

# Repeat breeding in domestic animals



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# Repeat Breeders

## Definition

A cow/ buffalo that has normal estrus & estrous cycle yet fails to conceive after 3-4 or more inseminations

Repeat Breeders are defined as a heterogeneous group of sub-fertile cows with no anatomical abnormalities or infections, that exhibit a variety of reproductive disturbances in a consistent pattern over three or more heat cycles of normal duration (Perez Mana and Espana, 2007)

# A manifestation by the animal due to multifactorial etiology

## Global Problem

Modern day high producing Holstein cows due to intensive selection for high yields have reduced fertility (Dobson et al.,2007)

**Incidence** : 06 to 35 %

2<sup>nd</sup> most common reproductive disorder

More common in cows vs buffaloes

# ETIOLOGY **Fail. Fert & EED**

## Predisposing Factors

**Nutrition** Negative energy balance

**High Protein** changes uterine pH & decrease P4

**Micronutrients** Ca, P, Mg, Cu, Zn, Vit A, E, Se

**Endocrine dysfunction**(suprabasal P4)

**Infection/reproductive tract abnormality**

**Poor semen quality**

**Age**

**Genetic**

**Immunologic** Antisperm antibody

**Peri-Parturient disease**

**Stress** Heat most important

# Repeat Breeding

## Male

### AI

Poor semen quality  
Cryo-preservation damages  
Frozen sperm 1/2 life  
Buffalo semen season

### Natural Service

Poor Nutrition  
Over-Use

## Female

**Nutritional Inadequacies**  
Lack of energy (NEBAL)  
Excess of Protein  
Deficiency of Minerals vitamins  
Specially Vit A, C, E and Se, Ca and P

**Hormonal dysfunction**  
Ovarian cysts  
Supra-basal Progesterone  
Low LH  
Low luteal progesterone  
Aberrant estrus

**Reproductive tract abnormality**  
Ovaro-bursal adhesions  
Kinked cervixes tubal blockage

**Infections Endometritis**  
Bacteria, viruses, protozoa,  
fungi

**Genetic problems and  
Immuno-infertility**

## Other factors

**Stress like heat, cold etc**

**Environmental pollutants**

**Metabolic disorders**

**Peri-parturient disorders**

**Housing**

## Services required per conception is the standard for assessment of the problem

- At conception rates of 70, 60, and 50 percent 2.7, 6.4 and 13.0% of healthy cows require 4 services to conceive.
- Low conception rates could be because of sub-optimal semen quality, faulty AI, poor hygiene and with poor CR the number of services required may further increase hence it remains difficult to define the repeat breeding problem for individual cows however, in herds-----

## Indices to assess the severity of herd problem of infertility

<b>Assesment Index</b>	<b>Normal</b>	<b>Slight problem</b>	<b>Moderate problem</b>	<b>Severe problem</b>
<b>% pregnant to a given service</b>	<b>&gt;65.0 – 60.1</b>	<b>50.1 - 60.1</b>	<b>45.0 – 50.0</b>	<b>&lt; 50.0</b>
<b>Services/ Conception of all served cows</b>	<b>&lt;1.54 – 1.66</b>	<b>1.99 – 1.66</b>	<b>2.2 - 2.0</b>	<b>&gt; 2.2</b>
<b>Calving to service interval Days</b>	<b>&lt;60.0 – 65.0</b>	<b>70.0 – 65.1</b>	<b>85.0 – 70.1</b>	<b>&gt; 85.0</b>
<b>Days Open (Calving to conception)</b>	<b>&lt;80.0 – 82.5</b>	<b>85.0 – 82.6</b>	<b>100.0 – 85.1</b>	<b>&gt; 100.0</b>
<b>% submission of all calved cows</b>	<b>&gt; 80.0 – 70.1</b>	<b>60.1 – 70.0</b>	<b>45.0 – 60.0</b>	<b>&lt; 45.0</b>
<b>Non detected estrus</b>	<b>&gt;10.0 – 14.9</b>	<b>19.9 – 15.0</b>	<b>40.0 – 20.0</b>	<b>&gt;40.0</b>
<b>Heat detection rate</b>	<b>&gt; 90.0 – 85.1</b>	<b>80.1 – 85.0</b>	<b>60.0 – 80.0</b>	<b>&lt; 60.0</b>
<b>18-24 day return intervals</b>	<b>&gt; 65.0 – 62.5</b>	<b>60.1 – 62.4</b>	<b>50.0 – 60.0</b>	<b>&lt; 50.0</b>
<b>% needing 3 services</b>	<b>&lt; 12.3 – 15.9</b>	<b>24.9 – 16.0</b>	<b>30.2 – 25.0</b>	<b>&gt; 30.0</b>
<b>% needing 4 services</b>	<b>&lt;4.3 – 6.3</b>	<b>12.4 – 6.4</b>	<b>16.6 – 12.5</b>	<b>&gt; 16.6</b>
<b>Culled as empty / year</b>	<b>&lt; 5.0 – 7.1</b>	<b>10.1 – 7.2</b>	<b>13.0 – 10.0</b>	<b>&gt; 13.0</b>

