



HEAT DETECTION AND ARTIFICIAL INSEMINATION

تلفن تماس : ۰۳۱-۳۵۲۵۲۲۲۰

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HEAT DETECTION

WHAT IS HEAT?

- ❑ Also known as estrus
- ❑ Is the period of sexual receptivity of open cows and heifers
- ❑ Normally occurs every 18 to 24 days



Why Heat Occurs

- Egg Develops in Cow's Ovary
 - Produces Estrogen
 - **Estrogen Causes Changes** in Reproductive, Circulatory and Nervous Systems
 - These Changes are Observed as **Signs of Heat**
- Egg Released
 - Progesterone is Secreted From Yellow Body (Corpus Leutum)
 - Yellow Body Develops at Site of Collapsed Follicle
 - **Progesterone Suppresses** Egg Development and Heat Signs for 3 Weeks or Duration of Pregnancy



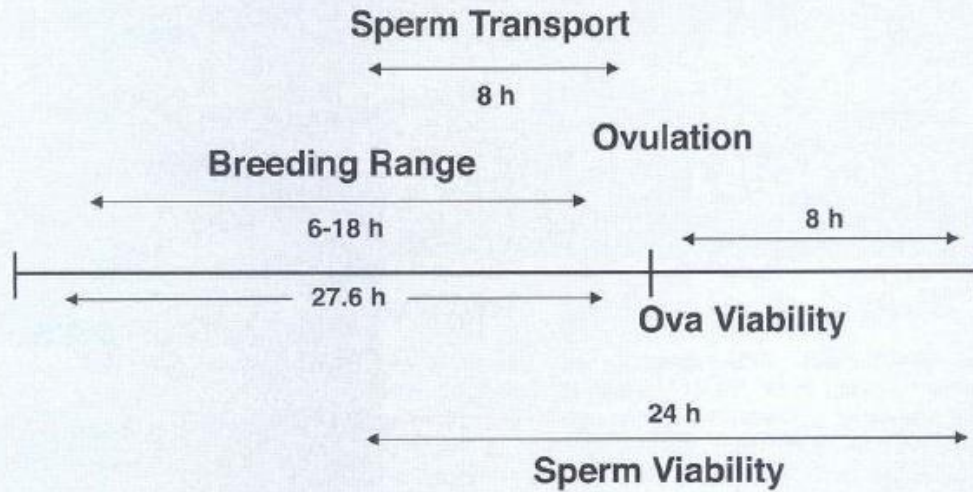
When is a Cow Fertile?

- After an Egg Has Been **Ovulated**
 - Released From an Ovary
- Occurs 10 to 14 Hours After Heat Ends
 - Heat Lasts 8 to 18 Hours
- For Highest Fertility Insemination Should Occur in Later 2/3rds of Heat
 - About 24 Hours After Cow Enters Standing Heat
 - Sperm Needs Time in Reproductive Tract Before Capable of Fertilization
 - Sperm Survives About 24 Hours in Reproductive Tract



When to Inseminate

When to Inseminate



(Nebel, Virginia Polytech, 1996)

ADSA '95 NEBEL



Primary Heat Sign

- **Sure Sign of Heat**
 - Female **Stands to be Mounted** by Another Animal
 - Known as **Standing Heat**
 - **Best Sign** of a Cow's Fertile Period
 - Cows in Heat Group Together and Mount Each Other





Secondary Heat Sign 1

- Mounting other cows
 - Cows in Heat Try to Ride Females Not in Heat
 - REMEMBER, Only Cows Standing for Mounting are in Heat
 - Cows That Ride May or May Not be in Heat





Secondary Heat Sign 2

- Roughened Tailhead
 - After Standing to be Ridden, Hair on the Tailhead is Rough or Rubbed Off
 - Easier to Notice During Winter When Hair is Longer
 - Muddy Forefeet of Rider Animal May Leave **Marks on Lower Hips, Sides or Shoulders**





Secondary Heat Sign 3

- Friendly
 - Cows in Heat May do the Following to Other Cows:
 - Follow
 - Stand Beside
 - Put Their Head on Backs or Rumps
 - Sometimes They Will Sniff, Nuzzle and Lick





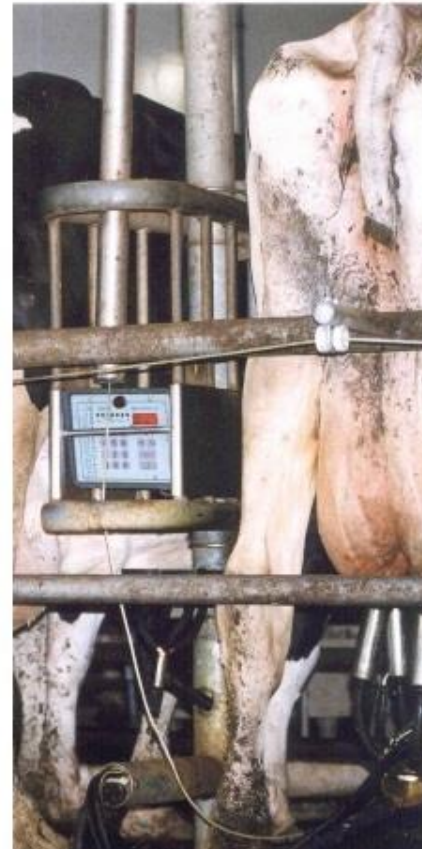
Secondary Heat Sign 4

- Nervous and Restless
 - Cows Become Nervous and Bawl More Than Usual
 - Signs of **Restlessness**
 - Walk in Search of a Bull
 - Pace the Fence
 - Pay Close Attention to People Working Nearby



Secondary Heat Sign 4

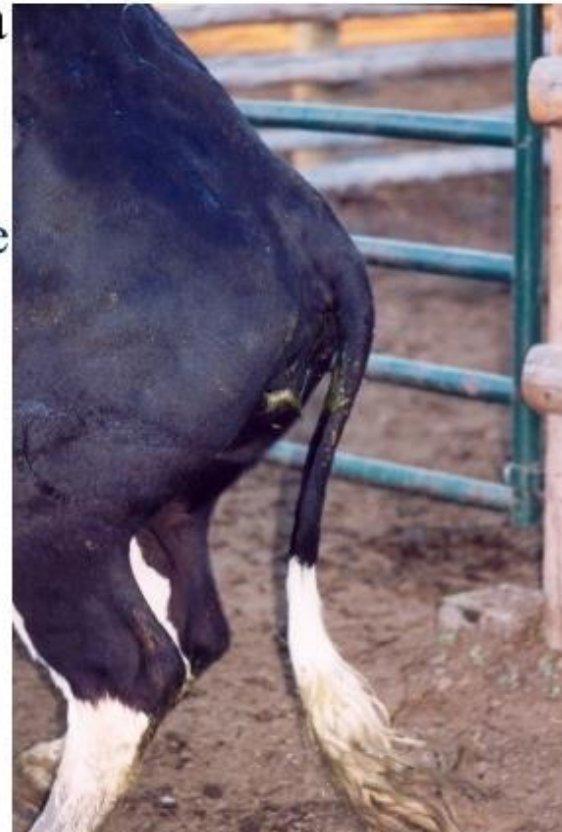
- Dairy Producers Can Identify Approaching Heat by:
 - Alert, Bright-eyed, Nervous Appearance
 - Drop in Milk Production





Secondary Heat Sign 5

- **Clear Mucus From Vagina**
 - Mucus Hangs in Strings From the Vulvar Opening
 - May Also be Smearred on the Tail or Buttocks
 - During Heat Reproductive Tract Secretes Stringy, Clear Mucus
 - Looks Like an Egg White





Secondary Heat Sign 6

- Changes to the Vulva
 - Vulvar Lips Look Moist and Slightly Swollen
 - Cow Not in Heat Has Dry, Finely-Wrinkled Vulvar Lips

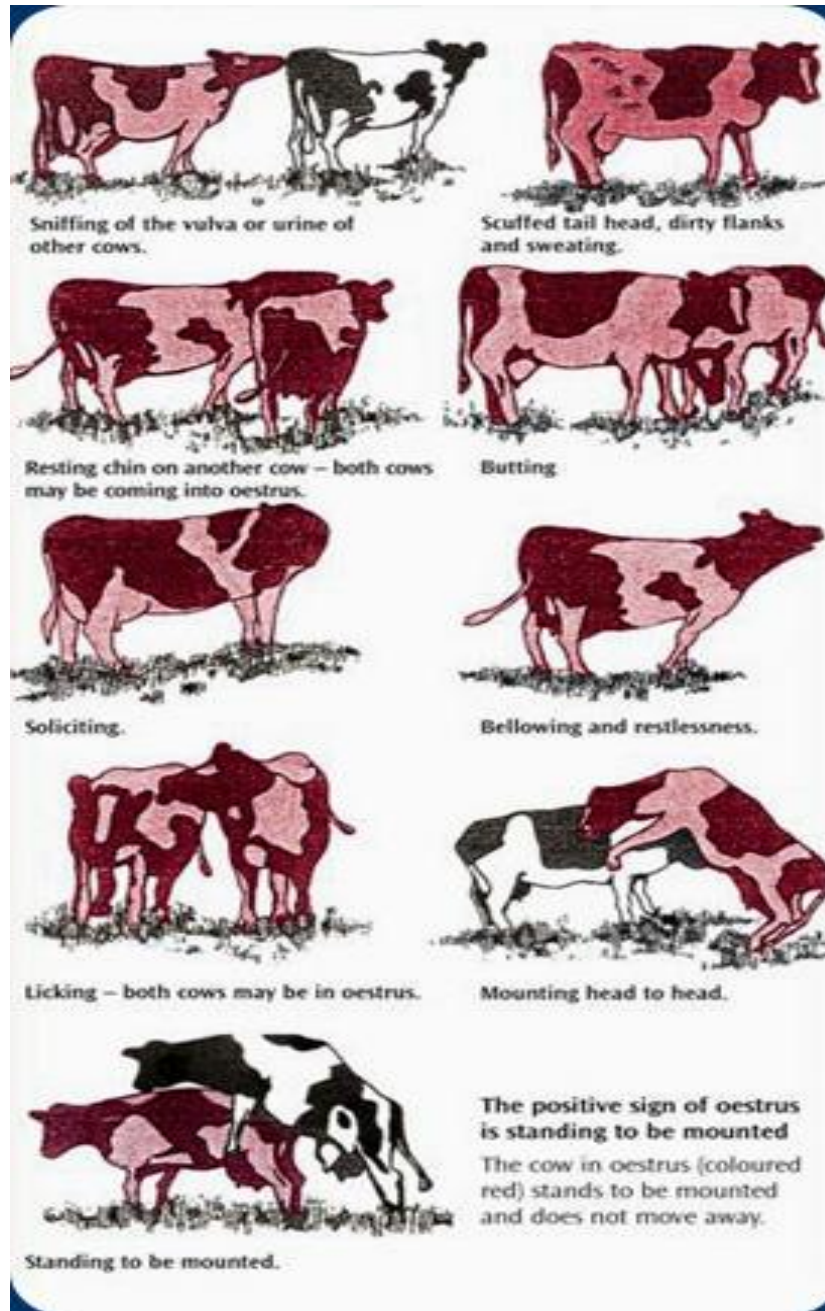


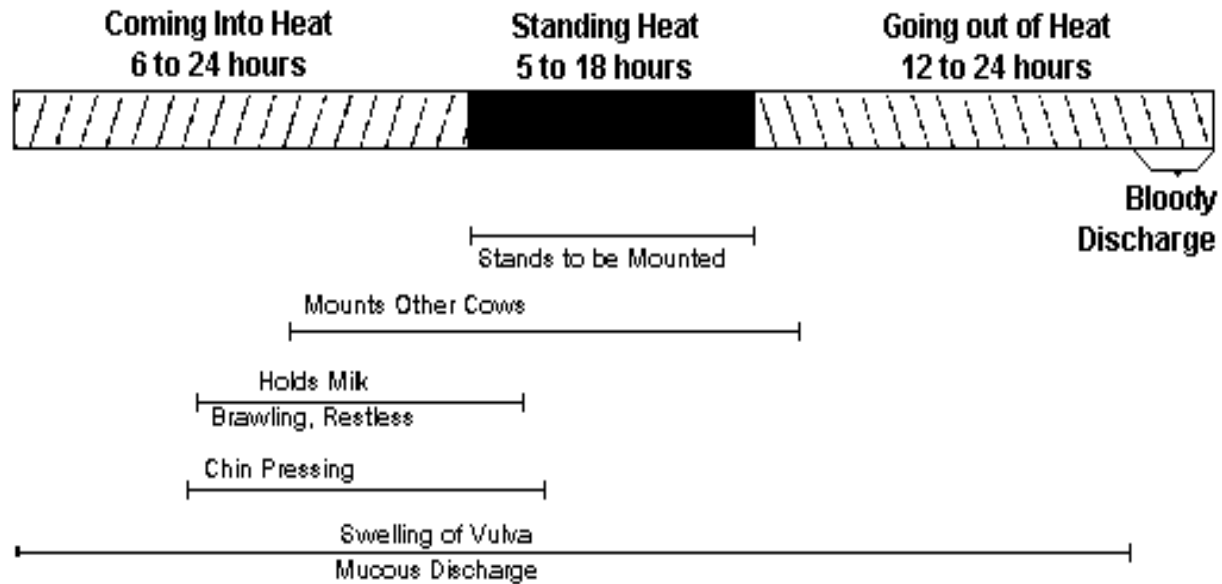


Prior Heat Sign

- Bloody Mucus Sign of Earlier Heat
 - Not a Consistent Sign
 - Often Observed Between Second and Fourth Days Regardless of Whether Cow Has Settled
 - **Bloody Discharge is NOT a Sign of Heat**
 - Simply Means Animal Was in Heat Several Days Ago
 - Watch for Next Heat Cycle in About 15-20 Days

SUN	MON	TUE	WED	THUR	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			







No Substitute for Observation!

- Observe for Heat at Least 30 Minutes Twice-a-Day
- Confinement Housing
 - More **Frequent Observations** Improve Heat Detection Efficiency
 - 3-6 Periods of Observation are Ideal
 - Provide Good Footing so Cows Can Stand for Mount
 - Hooves Should be in Good Condition
- Smaller Herds
 - Place a Dry Cow With Cows Suspected in Heat
 - Dry Cows are **Aggressive Mounters**



No Substitute for Observation!

