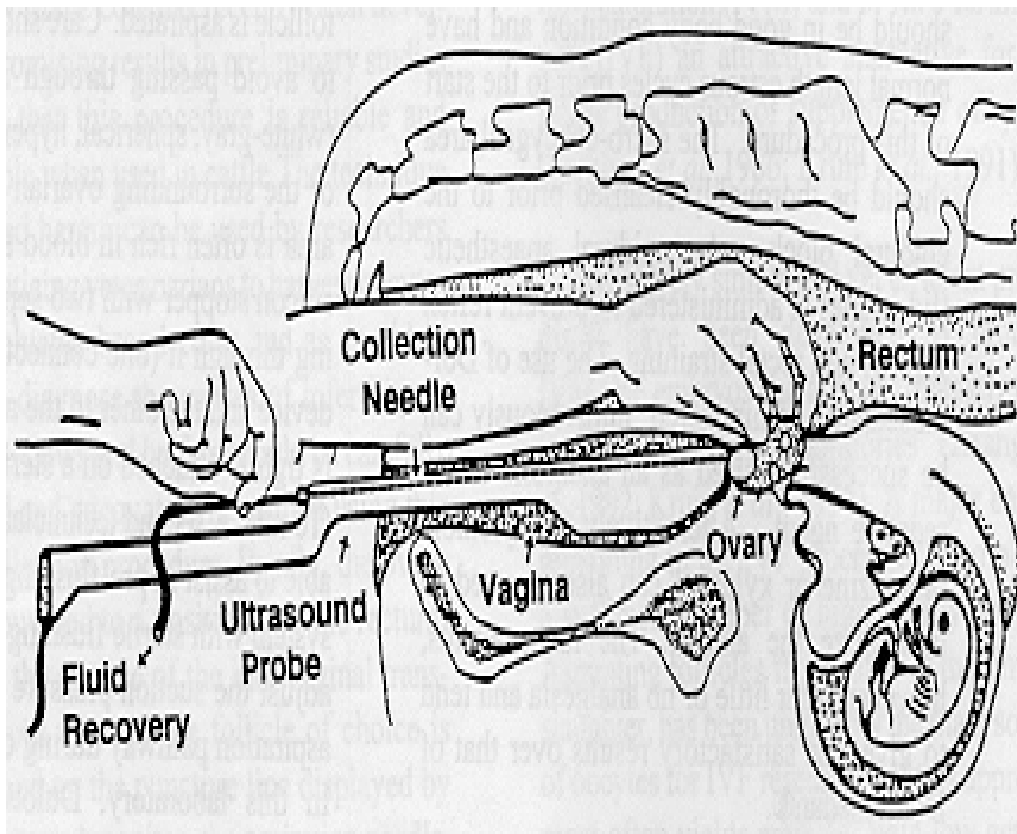
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- SOUND WAVES ARE PASSED THROUGH BODY PARTS. DIFFERENT DENSITIES REFLECT SOUND WAVES BACK IN DIFFERENT WAYS
- MOST OFTEN USED FOR EARLY (28 DAYS+) PREGNANCY DIAGNOSIS BUT ALSO FOR FETAL SEXING, INFERTILITY DIAGNOSIS AND OTHERS

# ULTRASOUND PICTURE OF PREGNANT COW

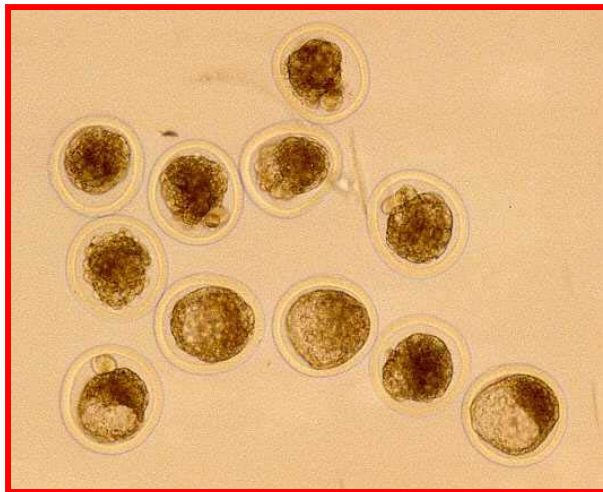


# ULTRASOUND-GUIDED TRANSVAGINAL ASPIRATION OF OVA



- EGGS ARE REMOVED FROM THE COW'S OVARY AND FERTILIZED IN THE LAB
- RESULTING EMBRYOES ARE PUT INTO RECIPIENT COWS

# EMBRYO TRANSFER



- THE COW IS GIVEN HORMONES TO MAKE MORE EGGS
- THE COW IS BRED
- THE EGGS ARE FLUSHED OUT OF HER UTERUS AND PUT INTO THE UTERUS OF A SURROGATE MOTHER COW