# Diagnostic Methods

- Record Analysis

- Visual

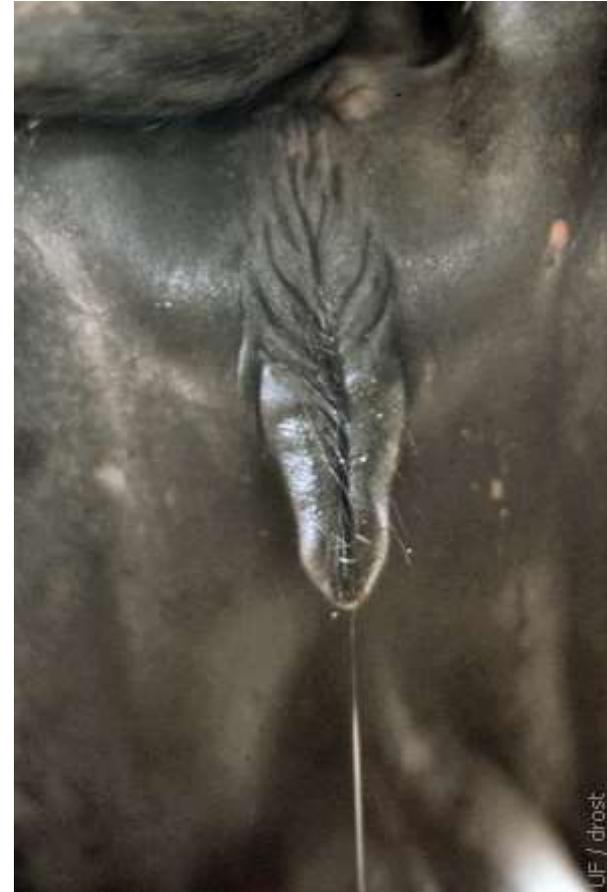
Proper estrus detection

Proper mating events

Colour, consistency of  
cervico-vaginal mucus

Vaginoscopic examination to  
exclude growths, adhesions

Uro-vagina uncommon can  
spoil semen



# Recto-genital palpation

- Uterine tone at AI- subjective
- Follicle at AI
- Ovulation depression
- Early CL day 5 Sub-optimal
- Early Embryonic deaths  
Not possible to be detected as most deaths occur before day 20