- **“Pattern”** Beef Cows or Dairy Heifers
 - Watch Them in a Restricted Area at Least Twice-a-Day
- **Why Double Observation?**
 - Observing Cows Once-a-Day Will Miss Cows Showing Standing Heat Earlier



Studies Show:

- Virginia Tech Institute Study Confirmed Importance of Twice-a-Day Checks
 - Researchers Found Only 28.6% of All Breedings Were Associated With Cows Standing for Two Consecutive Heat Checks
 - So **71.4% of Cows Would be Seen in Standing Heat Only One Time of the Day**
 - If Single Time Choice to Check Cows Didn't Coincide With Cows Exhibiting Standing Heat They are Missed!





Observation

Signs to Look for During 18-Hour Heat Period

Mounting/ Riding	Behavior	External Genitalia	Mucus	Bloody Discharge	Hair on Tail & Head Ruffled & Matted
EARLY					
Mounts other cows	Bawling, fence walking, "spooky," butts others, trails other cows, very nervous	Lips of vulva red and slightly swollen	Very little & very watery, will note quantity when mounts others	None	No, but may be on cows mounted by animal coming in heat
MIDDLE					
Stands to be ridden, but will still mount others	Complacent, friendly, still trails and licks others, does not eat, still restless	Lips of vulva red and swollen, wall of vagina moist and glistening	Abundant & clear, copious in amount	Seldom observable	Slightly to very
LATE					
Will not stand to be ridden, but will mount others	All signs of nervousness, trailing, and head butting disappearing	Swelling decreased	Decreased in amount & very sticky & rubbery in consistency	1-3 days after all signs of riding ceased	Most pronounced at any time

John B. Herrick, "Breeding Time Requires Good Eyesight and Cow Knowledge," The Advanced Animal Breeder, May 1978, p. 15.



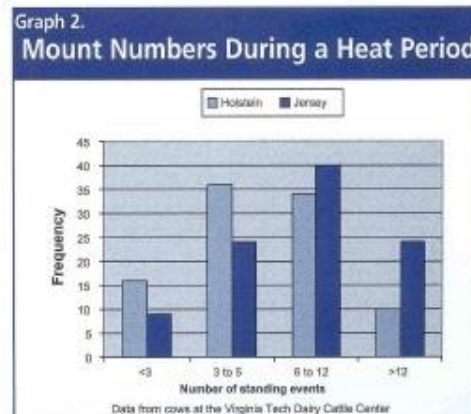
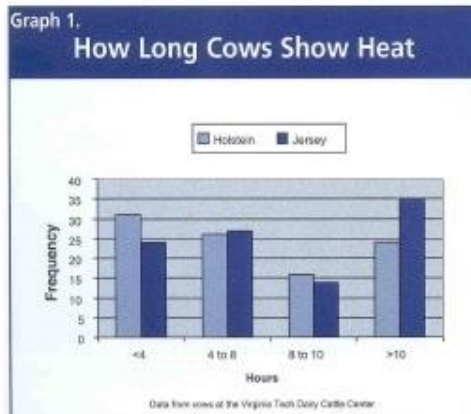
Time of Heat

- Traditional Dairy or Beef Herds
- Cornell University Study Reported:
 - 22% of Cows Show Heat Signs Between 6 a.m. and Noon
 - Between Noon and 6 p.m. the Percent Exhibiting Heat Signs Dropped to 10%
 - The Percent Increases to 25% Between 6 p.m. and Midnight



Length of Heat

- Confinement Housing
- Recent Data From Virginia Tech Institute Indicates:
 - Estrus Expression is Getting Shorter
 - Both Mounts and Length of Expression



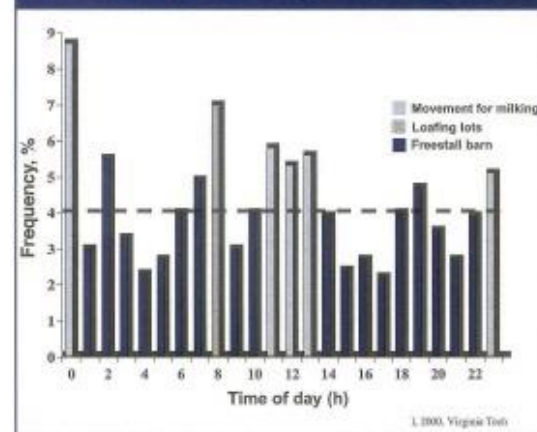


Heat Expression

- Commercial Confinement Dairy Operations
- **Heat Expression Constant Throughout the Day**
 - Likely Explained by **Management Practices Like:**
 - 3x-a-Day Milking
 - Constant Ration Pushup
 - Improved Environmental Conditions

Graph 3.

Distribution of the Onset of Estrus for Lactating Cows at the Virginia Tech Dairy Cattle Center



© 2003, Virginia Tech



Some Heat Detection Aids

- Heat Watch [©] System
- Pedometry
- Chin-ball Marker
- Androgenized Animals
- Kamar [®] Heatmount Detector
- Tail Chalking
- Records
- Checklists
- Milk Progesterone Tests



Heat Watch[©] System

- Electronic Heat Mount Detection System
 - Electronic, Pressure Sensitive Transmitters are Glued to Tailhead
 - **When Animal is Mounted Transmitter is Activated**
 - Sends Electronic Signal to Receiver
 - Receiver Sends Signal to Buffer for Storage
 - Heat Watch Software Downloads Data From Buffer
 - **Producer Can Keep Information as Long as Desired**
 - Historical Data Can be Used to Track Mounting Habits of Animal for Future Breeding Decisions



Heat Watch[®] System

- Product Offers:
 - Twenty-four (24) Hours-a-Day / 365 Days-of-the-Year Monitoring Heat on Enrolled Animals
 - Can be Used on Cows and Heifers
 - Measures Actual Mounts
 - Not Just Walking Activity
 - Does Not Need Expensive Parlors or Gates
 - Shows When Mounting Starts to the Minute



Heat Watch[®] System





Pedometry

- Mounted on Leg or Around Neck of Animal
- Measures the Activity of Animal
 - Secondary Sign of Heat
 - Animals in Heat Have Higher Body Movements Than When Not in Heat
- Information Can be Automatically Downloaded
 - Historical Information is Helpful When Interpreting Activity Based Information



Chin-ball Marker

- Worn Beneath Detector Animal's Chin
- Consists of Dye Reservoir With Steel Ball Valve
 - Attached to a Strong Leather Halter
- When Detector Animal Mounts Cow Device Acts Like a Ballpoint Pen
 - Leaves a Mark on the Cow's Back and Rump



Chin-ball Marker





Androgenized Animals

- Females Injected or Implanted With Testosterone
 - Synthetic Male Hormone
 - Stimulate Females Into Showing Male-Like Behavior
 - Cows That Lost a Calf, Open Cows and Cull Cows are Excellent Candidates

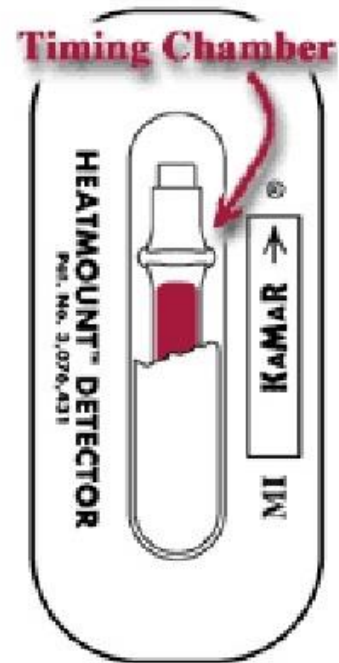
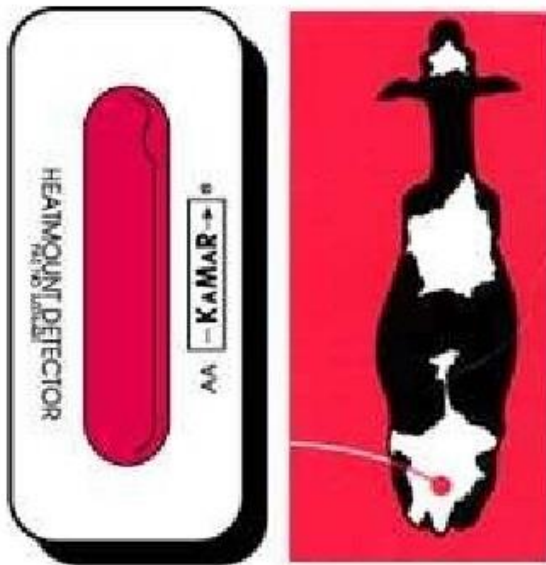


Kamar[®] Heatmount Detector

- Plastic Device Glued to the Tailhead
 - Use on Cows Eligible for Breeding During Next 21 Days
- Prolonged Pressure from Mounting Animal Turns White Detector Red
 - At Least 3 Seconds of Full Weight are Necessary to Change Detector's Color
 - Means a Cow Must Stand to be Mounted



Kamar[®] Heatmount Detector





Tail Chalking

- Tail Chalking is Used in Larger Dairies
- Chalk is Applied to Tailhead of All Animals
 - Chalk is Applied Daily
- Animals Riding the Cow in Standing Heat Will Smear or Rub Off the Chalk
 - Must Become Skilled in Interpreting the Marks



Tail Chalking





Records

- A Good Record Keeping Program is Economical for Both Dairy and Beef Producers
 - Dairy Herds
 - Recording Heat Detection and Insemination Information
 - Barn Charts, Individual Cow Record Cards and Heat Expectancy Charts Can be Used
 - Beef Herds
 - Identify Cattle and Record Insemination Information
 - Allows for Easier Heat Detection and Better Overall Herd Management
 - Beef Herd Record Book and Heat Detection Record Book Can be Used



Checklists

- Use Heat Detection Checklists as Part of Herd Health Program
 - A 24-Day Checklist Should List All Open Cows
 - Listed Cows Should be More Than 30 Days Fresh
 - At Least 85% of Listed Cows Should be Observed in Heat



Checklists

Dairy Camp 305 - TWIN FALLS Example 2

File Data Screens ABS misc E-View Report Regrod Prod Activity Misc Help

Command

Reports **LIST ... FOR LACT10 RC=2-4 DSLH=1-35 \CP2 DOWNBY RPRO DOWNBY DSLH**

ID	DIM	DSLH	RPRO	SIR1	HOAT	ID	DIM	DSLH	RPRO	SIR1
2684	104	34	BRED	29H9138		7133	134	16	BRED	29H9138
2760	162	34	BRED	29H9155		7249	325	16	BRED	29H9018
7555	103	34	BRED	29H9023		7252	175	16	BRED	29H9154
2779	126	33	BRED	29H9330		7620	133	16	BRED	29H8697
7213	185	31	BRED	29H9138		1747	397	15	BRED	29H8933
1462	363	27	BRED	29H8670		2671	98	15	BRED	29H9330
1567	86	25	BRED	29H9138		6990	190	15	BRED	29H8343
2075	163	25	BRED	29H8933		2008	59	14	BRED	29H9568
2686	118	25	BRED	29H9023		2529	85	14	BRED	29H8343
7622	94	25	BRED	29H8697		2561	205	14	BRED	29H9155
2028	113	24	BRED	29H9023		2710	189	14	BRED	29H8697
1370	171	23	BRED	29H8343		2748	144	14	BRED	29H8343
1586	280	23	BRED	29H8933		2791	129	14	BRED	29H9138
2376	179	23	BRED	29H9252		6343	104	14	BRED	29H9330
2611	129	23	BRED	29H9138		6357	104	14	BRED	29H9138
2820	71	23	BRED	29H9114		7650	160	14	BRED	29H8343
6740	184	23	BRED	29H8697		1195	128	13	BRED	29H8933
830	230	22	BRED	29H9138		1352	144	13	BRED	29H8343
6718	146	22	BRED	29H9023		1357	86	13	BRED	29H9280
6202	458	21	BRED	29H8774		1453	184	13	BRED	29H8697
2596	93	20	BRED	29H8933		1659	284	13	BRED	29H9173
2647	207	20	BRED	29H8697		1713	270	13	BRED	29H9252
2656	90	20	BRED	29H8933		1786	86	13	BRED	29H9138
2735	90	20	BRED	29H8697		2041	58	13	BRED	29H8933
6319	67	20	BRED	29H9154		2089	63	13	BRED	29H8343
6177	70	20	BRED	29H9033		2407	84	13	BRED	29H8697

Enter

System Main Commands CowCard Grid Report Graph Activity

(3/27/02) Prt Off C:\WORK\HERDS\TWINEX1\COVFILE1.DAT TWIN FALLS Example 2

LEST : Total cows 230



Milk Progesterone Tests

- Measures Progesterone Level in Milk
 - Progesterone is at Low Level Just Before, During and Just After Heat
 - Progesterone Levels Indicated by a Color Reaction
 - Lower Level = Greater Reaction





Errors in Heat Detection

Errors in Heat Detection

Sign	Percent Error
Standing	2.6
Riding other cows	2.9
Rough tailhead	3.6
Unusually active	4.5
Bawling	4.7
Mucus on vulva	6.1
Blood on vulva	7.1
Not letting down milk	9.0
Full red Kamar	12.4
Partial red Kamar	18.3

(Cornell University-Eastern AIC, 1981)



When to Inseminate - Beef

- Several Factors Affect Beef Cattle Cycling Rate
 - Mature Cows
 - Rest After Calving
 - Body Condition
 - First Calf Heifers
 - Take Longer Than Older Cows to Resume Cycling
 - Feed Consumed Must Support Their Growth, Plus Milk Production for Calf
 - Virgin Heifers
 - Age, Weight, and Breed Determine When Cycling Begins
 - See Chapter 15 for More Information on Heifer A.I.



