**PREGNANCY (Gestation)**

Following the successful insemination, a cow becomes pregnant.

An animal is said to be pregnant when it had a young one developing in the uterus. Pregnancy extends from fertilization of the ovum to the birth of the young. A pregnant cow is also referred to as in-calf cow.

Gestation period varies from animal species to species e.g. on average it is 114 days in sow, 282 days in the cow, 148 days in ewe and she goat; 335 days in the horse (mare) and 28-30 days in the rabbit (doe).

**Signs of pregnancy in cattle**

* The cow doesn’t go on heat 21 days after mating due to persistent corpus luteum.
* Enlargement of the belly.
* The cervix closes
* The pulse rate of the animal is higher than normal.
* The udder fills up with a thick, honey like substance towards the end of pregnancy.
* The temperature of the cow goes slightly higher than normal.
* The flanks become hollow while the spine and root of the tail becomes more prominent.
* The body weight of the animal increases considerably especially from the fifth month of pregnancy.
* The skin of the animal becomes smooth and shiny.
* Increase in the level of progesterone in blood and urine.
* The udder increases in size as pregnancy progresses.
* Some signs of life can be detected in the later stages by feeling through the abdominal wall of the right flank.
* Abdominal movements are visible especially in the late periods of pregnancy.
* Corpus luteum can be felt when examined by the veterinary doctor.
* The developing foetus can be felt through the wall of the rectum at the age of about two and a half month.

Methods of diagnosing pregnancy

1. Rectal pulpation: This can be done by the veterinary doctor to feel and study the stage of pregnancy, development of the foetus and changes in the genitalia and associated structures of the dam.
2. Use of biological tests: the presence of gonadotrophic substances produced by the placenta and chorion in urine and blood e.g. progesterone and chorionic gonadotropin (HCG) can be used to detect pregnancy.
3. Observation for absence of oestrus 21 days after service; failure of a cow to come on heat at the time of the next expected heat period is the common and cheapest indication of pregnancy. However, it is not a sure proof of pregnancy because other factors may contribute to absence of oestrus e.g. infections and persistent corpus luteum.
4. Vaginal biopsy; This is based on the studies in the changes of the vaginal wall. The layers of the vaginal epithelium reduce in number in the early days of pregnancy.
5. Use of ultra sound; this is based upon generation of high frequency sound through different tissues. The piezometer is inserted in the rectum and receives ultrasonic energy from the foetus.
6. Use of x-ray studies: X-ray pictures can be used to effectively establish pregnancy especially after foetal bones have formed and started calcification. It can be used to detect progress of foetal development at particular stages.
7. Observation for changes in contour of the abdomen; as pregnancy advances in any female, dropping of the abdomenial wall occurs as well as widening of the abdomen. This is termed as bellying down. This occurs due to increase in the size of the foetus and foetal fluid and enlargement of the uterus.

Benefits of diagnosing pregnancy to a farmer

* It helps the farmer to reorganize resources in time for the next service in case there was no conception by the female.
* It enables the farmer to study and monitor the progress in the developing embryo and timely seek veterinary help in case a problem is detected.
* It helps in identifying sterile or infertile animals for culling.
* It helps the farmer in proper management of the feeding programme i.e. pregnant animals require extra feeding to cater for increased nutritional and developmental demands of the foetus.

**MANAGEMENT OF A PREGNANT COW UP TO CALVING TIME**

* Carryout pregnancy diagnosis two months after service and in case the animal failed to conceive is returned to service.
* Provide adequate clean water audibly.
* Provide enough feeds/pastures to the cow.
* Ensure effective control of external parasites/hand spray the animal using recommended chemicals to control external parasites.
* Deworm regularly using recommended dugs to control internal parasites.
* Treat diseased cow immediately.
* Ensure proper handling of the cow.
* Vaccinate the animal against killer diseases so as to protect the unborn calf.
* Dry off the cow at the seventh month of pregnancy to prepare it for the next lactation.
* Carryout steaming up in the last two months of pregnancy to enable the cow prepare for calving.
* Isolate the animal from the rest of the herd two weeks before calving and confine it in a nurse paddock/calving pen.
* Disinfect the calving pen using suitable chemicals to kill germs before confining a cow.
* Provide clean beddings in the calving shed.
* Watch the cow closely for signs of calving down.
* Leave it alone to calve unless there are signs of complication.
* Assist in case of minor complication and call a veterinary doctor immediately in case of serious complications.
* Provide warm water to the animal to enable it release after birth.
* Remove the after birth after calving to prevent the animal eating it.
* If the after birth is retained to release the pressure in the udder.

**Drying off**

This is the practice of stopping milking a pregnancy cow at about two to three months towards calving.