# Laboratory Tests

- Uterine pH

Normal pH 7.3

6.9 and 8.0 suggest  
endometritis

White side test to detect metritis

Cervical mucus + NaOH Boil

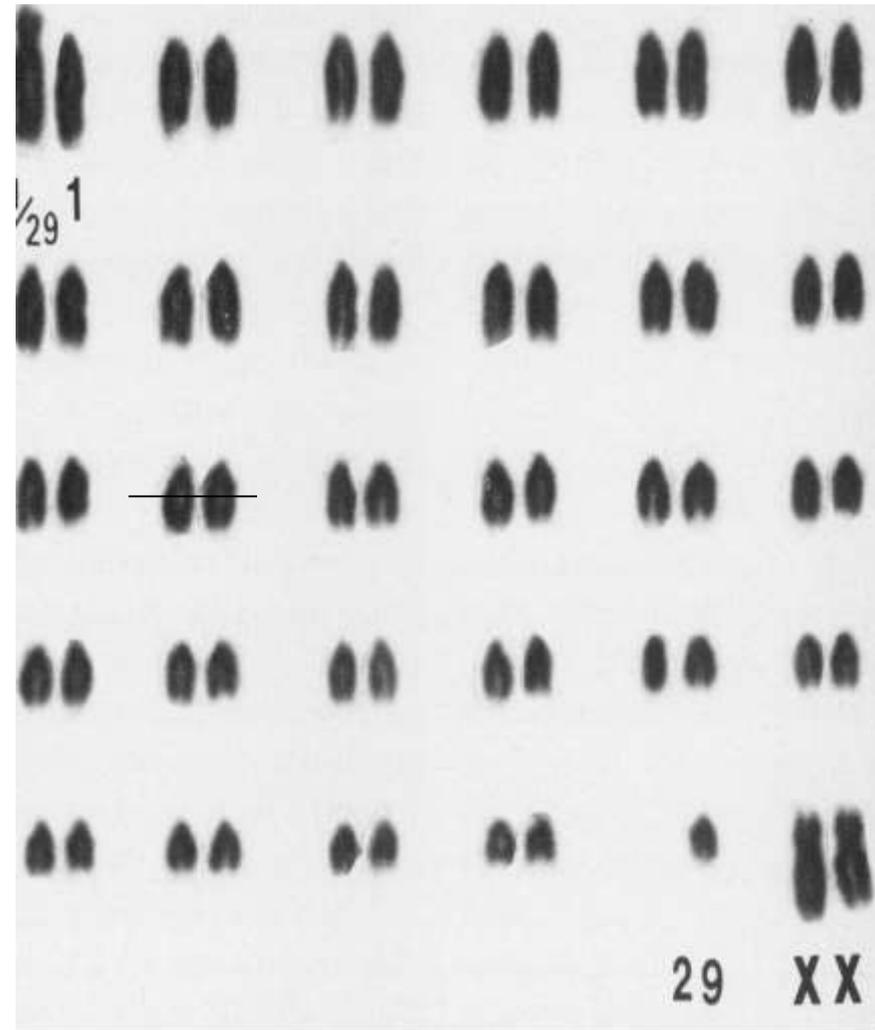
Yellow colour indicates metritis

Cervical mucus penetration assay

Hemizona assay more to asses sperm  
function

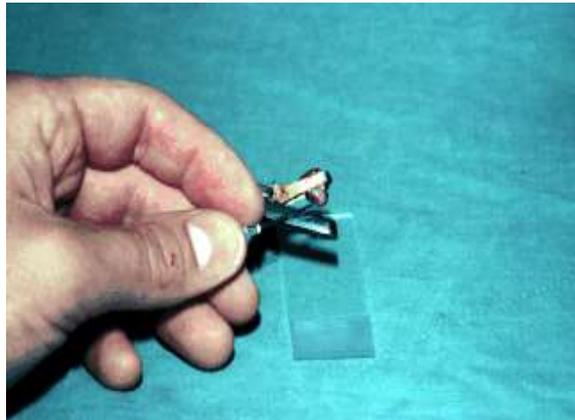
Metabolic profiles Glucose, Ca, P

Karyotyping on lymphocytes

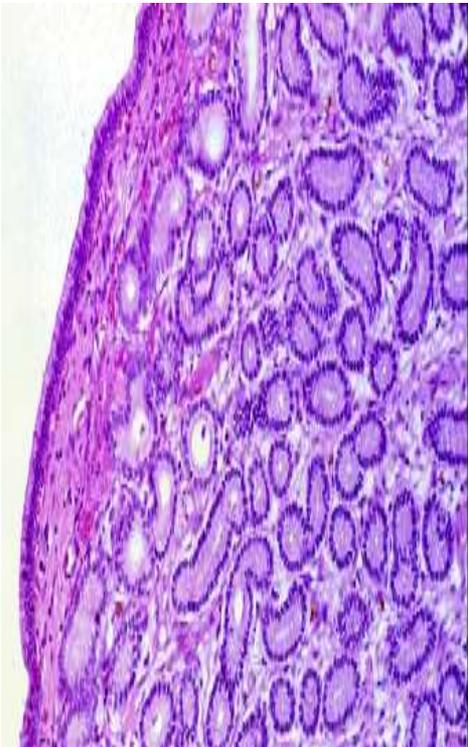
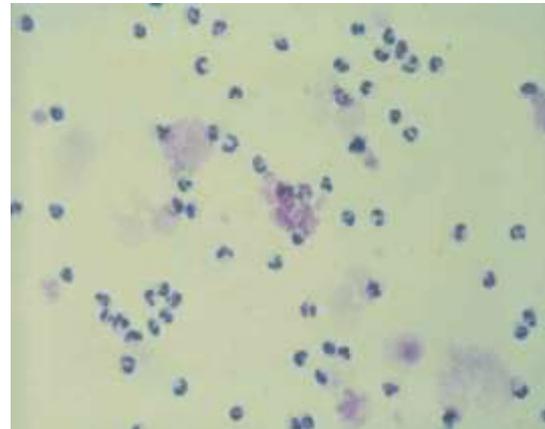