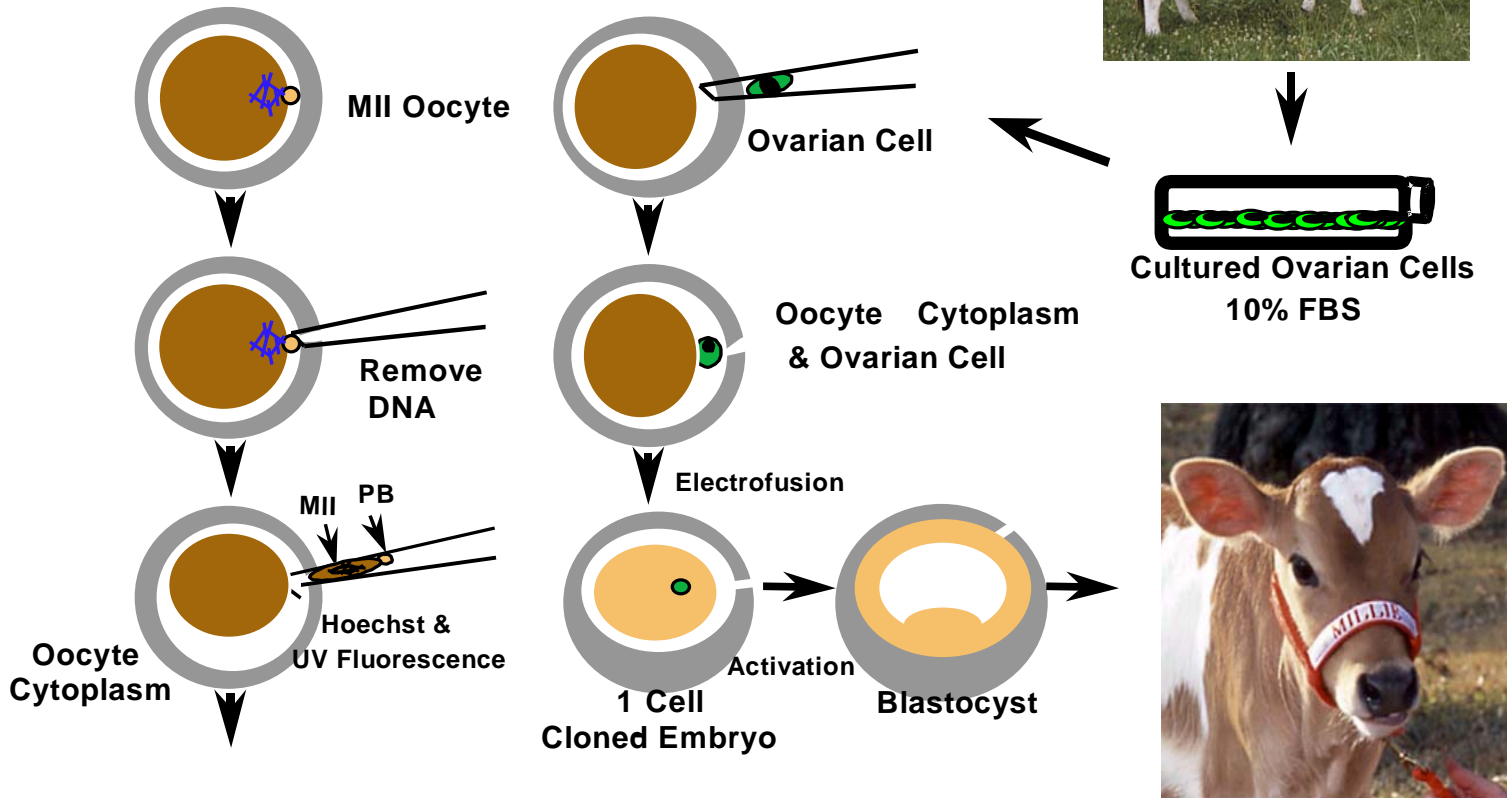
# CLONING

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- A CELL (OFTEN SKIN WHICH IS EASY TO GET TO) FROM AN ADULT IS TAKEN AND PROCESSED TO WAKE UP ALL ITS GENETIC MATERIAL
- THIS GENETIC MATERIAL IS PUT INTO AN EGG SHELL FROM A DISCARDED COW EGG
- ALLOWED TO DEVELOP IN THE LAB FOR A WEEK AND THEN PUT INTO A SURROGATE MOTHER