A dry cow is one that has been in lactation and then dried off to prepare for calving.

A dry period is usually two months.

**Procedure of drying off:**

1. Incomplete milking:

In this method the cow is milked halfway in the morning and in evening and the left. This is done to reduce the amount of milk in the udder. It is done for 3 to 4 days.

This method is the best to apply on heavy milkers.

1. Intermittent milking

Here the cow is milking on a alternate days for 3 – 5 days after which milking is stopped completely. Or the cow is milked once a day either in the morning or evening for about five days after which milking is stopped.

1. Ceasation:

This is the complete stoppage of milking.

This method works best in cows that tend to give milk yields towards the time of drying off.

1. **Drying therapy:**

Here antibiotics e.g. orbenin are included in feeds to suppress milk production.

It is advisable to apply long acting intramammary antibiotics to avoid infection of the udder.

**Reasons for drying off**

1. To restore the udder tissue for the next lactation.
2. To allow the cow regain the lost weight during lactation.
3. To allow the udder to produce colostrum for the newly born calf.
4. To enable the growing foetus to get more nutrients so that calving it is strong and healthy.
5. To allow the animal’s body to rebuild/replenish its mineral reserves especially calcium and phosphorus that are required for milk production.

**Steaming up**

This is the practice of feeding a pregnant cow on feeds of high nutrient value/extra concentrates in the last two months of pregnancy.

**Reasons for steaming up**

* To cater for increased foetal nutrient demand.
* To prevent nutritional disorders associated with milk secretion e.g. milk fever, grass tetany, ketosis.
* To accustom the animal particularly heifers to the milking parlour.
* To enable the cow produce a lot of milk after calving.
* To replace the nutrients that have been used in the development of the foetus.
* To get the cow into fit physiological conditions for milk secretion.
* To allow the cow to build up its body reserves so that it can have sufficient energy at calving.
* To enable the cow produce heavy and healthier calf.

**CALVING**

This is the act of giving birth to calves. It is brought about by the contraction of the uterine muscles and relaxation of the muscles of the muscles of the cervix.

**Signs of calving/calving down**

* Enlargement of the vulva (vulva becomes flabby)
* The cow isolates herself from the herd.
* Frequent urination
* Loss of appetite.
* The cow repeatedly arches her back and raises tail.
* Pelvic muscles relax
* The cow walks with difficulty
* The animal lies down
* The animal becomes out a few hours before calving.
* Colostrum secretion is seen on the teats
* Pin bones become more prominent
* Udder enlarges and becomes filled with milk.
* Thick clear mucus is seen on the vulva
* Deep breathing

**Presentation of the foetus in the birth canal**

The calf or kid is normally present front feet first with the head extended and the nose between the front feet.

Pigs however, emerge with hind legs first.

Abnormal presentation prolongs the process of parturition.

**Dystocia**

This refers to the difficult birth/parturition with complications

**Causes**

* Improper presentation of the foetus in the birth canal.
* Narrow birth canal in relation to the foetus size.
* Inadequate production of relaxing and, or oxytocin hormone which help in the relation of pelvic ligaments to facilitate parturition and contraction of uterus to expel the embryo during birth.
* Pathological conditions of the dam or foetus: weak or sick mother experience dystocia and also poorly developed foetus and weak foetus may also lead to dystocia.
* Fused joint or Siamese twins and monstrosities such as calves with two heads or extra appendages.

**Abnormal presentation and their corrective measures.**

1. Only one leg of the lamb/calf has come out.

**Corrective measures**

* Push the lamb back gently into the uterus
* Arrange the legs according to the position of the lamb.
* Draw/pull both legs gently.

1. **Head first with one or both legs bent backward**

**Corrective measure**

* Restrain the animal
* Put on plastic gloves and apply a suitable lubricant over the gloves.
* Manoeuvre the gloved and we'll lubricated hand through the birth canal.
* Push the calf back into the uterus
* Grasp the bent leg and straighten it.
* Gently position the head and thw two legs in the birth canal
* Apply obstetrical chains to each foot and pull the calf gently towards the birth canal.

1. **Backward presentation with hind feet first.**

**Corrective measure**

* Restrain the animal
* Put in plastic gloves and apply a suitable lubricant over the gloves
* Manuever the glove and well lubricated hand through the birth canal
* Push the calf back into the uterus using gloved hand.
* Turn the calf and pull the feet and the head towards the birth canal
* Apply obstetrical chains to each leg and then pull the calf gently.