# Other Tests

- Uterine biopsy and cytology



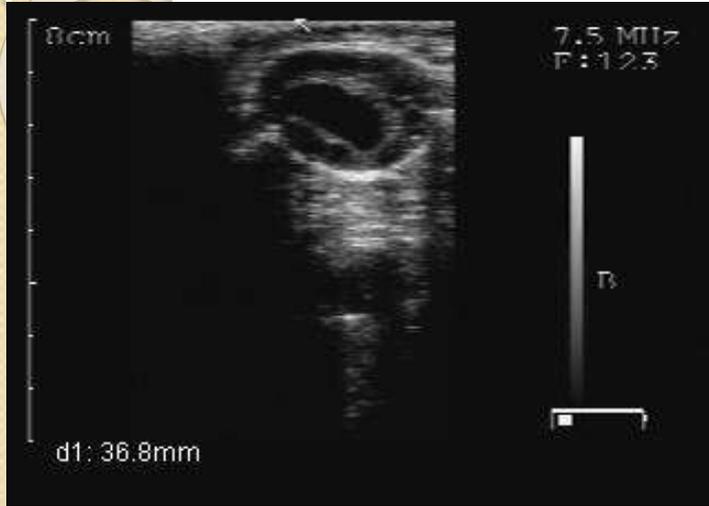
- PMNs > 18% suggest endometritis



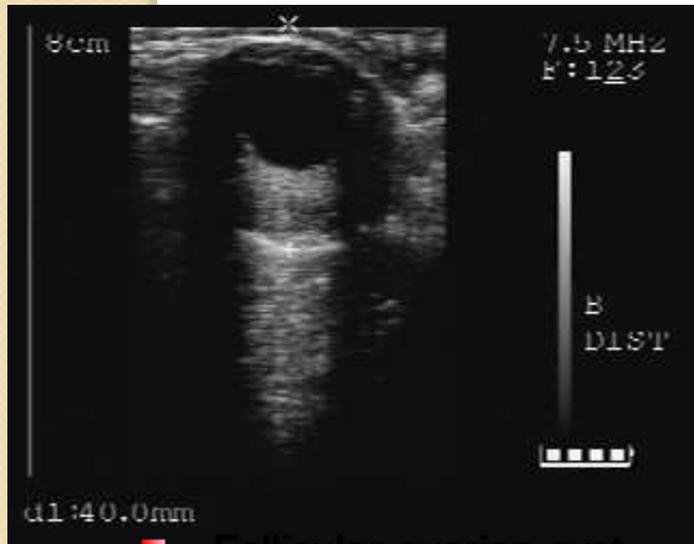
# In Vivo imaging techniques USG



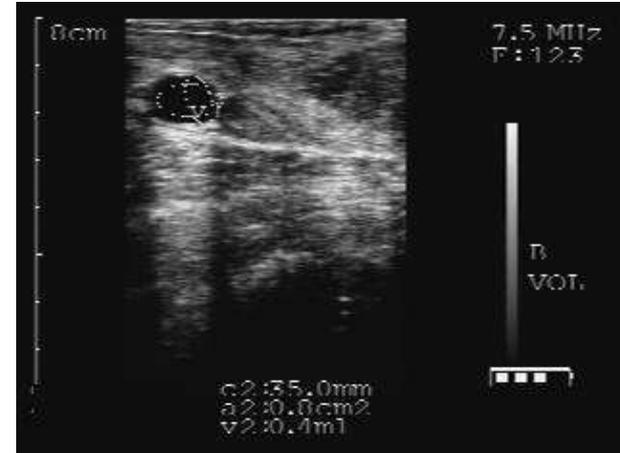
# Ultrasonography



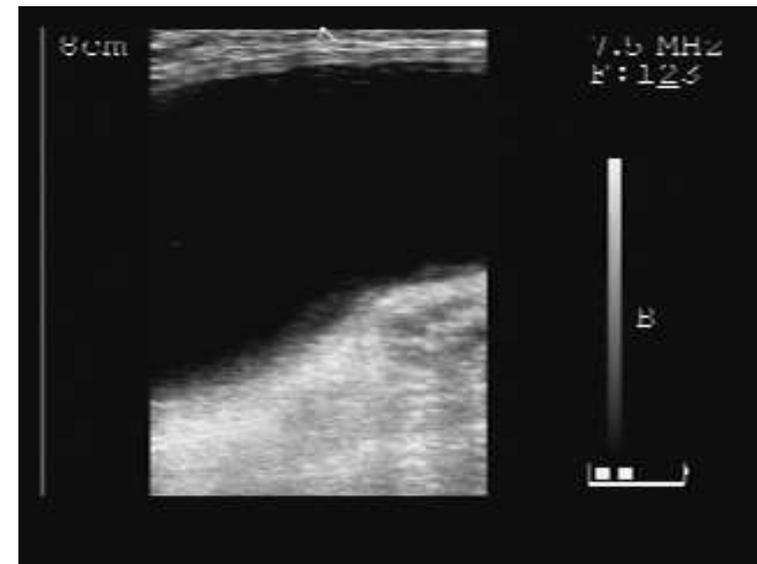
Luteal ovarian cyst



Follicular ovarian cyst

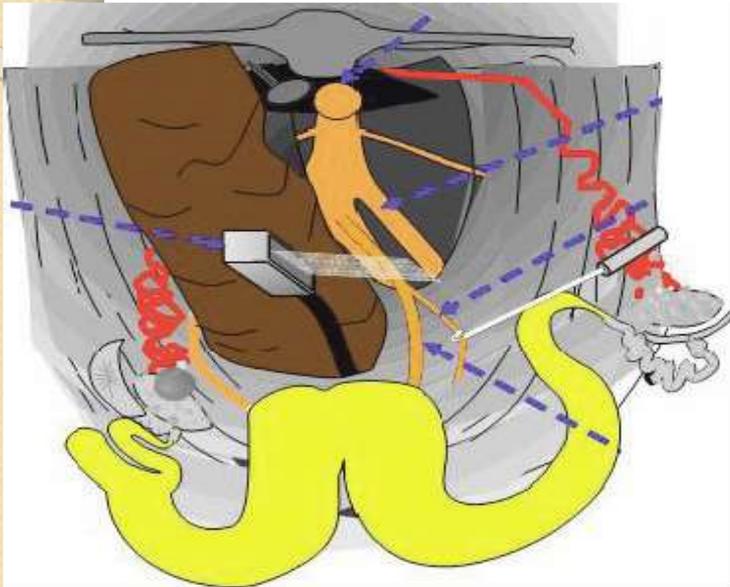


Uterine fluid accumulation

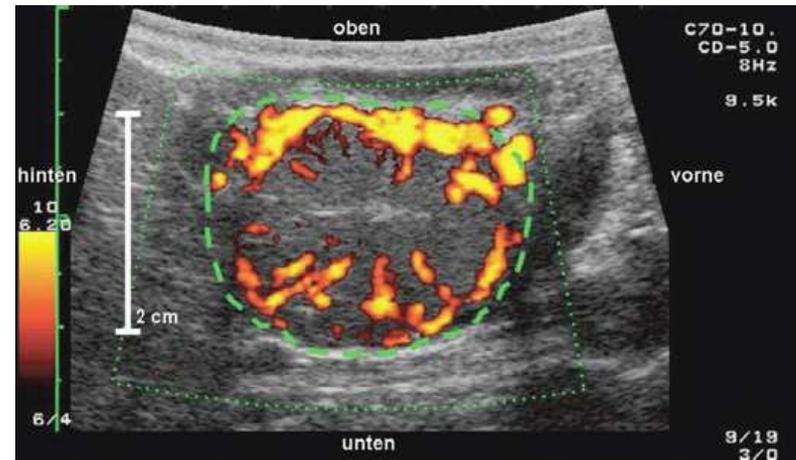


Mucometra

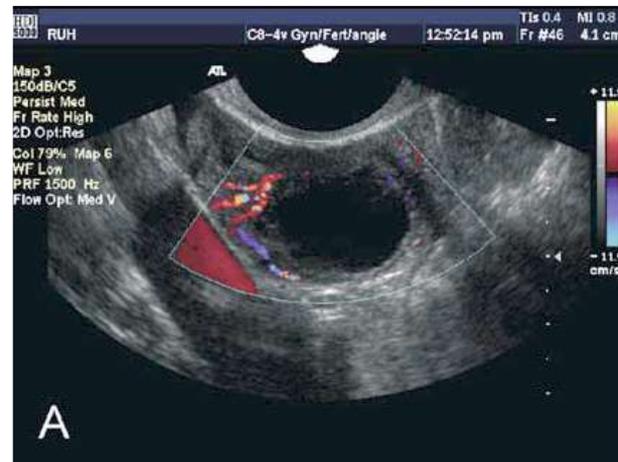
**Colour doppler** The frequency of a Doppler shift is typically between 100 Hz and 11 kHz,  
Determines echogenicity and blood flow and hence can determine physiological status of follicles/ CL etc..



Schematic representation of a cow's pelvic area



**Power-mode image of vascularization (yellow-orange) of the corpus luteum of a cow**



# Magnetic Resonance Imaging



Magnetic resonance imaging is based upon relaxation of hydrogen protons in a large magnetic field after a radio-frequency pulse (RF) has deflected the proton spin transversely.



- Three dimensional images can predict ability of follicles to produce steroid and ovulate and hence can predict the exact physiology

# CT Scan (Computer assisted tomography)

- Uses X-Rays for diagnostic purposes

Only in the developmental stage in veterinary medicine