Heat Detecting Beef Cattle

- Restricted Areas Make Heat Detection Easy
 - Keep Cattle in Feedlots or Similar Conditions
 - If Cattle are in Open Range, Need to Find Way to Restrict Them for Observation
 - Ranches Using Short A.I. Breeding Periods Should Consider Heat Observation Pastures
 - Move Cows at Least 2 Weeks Before Breeding Starts
 - Allow Cows to Establish a Routine of Grazing, Watering and Coming to Feed
 - Feeding Highly Palatable, High Energy Feeds Encourages Herd Assemble Once-a-Day
 - Provides a Convenient Time to Check for Cows in Heat



Heat Detecting Beef Cattle

- About **5% of a Normally Cycling** Beef Herd's Females Should Show Heat Daily
 - As Cows are Inseminated Remove Them From Pasture
 - About Half the Herd and Half the Pressure on the Pasture is Gone in About 10 Days
- **Dry Areas**
 - Provide a Single Water Source, Helps Identify Cows in Heat
- **Winter Breeding Areas**
 - Twice-a-day Feeding of Silage, Grain, Hay or High-Energy Liquid Feeds Provide an Opportunity for Heat Detection



When to Inseminate - Dairy

- Heifers Show First Heat at 9-11 Months
 - Some May Ovulate Earlier
 - Poorly Fed Heifers May Not Come Into Heat Until 20+ Months
- Heifer Insemination Depends on Size and Ability to Deliver a Calf
 - Small Heifers May Have Severe Calving Difficulties
 - Can Lead to Decreased Milk Production, Permanent Infertility, or Death of Heifer or Calf
 - Ease of Calving Depends More on Size Than Age
- Most Heifers are Inseminated by 13-14 months



When to Inseminate - Dairy

- Cows May Show First Heat Period 2-6 Weeks After Calving
 - That Doesn't Mean Cow is Ready for Insemination
- Cow's Uterus Takes at Least 40 days to Completely Recover From a Previous Pregnancy
 - If There Were Complications After Calving, Uterus Will Need More Time to Heal



A.M - P.M. vs. Once-A-Day

- Studies Have Found Cattle Can be Inseminated Over a 24 Hour Span With Acceptable Fertility
 - Fertility Was the Same for Cattle Inseminated Once-A-Day or by the A.M.-P.M. Rule
 - Good Calving Rates Can be Obtained by Inseminating Cattle Over a 24 Hour Interval After First Heat Observation
 - Optimum Time for Insemination Was 16-24 Hours After Detection of Heat
- Estrus is a Random Event
- 95% of Cows Ovulate Between 17 and 38 Hours After Standing Heat Starts



Frequency and Time of Service

Table 3.

Frequency and Time of Service

Service Schedule	No. Herds	No. Cows	% 60-90 Day Non Return Rate
One-Time-A-Day Service is approximately the same hour, plus or minus 1 hour	851	55,323	66.0
One-Time-A-Day Service where all cows were serviced at the single daily stop, either A.M. or P.M.	1,947	111,131	66.6
Twice-A-Day Service where A.M. observed cows were serviced in the P.M., and P.M. observed cows were serviced the next A.M.	4,548	288,742	66.0

Published in the Advanced Animal Breeders, April 1983, Page 8 Author Steve Newman. Data gathered from Eastern A.I. Cooperative (at time data was published).



Non Return Rates

Table 4.

Non Return Rates for Once Daily and A.M./P.M. A.I.

A.I. Program	Cows (No.)	Non Return Interval		
		60 d	75 d (Percent)	90 d
Once Daily	3659	64.6	60.1	58.4
A.M.-P.M.	3581	65.6	60.6	57.8

Published in the Journal of Dairy Science, 1994, Page 3185 by Nebel et. al. Study was done at Atlantic Breeders Cooperative (at time data was published).



A.M - P.M. vs. Once-A-Day

- Electronic Heat Devices
 - Provide Information of When Mounting Started
 - Offer Little Information on Cow Ovulation
- Commercial Operation
 - Some Luck is Involved When Finding Cattle in Heat
 - Cows are Mounted a Low Number of Times
 - Hard to Determine if First Mount or Last



Dairy Management Issues

- Important Considerations Include:
 - Extra Time Required in Lock-ups
 - Total Time Standing on Cement
 - Body Temperature of Cow During Summer Heat Stress
 - Inseminator Fatigue



Beef Management Issues

- Important Considerations Include:
 - Number of Cattle Handled
 - Inseminator Fatigue
 - Sorting Cattle After Observation of Heat When Using Synchronization Programs



Summary

- Cows and Heifers are Sexually Receptive for About **18 Hours** During Estrus
 - This Time is **Known as Heat**
 - Standing to be Mounted is the Surest Sign of Heat
- **Observe Cattle for Heat 30 Minutes Twice-a-Day**
 - Early Morning and Late Evening are Best
- Cows Should be **Inseminated in Last 2/3rds of Standing Heat**



Summary

- Studies Have Shown Once-a-Day Breeding is Comparable to Breeding Using the A.M.-P.M. Rule
 - Usually More Efficient for Commercial Operations
- Determining Time of Heat Start is Difficult
 - Makes Precise Timing of Insemination Impossible
 - Inseminate 6 to 24 Hours After First Observation of Heat
- Heat Detection Aids Help Many Producers



Summary

- Age and Weight of Heifers Determines When Cycling Begins
 - Most Will be Cycling by 13 to 14 Months
- Cows Should be Given at Least 40 Days to Rest Before Rebreeding
- **Asking “Is the Cow Really in Heat?” is More Important Than Asking “What Time Should I Inseminate the Cow That is in Heat?”**



Question 1

- When is the best time to inseminate for highest fertility?

6-24 hours after the start of standing heat



Question 2

- The hormone estrogen causes physical and psychological changes known as heat in a cow or heifer.
- What is the single, surest sign of heat?

Standing to be mounted by another animal.



Question 3

- Name secondary heat signs.
 - Nervousness
 - Swollen vulva
 - Bawling
 - Pacing
 - Mounts other cows
 - Marks from the mounting animal
 - Hair worn on the tailhead
 - Mucus flowing from the vulva



Question 4

- When you checked your cows today, you noticed bloody mucus smeared on one of your cows' tail and buttock.
- Should you inseminate her immediately? **No**
- Why or Why not?

The bloody discharge indicates she was in estrus and you should observe her for heat in about 17 days. If inseminated chances of pregnancy are considerably reduced.



Question 5

- Describe the various kinds of heat detection aids that are available.

Patches that change color or raise a flag when the animal is mounted. Chin ball markers on detector animals mark estrous animals with ink. Electronic heat detection devices that monitor mounting activity. Daily chalking of tail heads. Milk progesterone tests. Good records and proper identification.



Question 6

- Heat detection aids should be used only as supplement to good visual observation.
- How much time out of your daily routine must you spend on heat detection if using visual detection?

At least 30 minutes twice-a-day.



Question 7

- Well-fed heifers normally show their first heat period at nine to eleven months, and then cycle about every 21 days after that except when pregnant.
- Are all heats of cows and heifers fertile heats?

No, heifers may not be old enough or weigh enough. Cows may not have had enough rest since calving. A small percentage of cows will show signs of heat even though pregnant.



Question 8

- When is the best time to inseminate heifers?
When the heifer is of a size that she could deliver a calf.
- How long should you wait before inseminating cows that have calved?

Cows need a minimum of 40 days to recover after calving.



Question 9

- The old a.m.-p.m. rule states that cows first observed in heat in the morning should be inseminated late that afternoon, and that cows first observed in heat in the afternoon should be inseminated the following morning.
- Does once-a-day insemination produce effective results? **Yes**
- Why or why not?

**There is no advantage to breeding twice-a-day.
Most cows ovulate between 17 and 38 hours
after the onset of standing heat.**



Question 10

- Considering the difficulties in precisely determining the onset of heat, what is the most practical rule-of-thumb to follow in inseminating based on first observation of heat?

Inseminate anytime after observing standing heat.

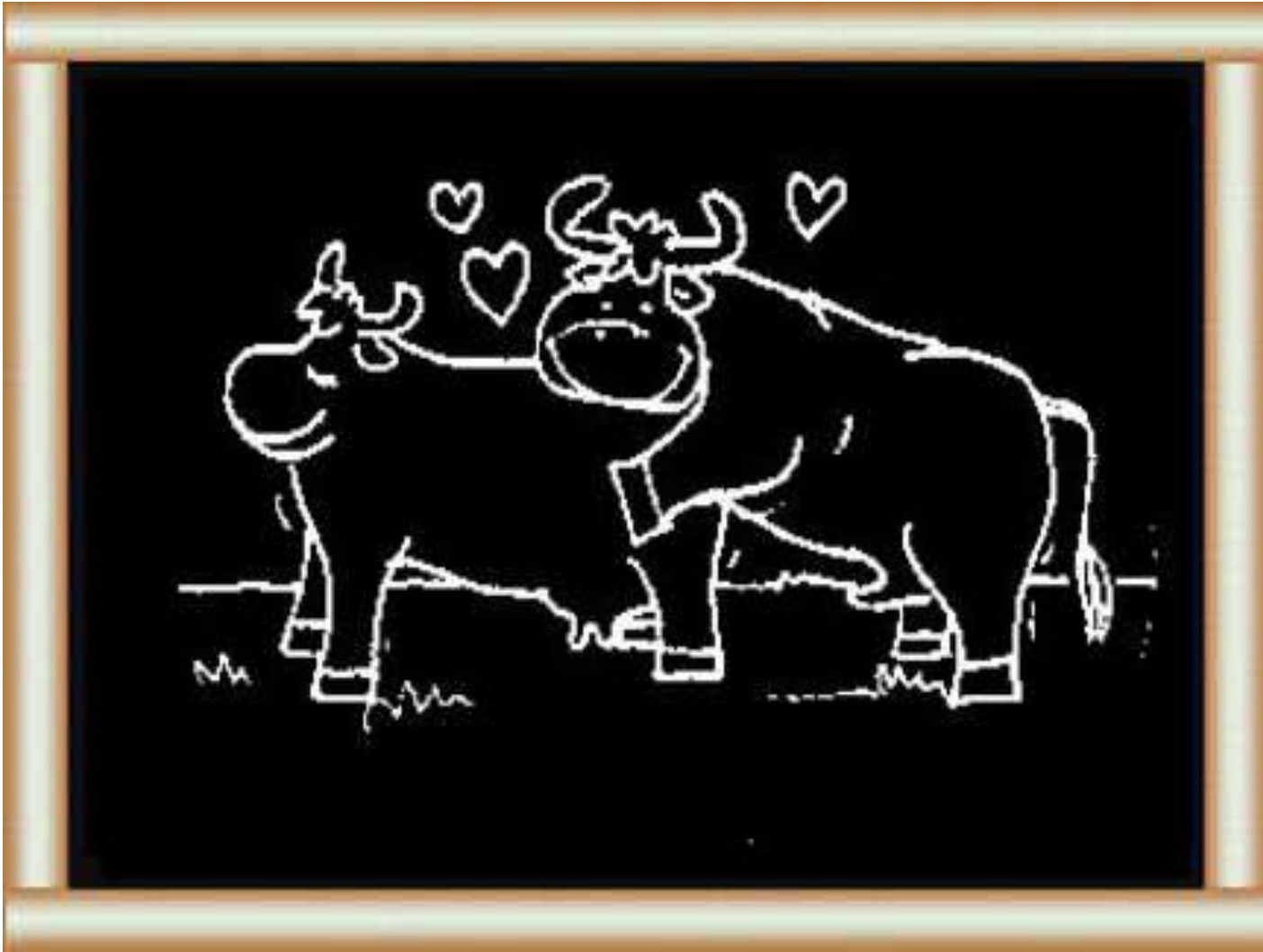


Question 11

- What are some of the management practices to be considered when planning a once-a-day or twice-a-day insemination program?

For Dairy - how long will the cows be locked up? How long standing on cement? Body temp during heat stress. Inseminator fatigue.

For Beef - number of cattle handled. Inseminator fatigue. Are cattle sorted after being observed in heat when using heat synchronization.





ARTIFICIAL INSEMINATION



Who invented artificial insemination?

➤ The first successful experiment with artificial insemination in animals was performed by Italian physiologist Lazzaro Spallanzani, who in 1780, while investigating animal reproduction, developed a technique for artificial insemination in dogs.



Who invented artificial insemination? (cont.)

This approach was refined in the 1930s
In Russia, and the subsequent
development
of methods for the cryopreservation



Who invented artificial insemination? (cont.)

(preservation through freezing) of semen led to the widespread use of artificial insemination in animals.



What are the advantages of AI in cattle?

The chief advantage of artificial insemination is that the desirable characteristics of a bull can be passed on more quickly and to more progeny than if that animal is mated with females in a natural fashion.


What are the advantages of AI in cattle? (Cont.)

- Increased efficiency of bull usage
- Increased potential for genetic selection
- Decreased costs
- Increased safety for animals and farmers
- Reduced disease transmission




What are the major drawbacks in AI in cattle?

Artificial insemination has some potential drawbacks, however, that must be considered. First, it can be more laborious, Male animals instinctively detect the females that are in the correct status for conception.



What are the major drawbacks in AI in cattle? (cont.)

With artificial insemination the detection work falls on the responsibility of the farmer. Poor detection results in decreased rates of fertility.




What are the major drawbacks in AI in cattle? (cont.)

Also, increasing the number of offspring per male has selective advantages only if the best males can be accurately determined.



What are the major drawbacks in AI in cattle? (cont.)

Otherwise this process only decreases the genetic variability in a population. Increasing the number of offspring per male always reduces the gene pool.



What are the major drawbacks in AI in cattle? (cont.)

The benefits of more intense selection must be balanced against the negative effects of decreased variation.