1. **Head and foot first with one leg crossed over the neck**

**Corrective measure**

* Restrain the animal
* Put on plastic gloves and apply a suitable lubricant over the gloves
* Manoeuvre the gloved and well lubricated hand through the birth canal
* Push the calf back into the uterus using gloved hand
* Grasp the leg over the neck and pull it straight into the birth canal
* Gently position the two legs and the head in the birth canal
* Apply obstetrical chains to each leg and then pull the calf gently towards the birth canal

1. **Front feet first with the head twisted upward and backward**

Corrective measure

* Restrain the animal
* Put on plastic gloves and apply a suitable lubricant over the glove
* Manoeuvre the gloved and well lubricated hand through the birth canal
* Push the calf back into uterus using gloved hand
* Grasp the nose of the calf and pull the head to side, downward and then towards the birth canal.
* Apply obstetrical chains to each leg and then pull the calf gently.

**Management of calf from calving to weaning**

* Remove the mucus membrane from the muzzle
* Induce breathing in case if fails by rubbing the chest with dry straw.
* Tie and cut the navel cord/umbrical cord
* Disinfect the navel cord using iodine tincture to prevent infections
* Allow the dam to lick the calf/use dry straw to clean the calf.
* Wash the teats to prevent infections
* Weigh the calf and record the birth weight
* Help the calf to stand
* Allow the calf to suckle colostrum for the first 3-4 days
* Provide beddings to the calf pen to provide warmth
* Take the calf to calf pen
* Observe strict hygiene in the calf pen
* Train the calf to drink milk twice a day
* Provide plenty of clean drinking water to the calf at all times of the day
* Vaccinate the calf against diseases
* Treat the calf immediately in case of sickness
* Provide roughages to the calf at the age of two weeks to facilitate ramen development
* Provide calf pellets to the calf one month after birth
* Put identification marks to the calf at the age of two weeks for proper record keeping
* Spray the calf regularly with suitable chemical to control external parasite
* Dehorn the calf using a suitable method
* Deform calves regularly using recommended drugs to control internal parasites
* Male calves that are not going to participate in the breeding programme should be castrated in the 4th week from birth
* Clip extra teats from the female calf
* Allow the calf to move out of the pen for exercise
* Reduce the amount of milk given to the calf two weeks before weaning
* Weigh the calf at weaning to determine the live weight
* Wean the calf at 8 - 10 weeks of age

**FEEDING OF THE CALF**

1. **Feeding colostrum**

Colostrum is the first milk produced by the cow 3 to 4 days after calving. New born calves should be fed three litres of colostrum per day for riot less than 3days after birth. Calves should be fed twice a day at twelve hour interval.

**Ways in which colostrum differs from ordinary milk**

* It is opaque yellow in colour
* It has a strong odour any may be bitter in taste
* It has higher ash content due to raised iron
* It has higher total solids especially globulin fraction and ash.
* Glucose content is variable but lactose is reduced
* Importance / benefits of feeding calves on colostrum
* It is very nutritious: rich in proteins, fats, minerals and vitamins necessary for fast growth of a young one.
* It contains antibodies which help to impart immunity to the young one.
* It has laxative and purgative property which helps to remove the first sticky dung (encomium) from the calf.
* It is highly digestible by the new born than ordinary milk.
* It contains high levels of solids not fat.

1. **Feeding whole milk:**

The calf should be fed on whole milk from the mother until it is weaned. Heavier calves should be given 4½ litres of milk daily while smaller ones should get 3.4 litres.

The calf should be fed twice a day in the morning and evening.

1. **Feeding calves on roughages / pastures.**

Roughages are feeds with high fibre content.

Calves are fed on roughage at the age of about 2 weeks to facilitate rumen development.

1. **Weaner meal/pellets:**

Pellets are introduced at ten days of age and fed up to about ten weeks of age.

By eight weeks, the calves should be consuming 2kg daily.

**Methods of feeding of milk to calves**

1. Single ducking / natural raising / mother raising

The calf is allowed to suckle directly from the mother with any restriction until it is weaned at about 4 - 6 months and the mother is never milked.

This method is practiced in beef cattle where cows usually produce small quantities of milk, just enough to sustain their young.

**Advantages**

* The calf suckles until it becomes satified
* It does not require training of the calf how to suckle.
* Diseases due to unhygienic conditions e.g. calf scours observed in bucket feeding are rare.
* It is very easy for the calf to suckle the mother than to drink milk from the bucket.
* It is labour saving as compared to bucket feeding.
* Calves get milk at the normal temperature which enhances proper digestion.
* It is a suitable method for the beef farmers who have little interest in milk but more in the beef of the animal.
* This is the most suitable method of raising calves in places with low market for milk.
* There is low mortality rate under this method.

**Diadvantages**

* The calf may get infected if the mother is diseased.
* The quality of milk suckled is not regulated and this can lead to scours.
* It weakens the dam since the calf is allowed to suckle its mother.