# Hysteroscopy / Laparoscopy

- Evaluates morphology of live tissues
- Received little attention in bovine because of the cervix
- Flexible hysteroscopes more common



*U. Bleul et al. / Animal Reproduction Science 90 (2005) 193–200*

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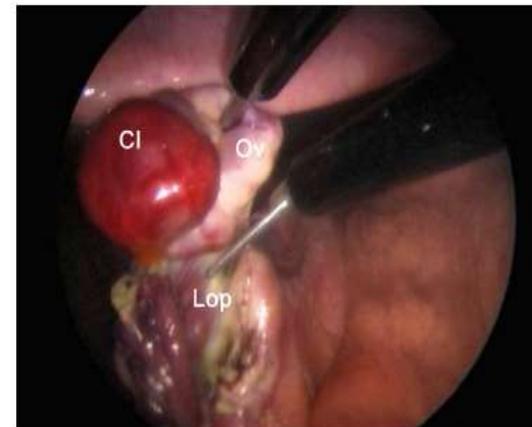


Fig. 3. Transsection of the proper ovarian ligament (Lop). CI=corpus luteum, Ov=ovary.

### 3. Results

# Hormone Assays

- RIA
- ELISA
- ECLIA

Immunosorbent assay

Progesterone assay

LH

Patency testing



Diagnosis of herd problem can be attempted but the diagnosis of cause of repeat breeding in an individual animal is extremely difficult

# Therapy

Evaluate semen

Evaluate for anatomic defects

Evaluate for nutrition and management and advice appropriate measures of correction

Evaluate reproductive hygiene and insemination procedures and adopt corrective measures

## • Herd

- Correct deficiencies
- Treat Bulls for minor problems
- Change Bulls or evaluate semen
- Vaccinate for infectious disease

## Individual animal

- Combating Uterine Infection
- Monitoring for Ovulation/Cysts
- Therapy of luteal insufficiency
- Improving AI techniques
- Improving management



# Specific corrective measures

- Genital tract infection

Intrauterine/parenteral antibiotics

Prostaglandins

Immunomodulators

Oyster glycogen 500 mg in 50 mL PBS I/Ut.