DISADVANTAGES OF ARTIFICIAL INSEMINATION

- Costly
- Estrus detection must be good
- Low conception rate
- Semen has to be stored properly
- Inbreeding
- The bull must be properly tested

Heat detection in cattle

Coming into Heat

- Stands and bellows
- Smells other cows
- Head butts other cows
- Mounts other cows but will not stand to be mounted
- Red, moist, swollen vulva
- Clear mucous discharge from vulva

Cow coming into Heat



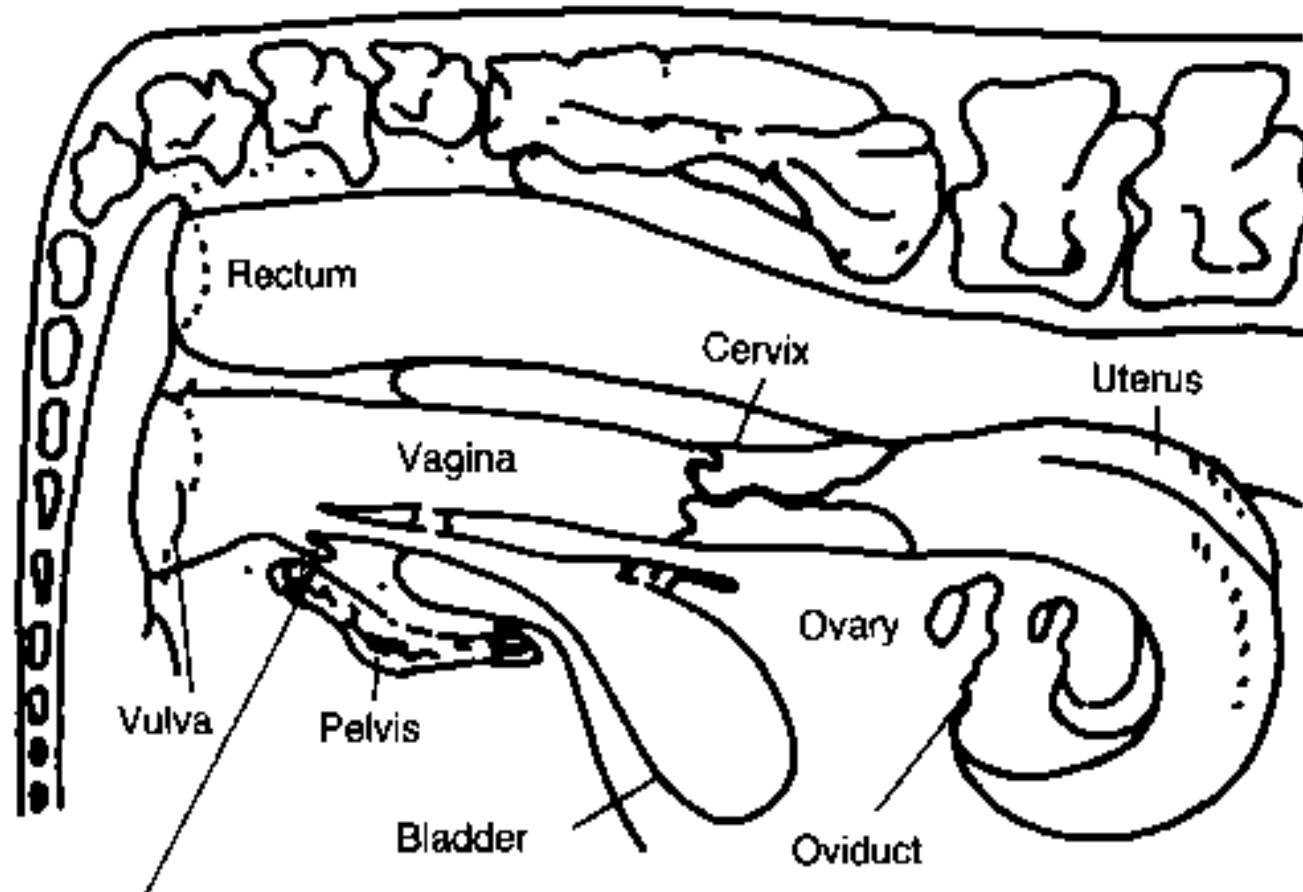
Standing Heat

- Stands to be mounted
- Mount other cows
- Bellows frequently
- Nervous and excitable

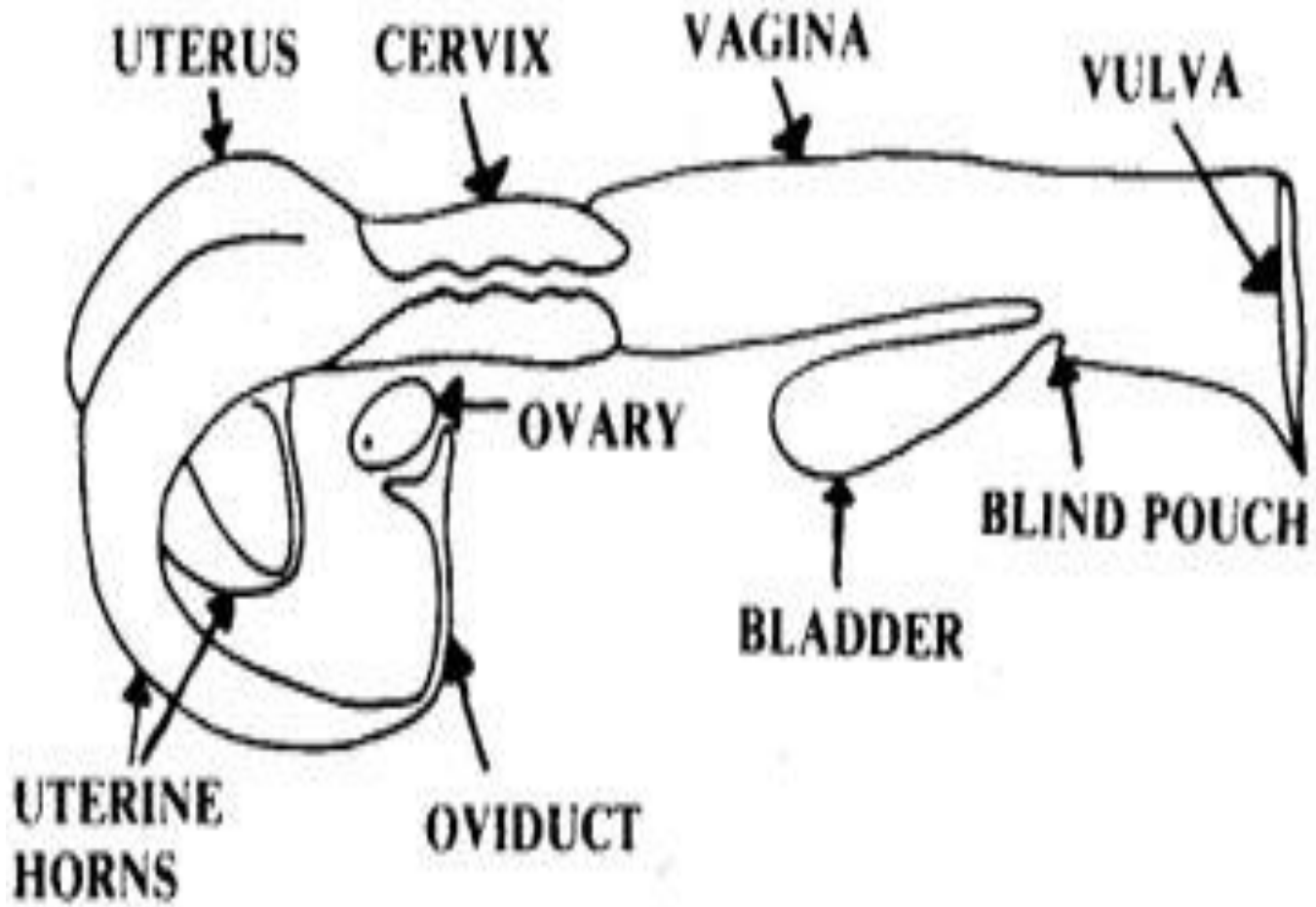


Cow in standing heat





Sub-urethral diverticulum



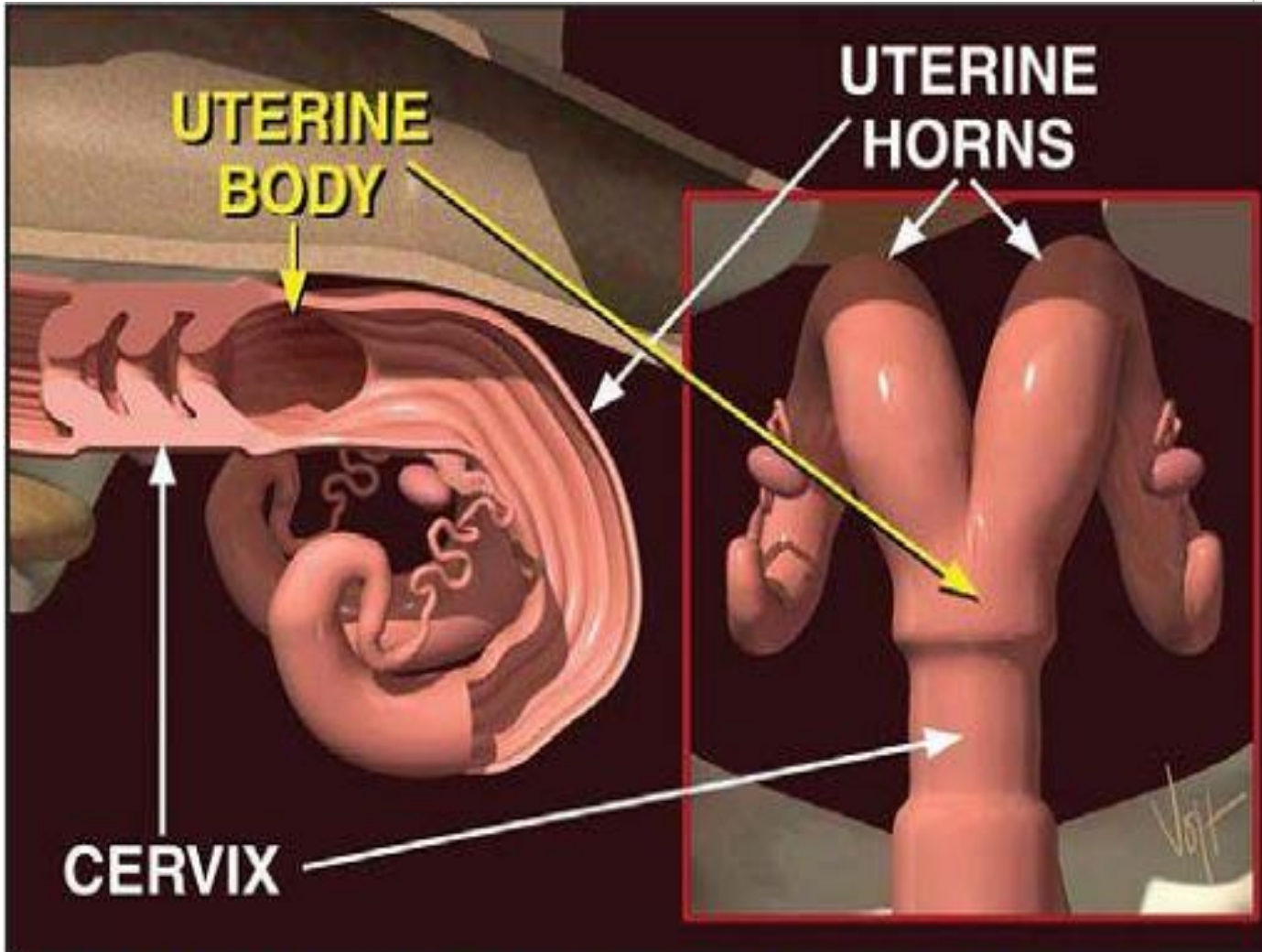
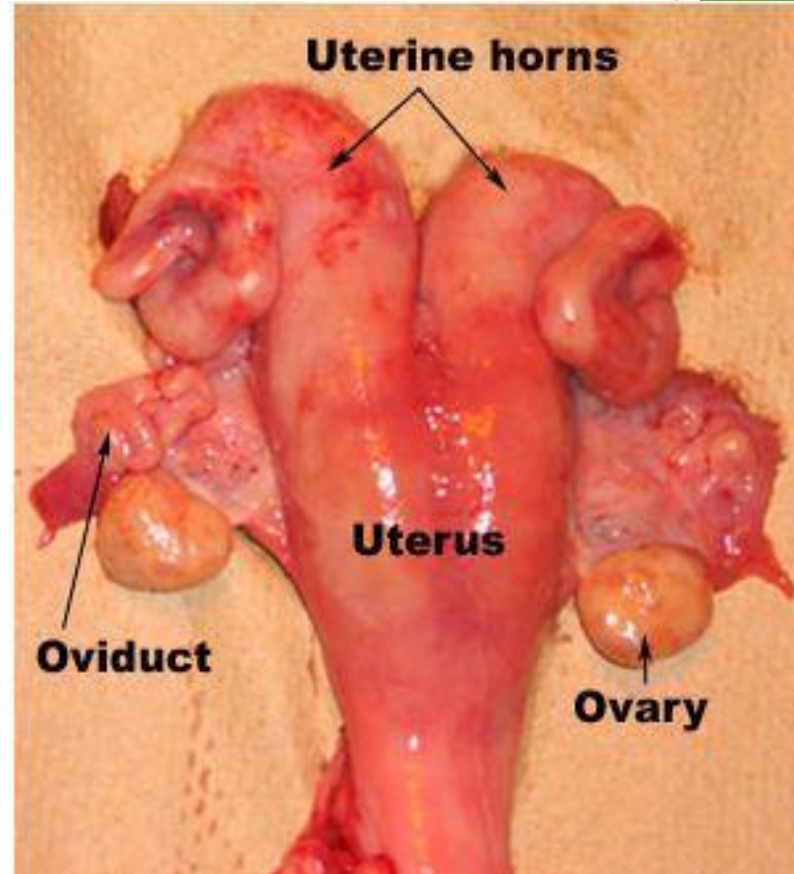
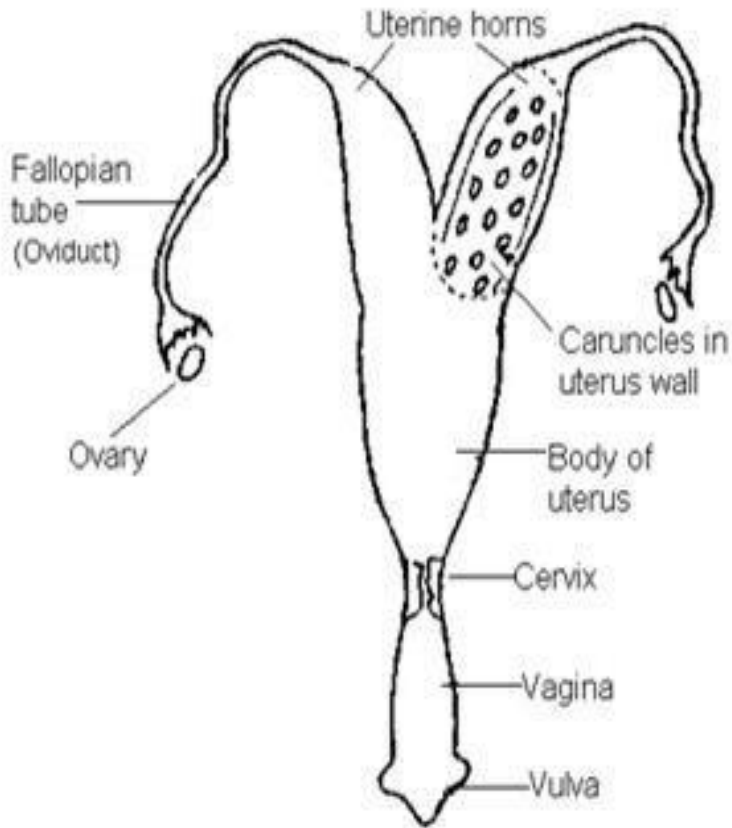
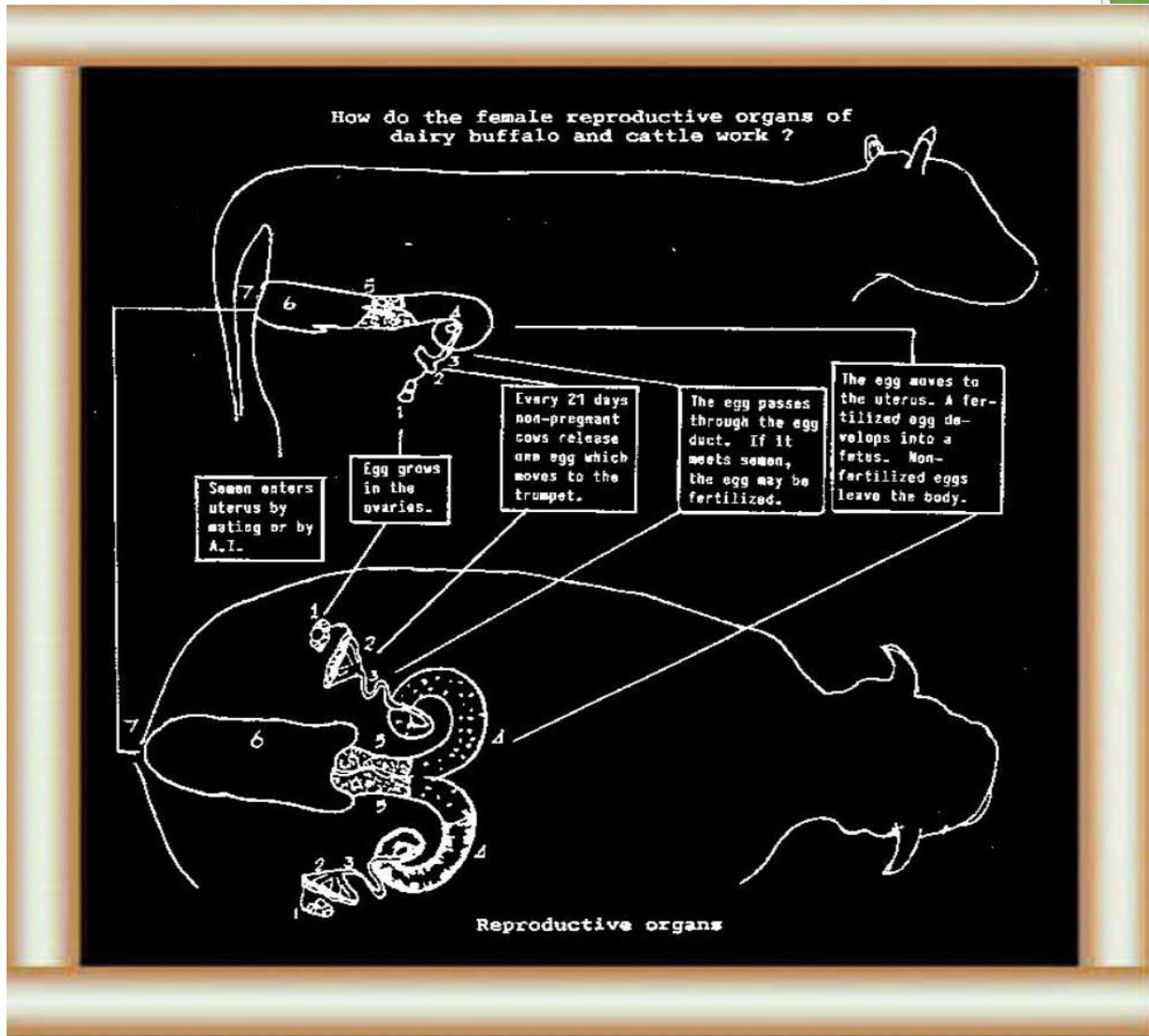