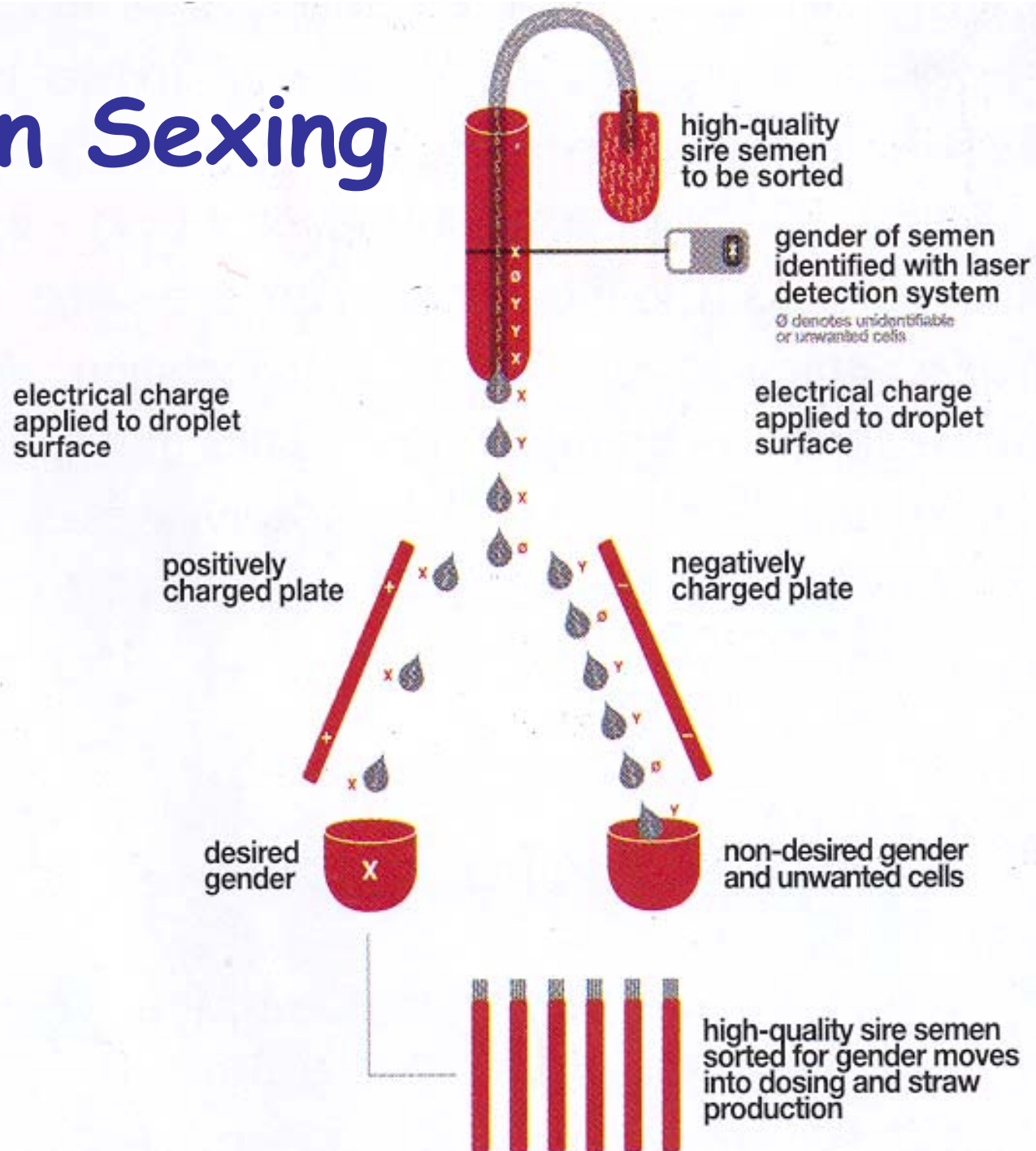


## Somatic Cell Nuclear Transfer From Teresa to Millie.....



Schematic representation of somatic cell nuclear transfer procedure used to produce Millie at the University of Tennessee. Ovarian cells were collected from the donor, Teresa, via ultrasound-guided transvaginal aspiration of follicles.

# Semen Sexing



# THE END