LPS 100 µg in 30 mL PBS I/Ut

Agents to alter Uterine environment

Antioxidants: 4mM Taurine + 50 mM fructose in  
PBS before AI

Vitamin C Inj Ascovet 20 mL before AI

Enzymes: Trypsin, Chymotrypsin, papain I/Ut.

Uterine motility stimulants

Mifepristone, clitoral massage



# Hormonal therapy

- Correction of Ovarian dysfunction

Delayed ovulation

hCG Injection Pubergen/Chorulon  
1500-3000 IU at AI

GnRH 100 Ug IM at AI

PG at AI

Antiprolactin Bromocryptine 10 mg  
orally 12 h before and at AI

Dextrose 500mL IV at AI plus  
Bovine insulin 0.2 IU/Kg IV

Clomiphene 300 mg orally

Metformin 2000-4000 mg orally

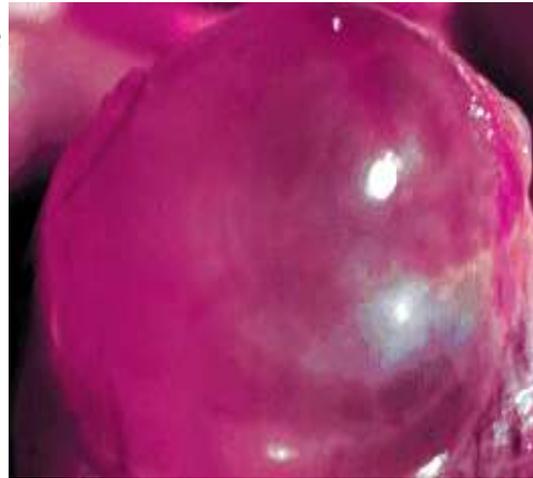


# Ovarian Cysts

Single IM injection of Progesterone  
Vaginal progesterone implants  
100 U<sub>g</sub> GnRH  
Ovsynch protocol  
PG + GnRH (day 0) + PG (day 14)  
Transvaginal US guided aspiration

## Mucometra

Pott Iodide 10-15 gm daily with  
feed for 5-7 days  
Ifer-H 2 mL SC



# Luteal Insufficiency

hCG injection at 4-5 days of AI

Progesterone injection 500 mg at 5 days of AI

Progesterone vaginal implants.

Recombinant Bovine Somatotropin 500 mg SC at AI

Antiestrogens Tamoxifen citrate ??

GnRH at AI and at day 14-16

Bovine insulin on day 8,9 and 10 of estrus

Feeding of fish oil

# Nutritional Management

- Management of dry cows important
- Advice not to feed more than 10% of rumen degradable proteins
- Dry cows should be fed low energy high fibre diet with more of chopped straw
- Feeding of anionic salts with Ca and P
- Injections of vitamin A, E and C important



# Timing of AI/ Semen deposition

- Multiple AI in long estrus periods
- Training of AI Personnel
- Deep Intrauterine AI