Figure 3. The short uterine body divides into two long uterine horns.



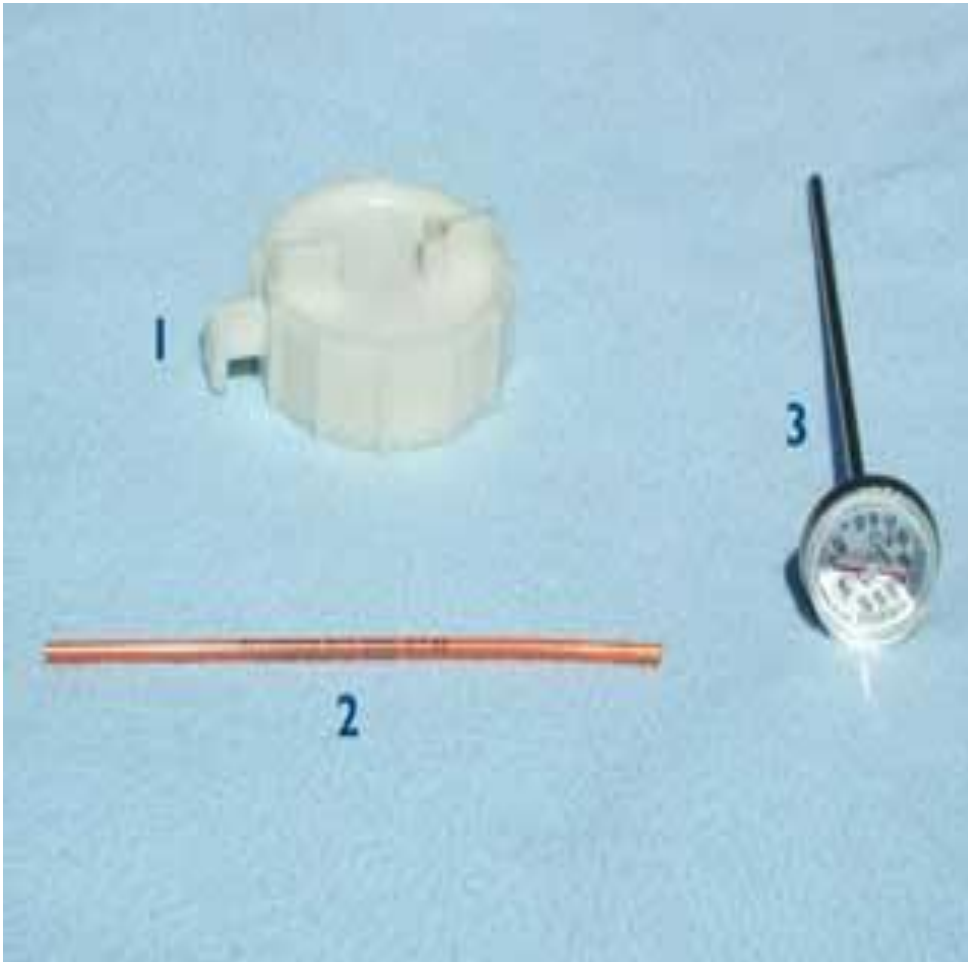




Common equipment used in artificial insemination (A.I.):

- 1. A French insemination gun.*
- 2. A Continental insemination gun.*
- 3. An insemination sheath with semen straw.*
- 4. A package of insemination sheaths.*





- Common equipment used in artificial insemination:*
- 1. A straw cutter.*
 - 2. A straw of semen.*
 - 3. A dial thermometer.*

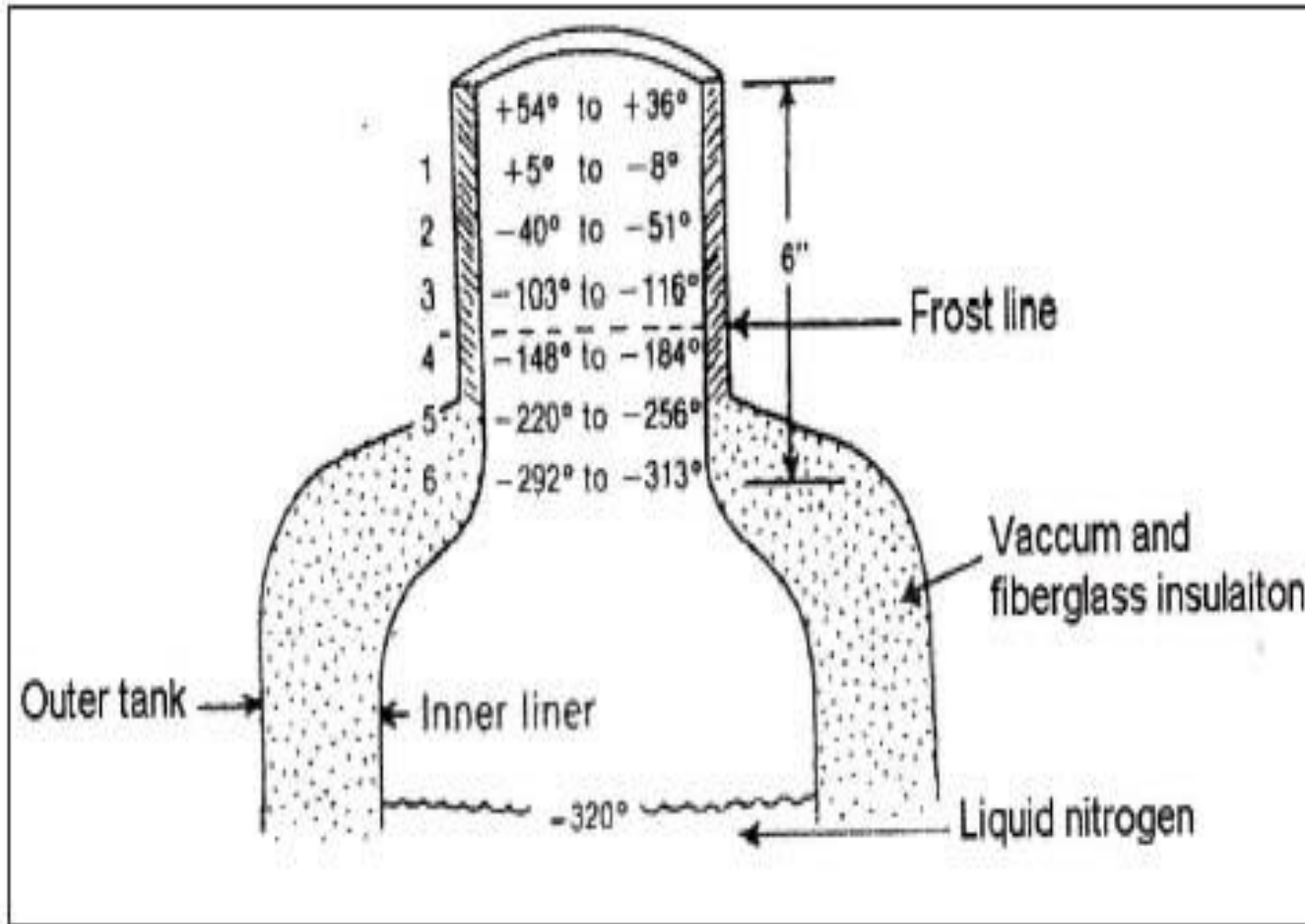


This is an insulated thermos that has been altered at home to allow semen thawing and to help keep the insemination gun warm. Commercially manufactured hot water baths can also be purchased.





In this picture, the person doing the inseminating is locating the desired cane of semen. Notice that the entire canister of semen is kept well below the neck of the tank.



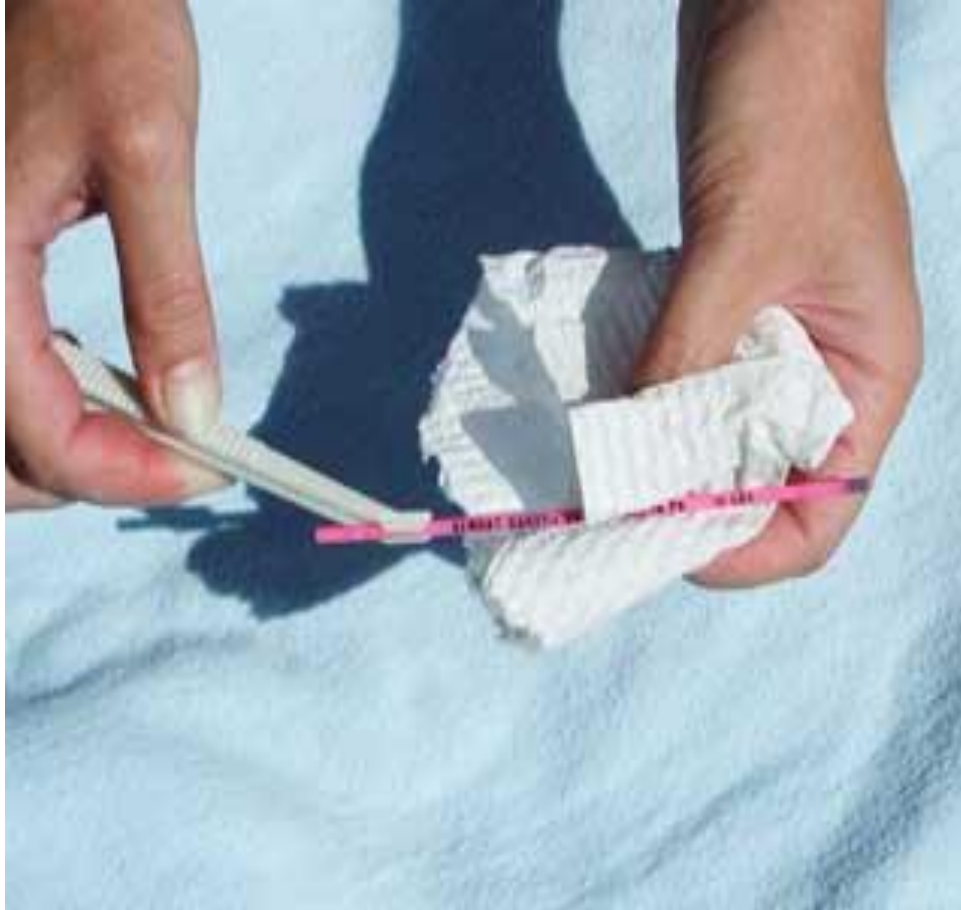


This is a homemade semen thawing thermos. The white arrow identifies the insemination gun in a water tight tube to stay warm. The black arrow identifies the area where a straw of semen can be placed to thaw. At the top of the thermos lid can be found a dial thermometer used to ensure that the water bath remains at 35°c.





Once the desired straw of semen has been removed from the tank, it should be placed directly in a water bath that remains a constant 35°c. The semen is usually thawed for 30 - 45 seconds.



After the semen has been thawed, the straw should be removed and completely dried with a paper towel. Water is spermicidal. If properly handled, the semen will remain viable for up to 15 minutes after it has been warmed.



The end of the straw must be cut. The dark end of the straw with the wax plug should be cut.





This picture shows a typical semen storage tank and a metal tool box used to keep equipment clean and easily accessible.



Artificial Insemination procedures

- Step #1: Restrain the animal to be inseminated.

Step #2:

- Raise the tail with the right hand and gently massage the rectum with the lubricated glove on the left hand.
- Step #3: Gently wipe the vulva with a paper towel to remove excess manure and debris.



Procedure for artificial insemination

Step #4:

Insert the gun at a 30° upward angle to avoid entering the urethral opening and bladder located on the floor of the vagina.

Procedure for artificial insemination

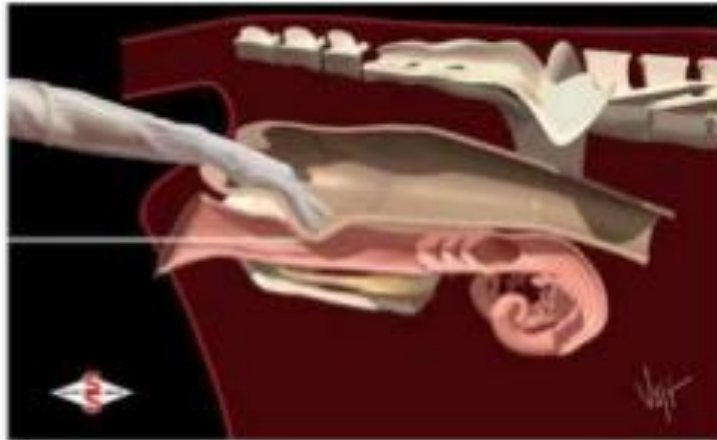


Figure #1: Keeping the gloved hand even with the tip of the inseminator gun.

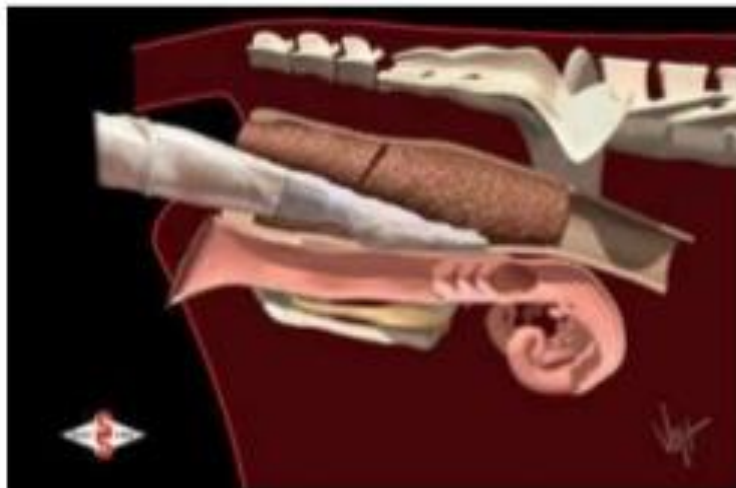
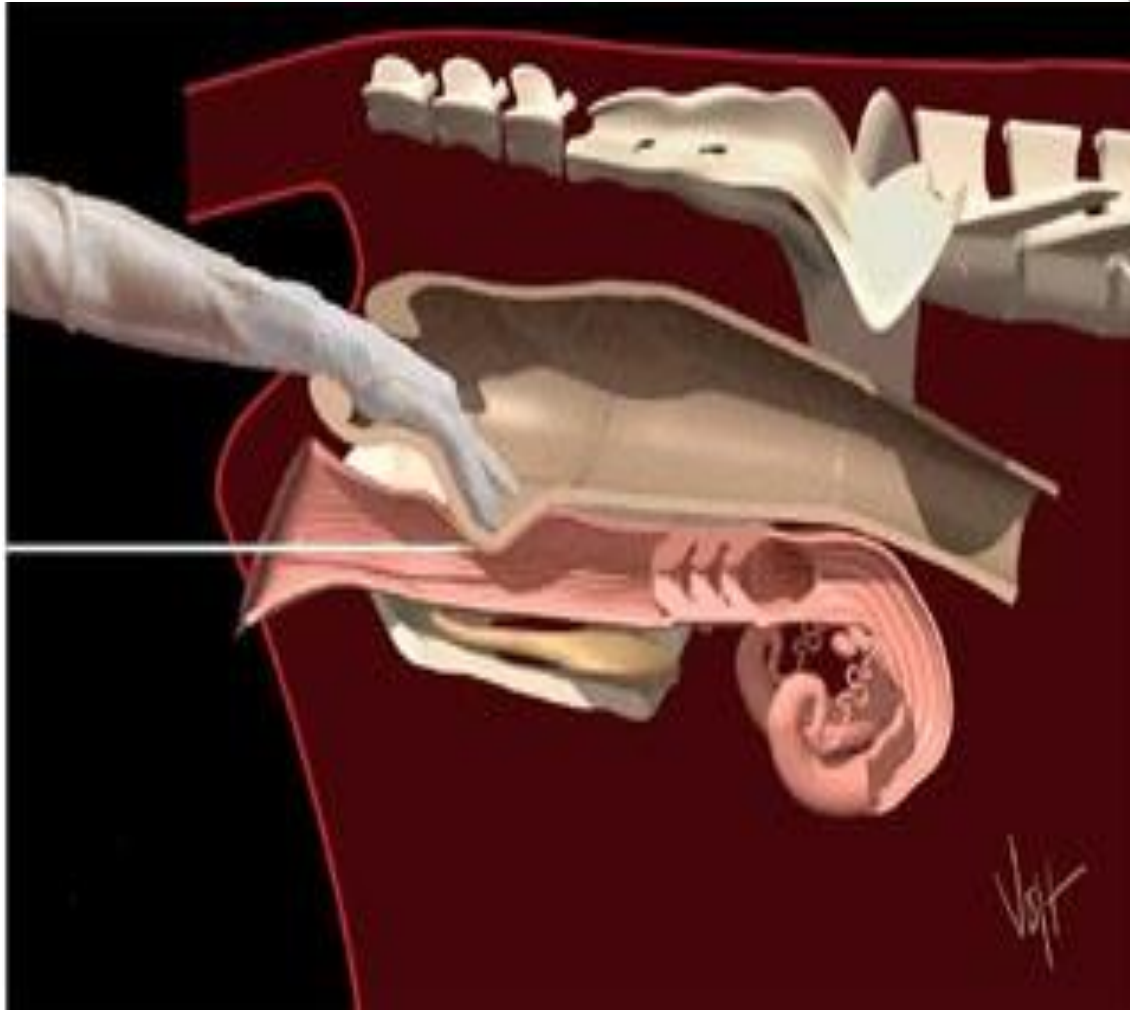
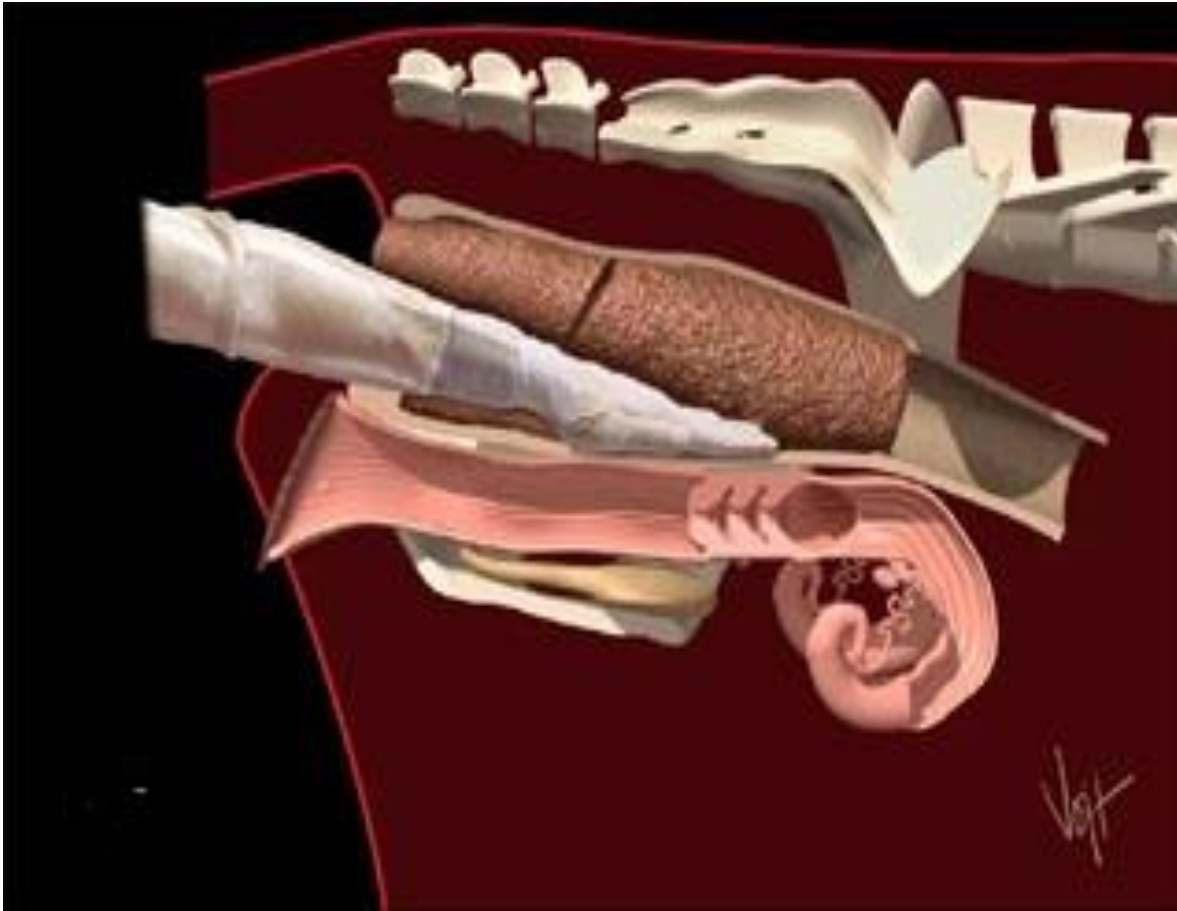


Figure #2: Allowing manure to pass over the top of the hand and arm.



Keeping the gloved hand even with the tip of the inseminator gun.



Allowing manure to pass over the top of the hand and arm.

Procedure for artificial insemination

Figure #3: Dealing with colon constrictions.