## Avoiding Periparturient disorders

Metabolic diseases Ketosis/milk fever

Parturient problems

## Immuno-infertility

More anecdotal

Give vitamin C, E and dexamethosne

Change the bull or semen

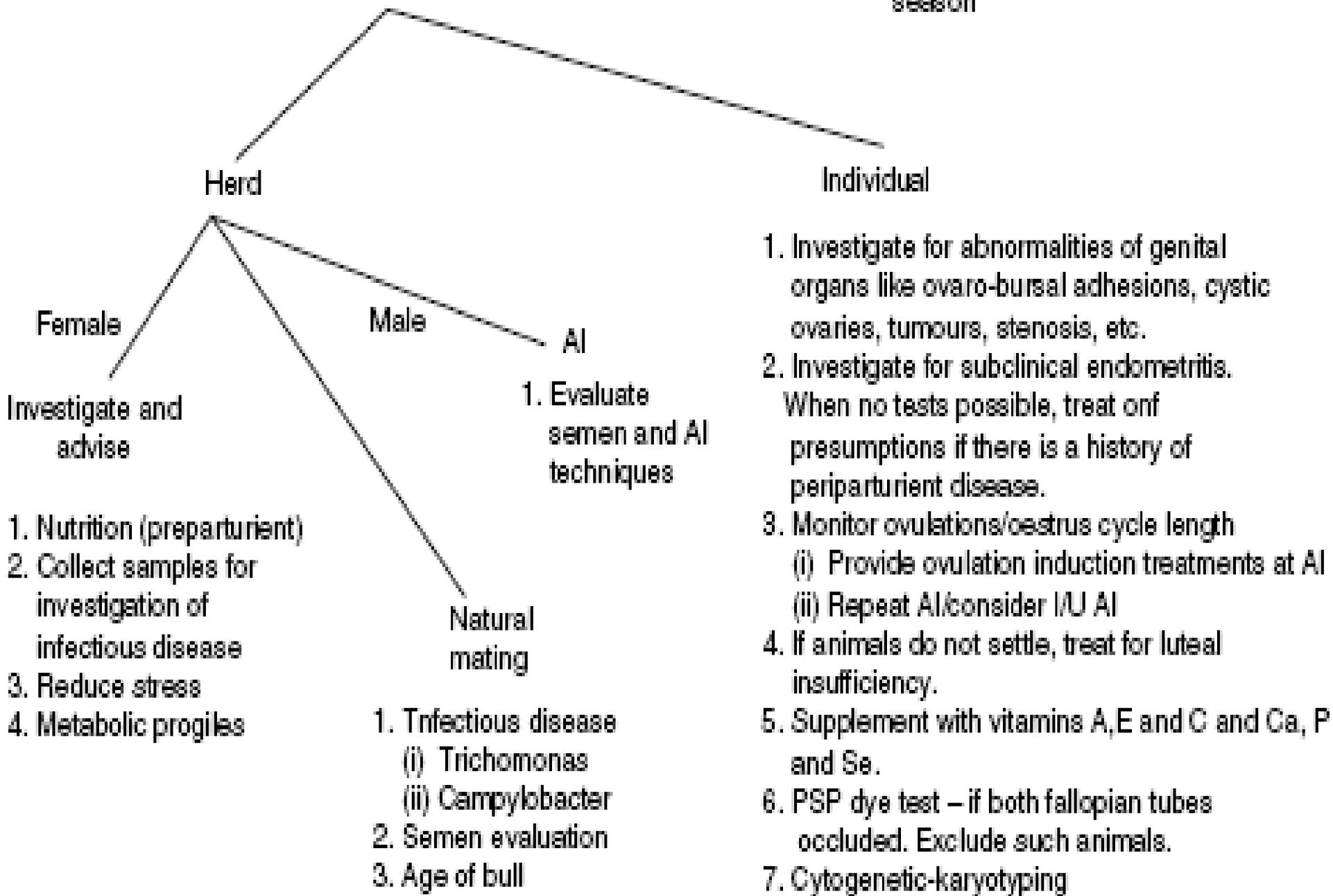


# Other therapies

Acupuncture and Intraperitoneal AI or embryo transfer.

- Repeated inseminations
- Mineral vitamin supplements
- Cooling of heat stressed cows/ buffaloes
- Adequate hygiene at parturition & at AI
- Regular and frequent check of semen
- Addition of sperm motility enhancers when liquid semen is used eg. caffeine
- Prevention of natural mating with scrub bulls

Repeat breeder cow/buffalo → Exclude effects of season



Female

Herd

Individual

Male

AI

Natural mating

Investigate and advise

- 1. Nutrition (preparturient)
- 2. Collect samples for investigation of infectious disease
- 3. Reduce stress
- 4. Metabolic profiles

- 1. Evaluate semen and AI techniques

- 1. Infectious disease
  - (i) Trichomonas
  - (ii) Campylobacter
- 2. Semen evaluation
- 3. Age of bull

- 1. Investigate for abnormalities of genital organs like ovaro-bursal adhesions, cystic ovaries, tumours, stenosis, etc.
- 2. Investigate for subclinical endometritis. When no tests possible, treat onf presumptions if there is a history of periparturient disease.
- 3. Monitor ovulations/œstrus cycle length
  - (i) Provide ovulation induction treatments at AI
  - (ii) Repeat AI/consider I/U AI
- 4. If animals do not settle, treat for luteal insufficiency.
- 5. Supplement with vitamins A,E and C and Ca, P and Se.
- 6. PSP dye test – if both fallopian tubes occluded. Exclude such animals.
- 7. Cytogenetic-karyotyping