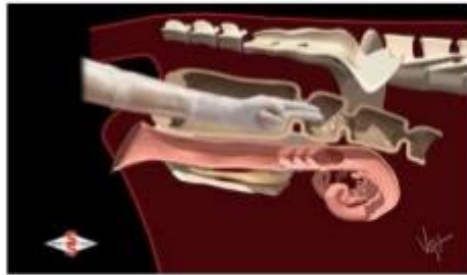
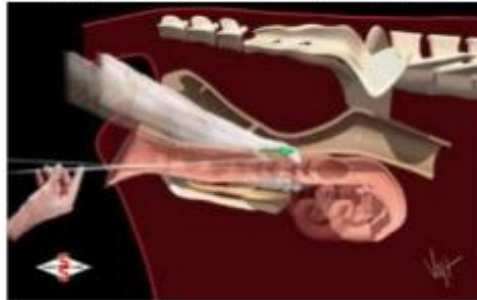
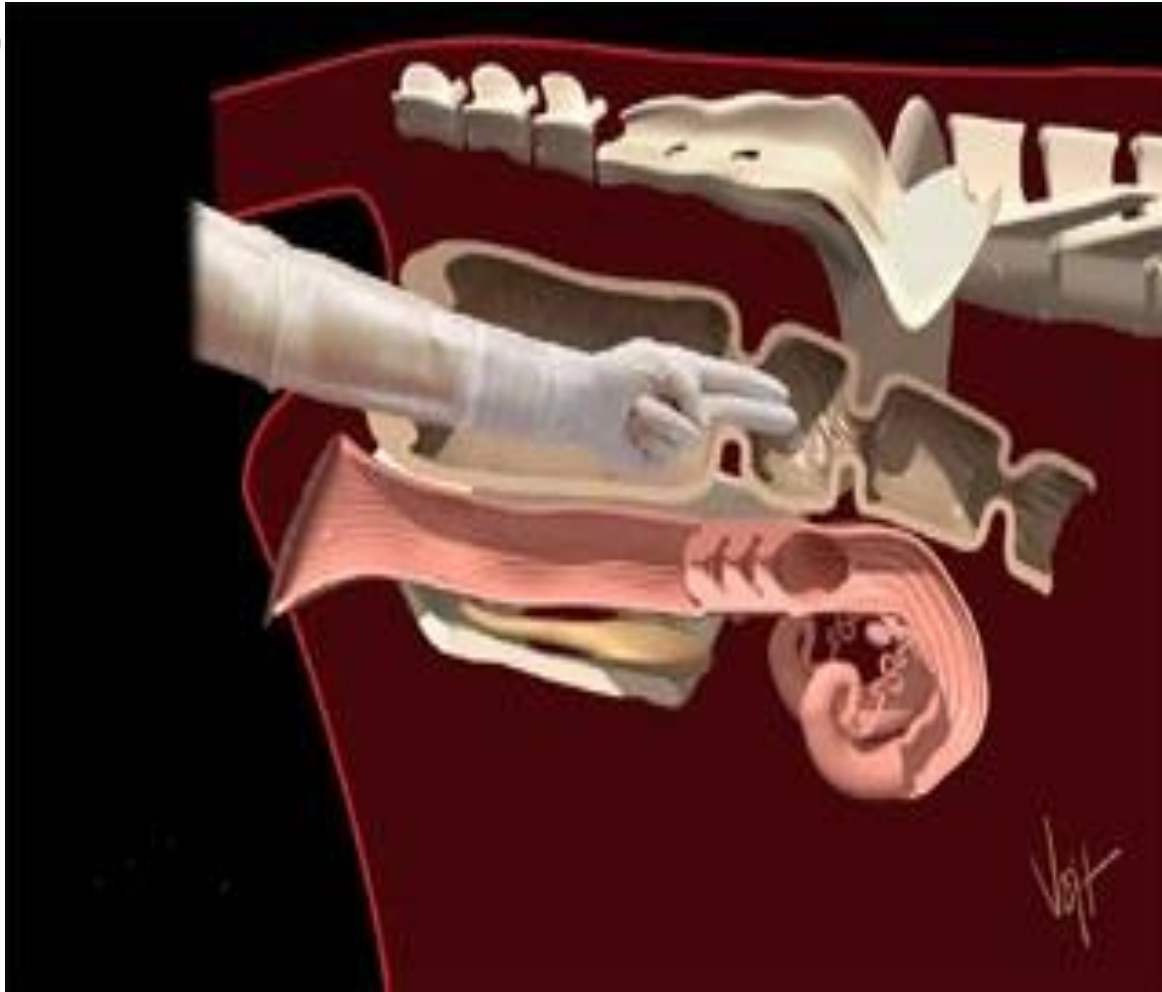
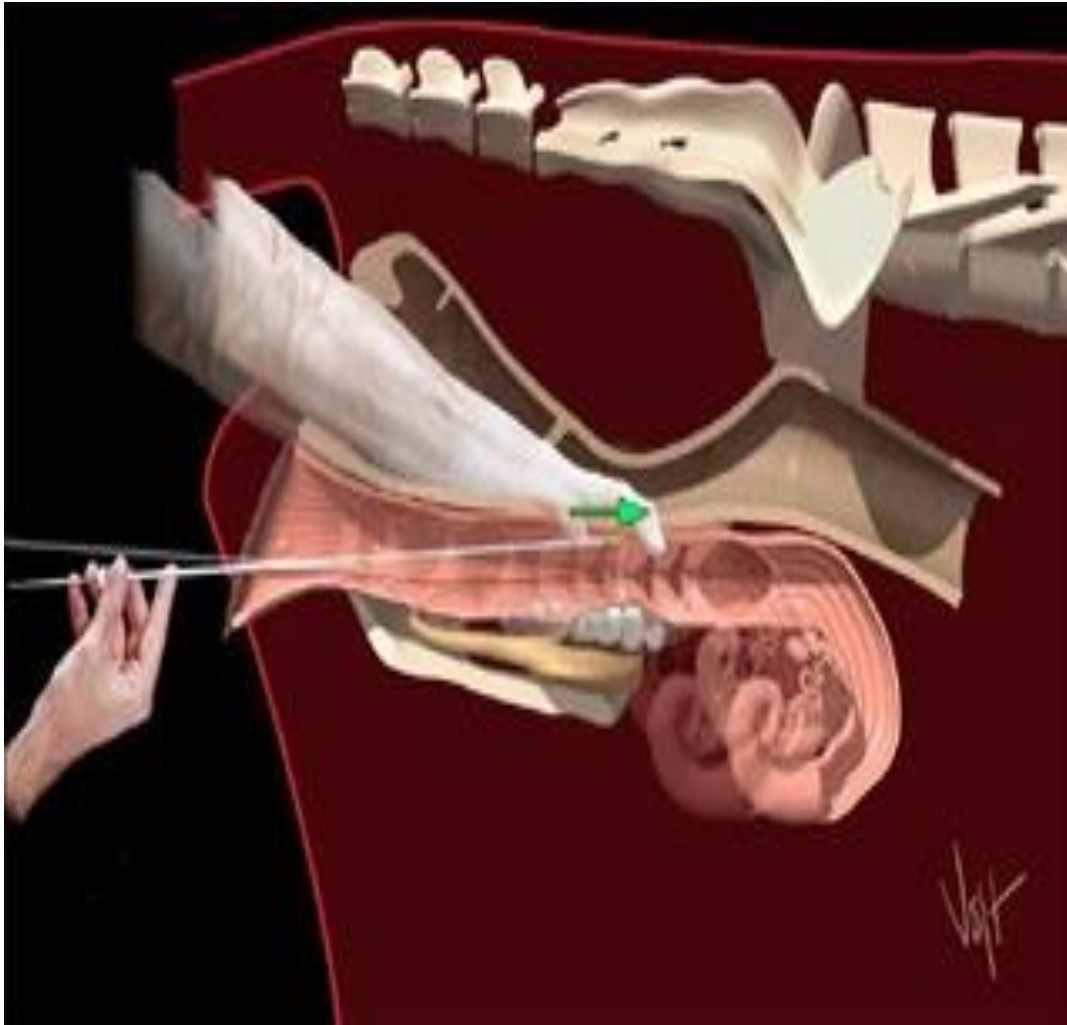


Figure #4: Grasping the cervix and gently moving it





Dealing with colon constrictions.



Grasping the cervix and gently moving it forward.

Procedure for artificial insemination

Figure #5: Close-up of the cervix.

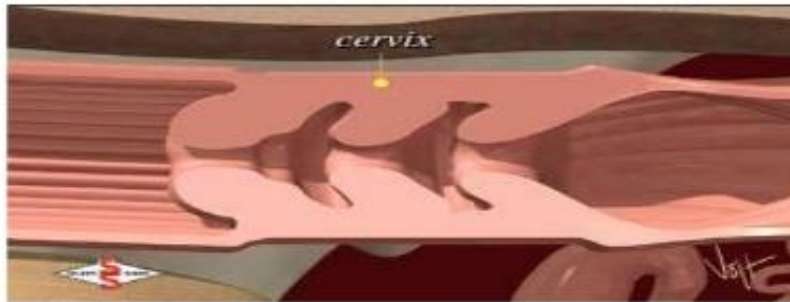
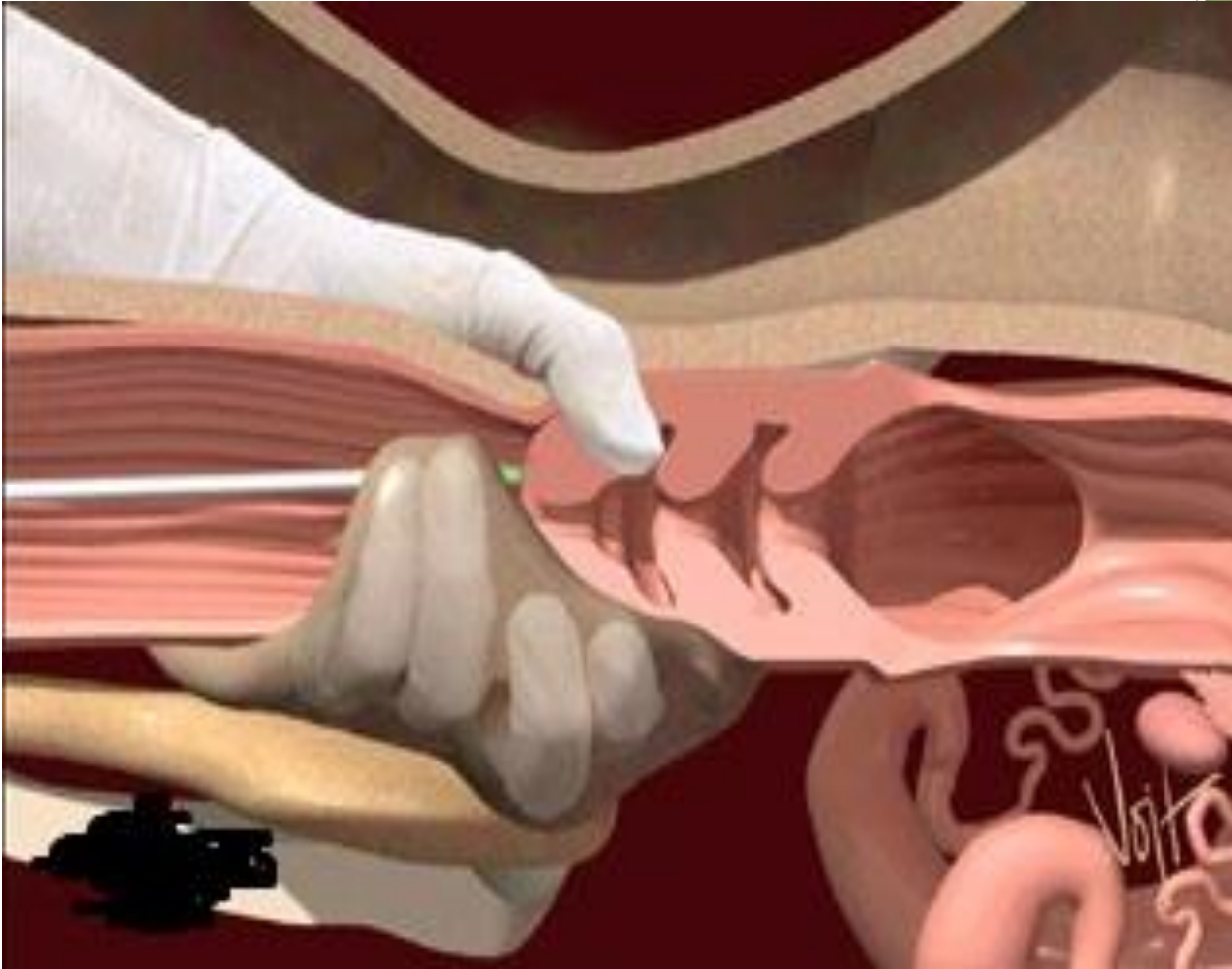


Figure #6: Finding the opening of the cervix.





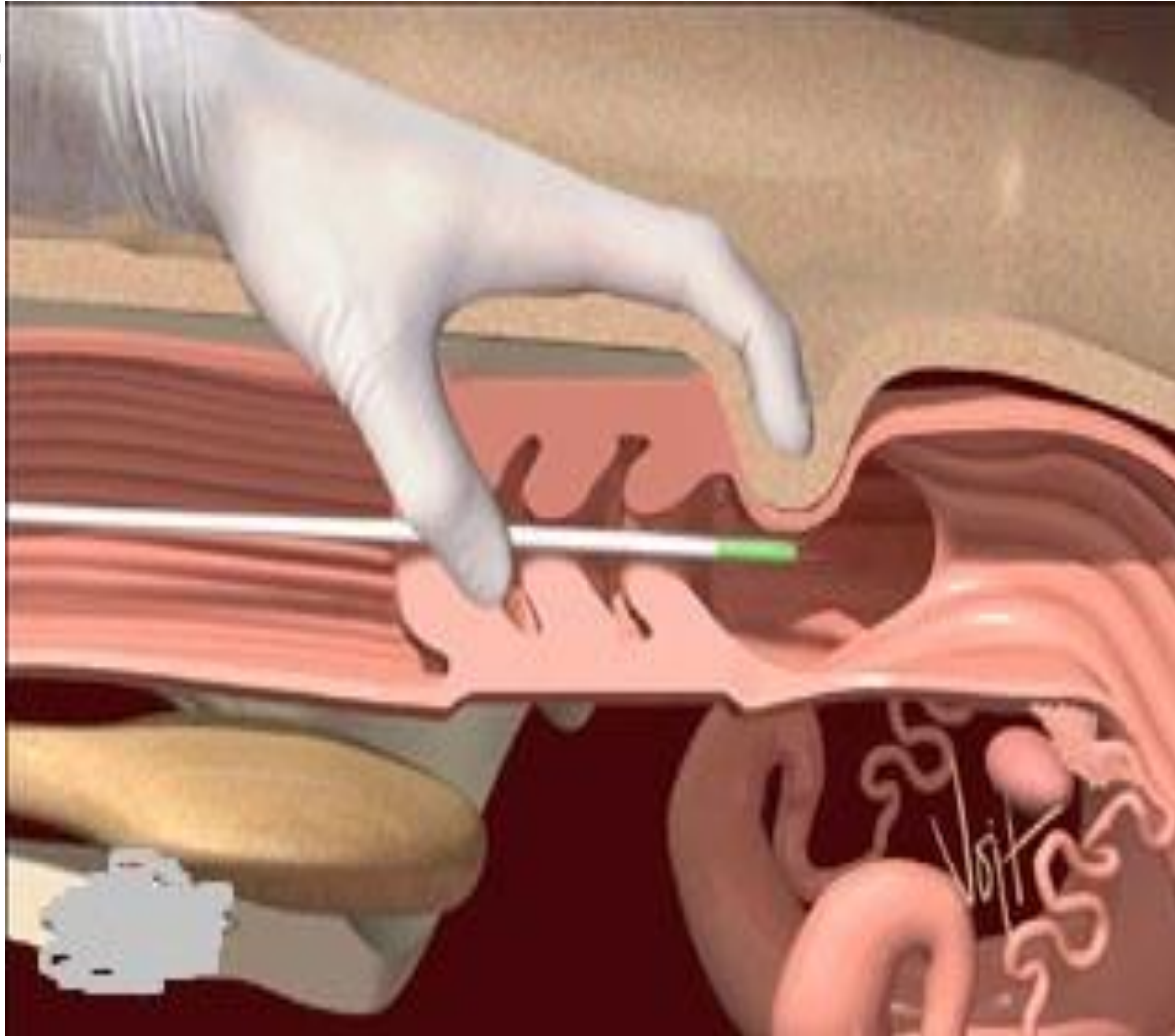
Close-up of the cervix.



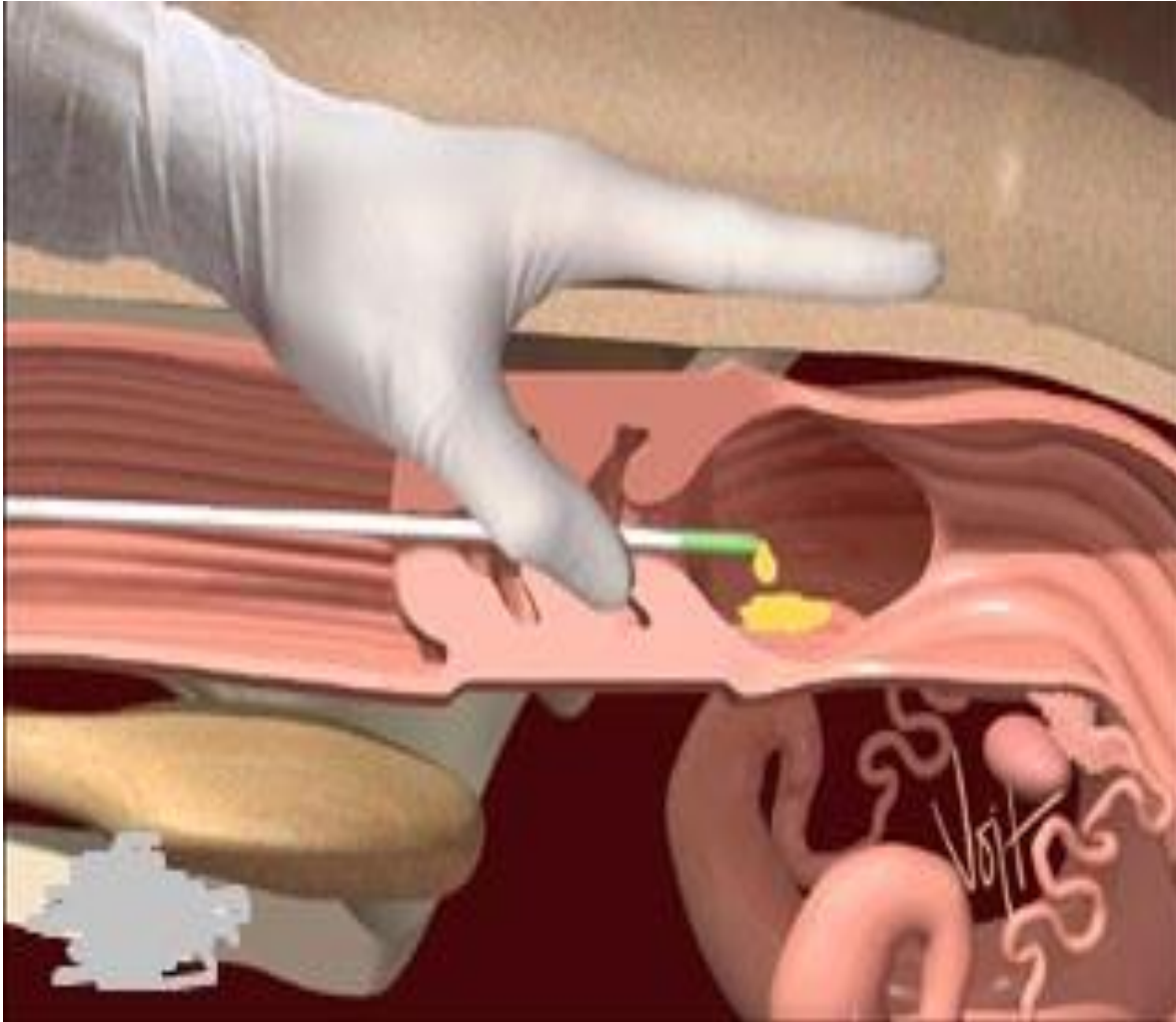
Finding the opening of the cervix.



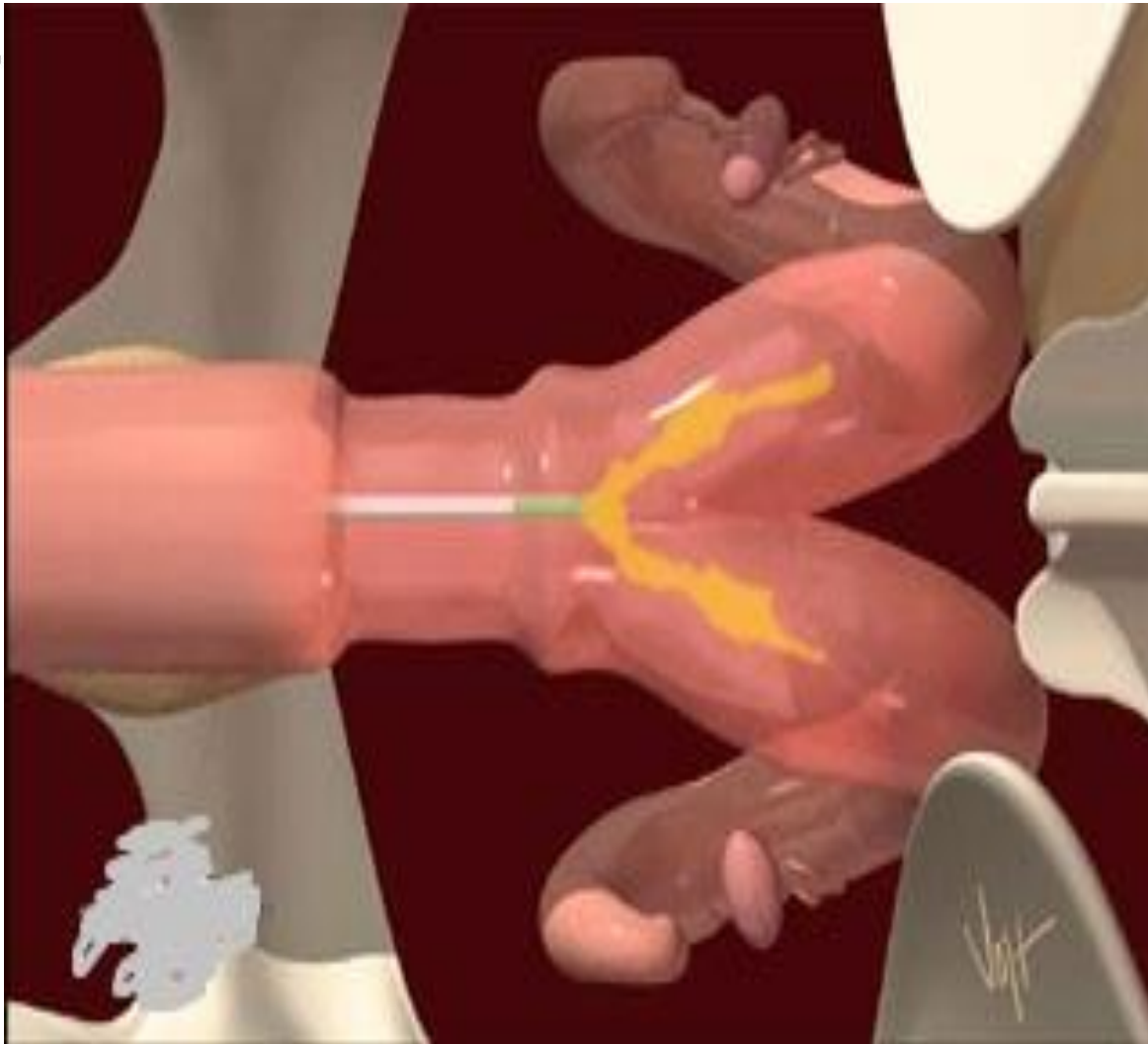
Moving the cervix over the tip of the insemination gun.



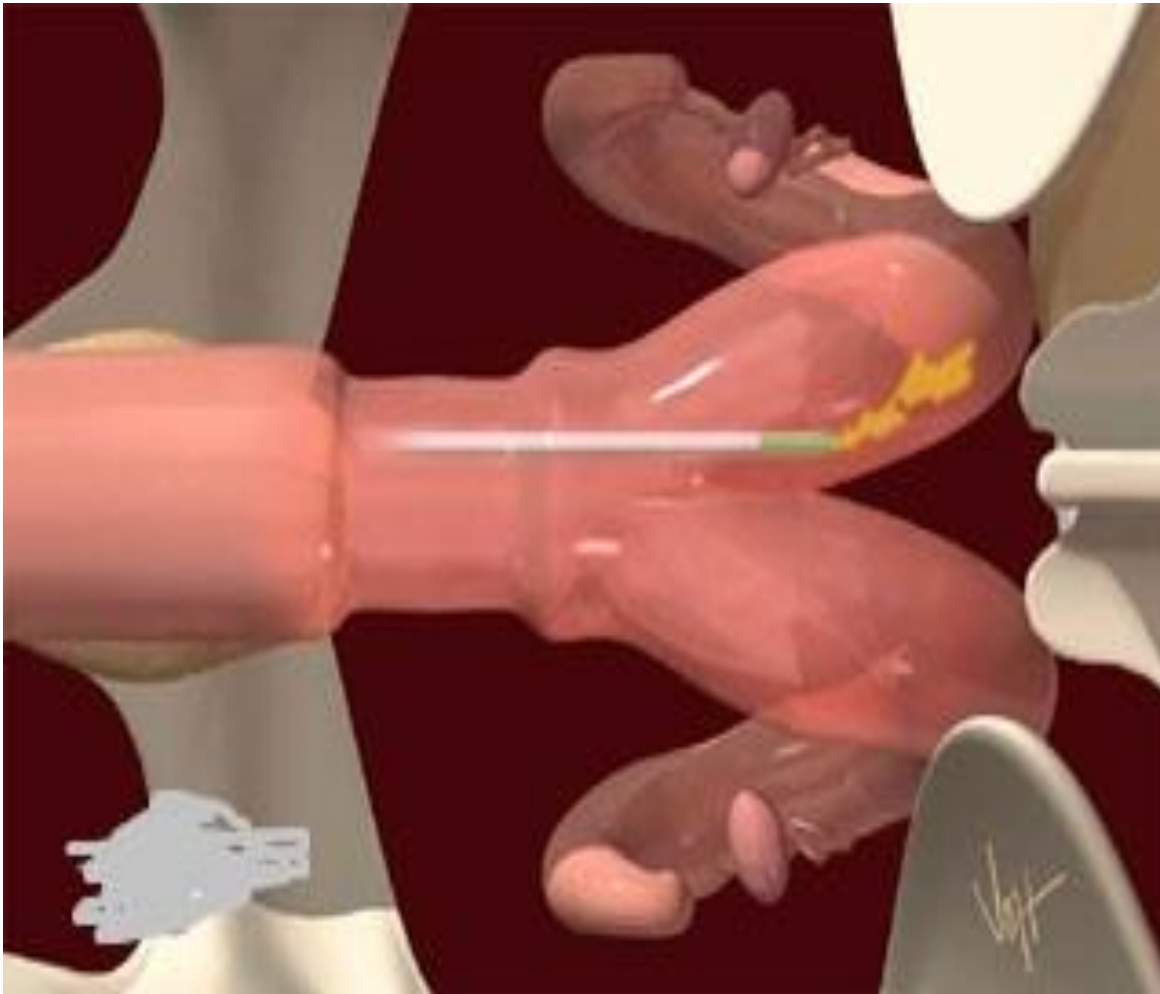
Locating the end of the insemination gun.



Depositing the semen in the body of the uterus.



Good distribution of the semen to both uterine horns.

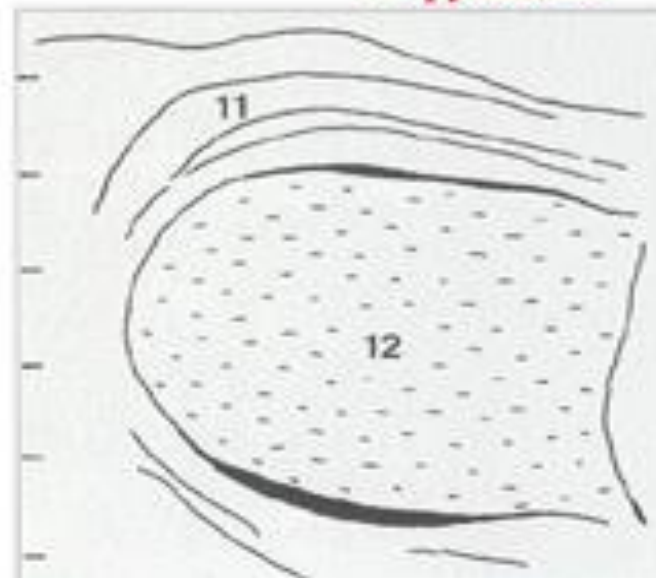


Improper distribution of the semen into one horn because the insemination gun is pushed too far forward.



Key

- 11 -uterine wall**
- 12 -pyometra**





E.I. Medical Imaging PID: TAG: 09-03-2009 06:39



L6.2
B →
FV50

G 18dB
N 20dB
F 34dB
FRZ
LOOP
139

USER1
CF

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The image is a B-mode ultrasound scan showing a large, dark, anechoic circular region, likely a vessel lumen or a cyst. The surrounding tissue is represented by a speckled, gray-scale texture. The image is framed by a black border with white tick marks on the left and top edges. Technical parameters and user information are displayed on the right side of the frame.