## Embryonic losses are reported to be 20%–30% in ewes, goats and sows

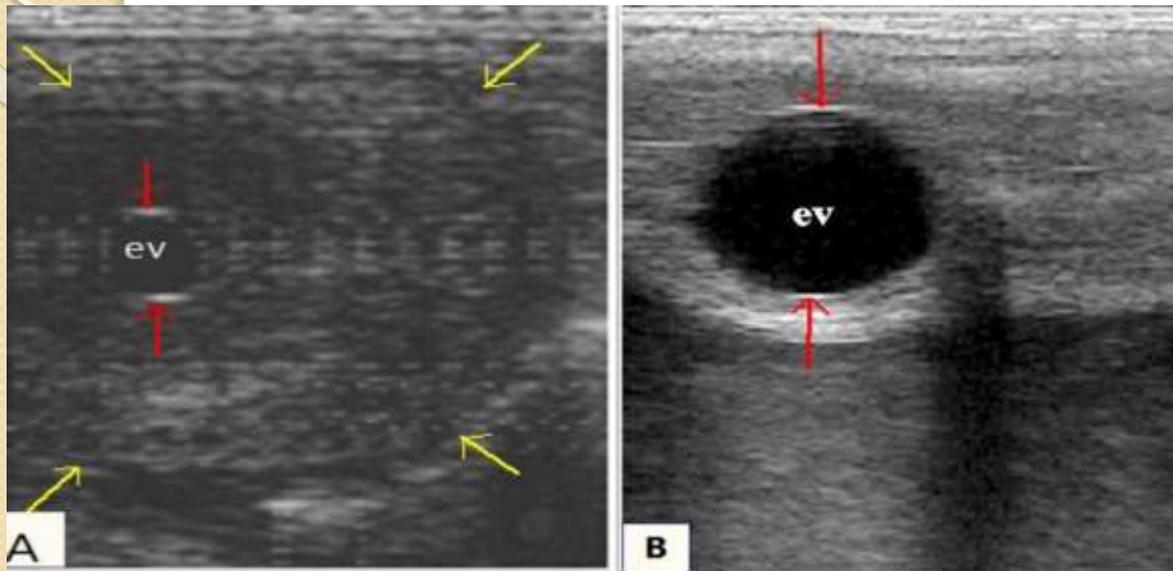
- The major reason for embryonic mortality is likely to be inadequate luteal function
- Consumption of toxic plants
- The injection of GnRH between days 10 and 13 after mating
- Progesterone FGA Day 4 after mating



# Mare Embryonic Resorption

- Endometritis
- Alterations in progesterone levels, the uterine and oviductal environment, maternal age and postpartum breeding have all been implicated with causing EED, either directly or indirectly.
- Foal heat breedings
- Retarded development of the embryo

Progesterone supplementation is probably the most common method of treatment



Administration of Regumate starting from Day 5 and continued till Day 120 and tapering thereafter

# Embryonic losses in camels

- Occurs between Day 20-90 of gestation
- Incidence 5-20%
- Diagnosis USG, plasma progesterone
- Day 15 and 35 important

# Reasons of Embryonic losses in Dogs

## Infectious Reasons

***Brucella canis***: The most important clinical signs are abortion in late pregnancy (after 45<sup>th</sup> day) in bitches.

Although there are no clinical signs prior to abortion, a serosanguinous discharge may be observed for 1-6 weeks following abortion

Recommended antibiotics for *B.canis* treatment are minocycline (25 mg/kg SID, 21 days) and ihydrostreptomycin (5mg/kg IM, 7 days) combined, tetracycline (30 mg/kg BID, 21 days) and streptomycin (20 mg/kg IM, 14 days) combined and per os enrofloxacin for 4 weeks

- Fetal death, mummification, abortion, premature birth and stillbirth may occur if pregnant bitches are infected with canine herpes virus.
- ***Neospora caninum***: *Neospora caninum* is a protozoan of which its final host is dog. *Neosporosis* causes early fetal death, mummification, fetal resorption and weak neonatals in pregnant bitches (6,8,11,12). However, it is not definite yet if *N. caninum* is the primary reason of natural abortions of bitches or not

- **Non-Infectious Reasons**

**Hypoluteodism:** Hypoluteodism is due to insufficiency of plasma progesterone concentration  
The best option accepted in hypoluteodism treatment is daily administration of 0.1 mg/kg *Megestrol acetate* up to 62nd day of pregnancy

- **Drugs:** Adverse effects of drugs in pregnant cause congenital malformation of embryo or fetus due to teratogenic effect or cause fetal resorption or abortion because of embryotoxic effects

## Classification of drugs according to their safety during pregnancy .

<b>Safe</b>	<b>Careful Operational Safety</b>	<b>Risky</b>		<b>Contraindicated</b>
Amoxicillin	Antiemetics	Amikacin	Prednisolone	Ciprofloxacin
Ampicillin	Atropine	Amphotericin	Primidone	Diethylstilbestrol
Antacids	Cimetidine	Aspirin	Propranolol	Estradiolcypionate
Cephalosporins	Diazepam	Amitraz	Salicylates	Griseofulvin
Clavulanic acid	Diphenhydramine	Betamethasone	Thiacetarsamide	Oxytetracycline
Diethylcarbamazine	Dopamine	Captopril	Tobramycin	Stanozolol
Digitalis	Furosemide	Chloramphenicol	Valproic acid	Streptomycin
Erythromycin	Ketoconazole	Cortisone	Phenylbutazone	Testosterone
Fenbendazole	Metoclopramide	Dexamethasone	Phenytoin	Tetracycline
Ivermectin	Ranitidine	Flumethasone		
Lincomycin	Sulfasalazine	Flunixinmeglumine		
Mebendazole	Sulfonamides	Gentamicin		
Miconazole	Theophylline	Ibuprofen		
Neomycin	Thyroxine	Indomethacin		
Piperazine	Trimethoprim	Levamisole		
Praziquantel	Metronidazole			
Pyrantel				
Sucralfate				

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- The above lectures are also explained in video lectures at my YouTube Channel Govind Narayan Purohit
  - Kindly share the videos and subscribe to my channel if you like them
  - Thanks