1. **Multiple sucking / foster mother raising/nurse mother raising**

A particular cow is given a number of calves not her own to suckle.

The calves are first allowed to get colostrum from their mothers and thereafter they are taken care of by the nurse cow.

The number of calves allocated to each cow usually depends on the amount of milk it can produce.

**Advantages;**

* Little supervision is required
* It is labour saving compared to bucket feeding
* Digestive disturbance (scours) in calves are reduced to a minimum since there are fewer chances of overfeeding calves.
* Calves are able to take in milk that is clean and at body temperature directly from the nurse cow.
* The method gives good calves as compared with bucket feeding.
* Milk from other dams can be saved for the market.

**Disadvantages**

* Injury to the teats caused by calves is common
* It is very difficult to keep feeding records.
* Calves may suffer from starvation when the foster mother is sick or produces little milk than required.
* The foster mother cow needs to be fed well which may increase the cost of production.
* Diseases my spread to the calves if the foster mother cow is suffering from infectious diseases.

1. **Restricted milk and early weaner feeding**

Milk feeding is reduced and early weaner concentrate fed.

Milk fed is restricted to 3 litres instead of 4 litres per day.

Early weaner concentrate is introduced from seven days of age.

1. **Artificial reasing (bucket feeding)**

In this method calves are allowed to sucke their mothers to get colostrum in the first 3 – 4 days after which they areseperated from their mothers and trained to drink milk from the bucket.

This method is commonly used in dairy farming where milk is the major product for selling.

**How to train a calf to drink from the bucket**

* Starve the animal for 2 to 3 hours to step up appetite.
* Obtain warm milk from the mother and dilute it with water (25% of its volume).
* Put the milk in a clean bucket
* Wash your hands with water and soap.
* Hold the calf in the right position to drink milk from the bucket.
* Dip the index and middle fingers in the milk.
* Put the fingers with milk in the calf’s mouth.
* Gently lower it head in the bucket as the calf sucks the fingers to drink milk.
* Carefully withdraw the fingers as the calf continues to drink the milk.
* Repeat the procedure every day until the calf automatically comes and drinks on its own.
* Feed calves two times in a day at regular intervals.

**Precautions that must be taken while bucket feeding a calf**

* The calf must not drink in gulps as it leads to chocking.
* Use fresh milk daily to avoid stomach disorders.
* The feeding bucket should be clean at all times to avoid spread of diseases.
* Milk should be at body temperature as cold milk may encourage stomach disorder.
* The trainer’s hands must be clean to avoid germs.
* The bucket should held at knee height for milk to bypass the rumen when swallowed.
* Feed calves at regular interval.
* Ensure feeding the right amounts of milk.

**Advantages of bucket feeding**

* Calves are weaned early
* No wastage of milk/feeds
* Calves are fed according to their individual needs. There is no underfeeding.
* A calf can depend on bucket feeding if the dam/mother dies.
* Early weaning feeds can easily be introduced.
* It reduces injuries caused by the calf to the teats of the cow
* Provides for good dairy herd management as milking starts immediately.
* It reduces incidences of disease transmission from the mother to the calf.

**Disadvantages**

* If the buckets are not properly cleaned they may lead to spread of diseases.
* Buying feeding buckets increases the cost of production.
* It requires more labour in handling the feeding process.
* It is time consumig
* The calf might take milk which has lower temperature than its body temperature leading to sours.

**CALF MORTALITY**

It refers to death of a calf.

**Causes of calf mortality**

1. Calf scours; It is a bacterial disease characterised by diarrhoea with a foul smell.
2. Calf pneumonia; It is caused by bacteria or virus.

It is started by damp conditions and poor ventilation.

It is characterised by rapid breathing, discharge from nostrils and rough standing hair.

1. Navel infection; this is caused by bacaterial attack of the navel cord creating septic conditions.
2. Worm infection from pastures; this is characterised by diarrhoea, rough standing hair, pot belly stomach etc.
3. Common scours; this is due to feeding errors e.g. feedin gcalves on irregular amounts of milk, feeding sour milk, using dirty utensils.
4. Calf coccidiosis; It is caused by protozoa. It is characterized with faeces of foul smell.
5. East coast fever; It is a tick borne disease, transmitted by brown ear tick. It is characterised by swallen lymph nodes, high temperature, nasal discharge etc.
6. Attck from predators such as lions, leopards etc.
7. Stress due to coldness or high temperature.

**Measures taken to minimise calf mortality**

* Confine calves in houses/pens to protect them from predators and unfavourable weather conditions.
* Feed calves on colostrum to provide immunity to calves.
* Ensure that calf pens are well ventilsted to prevent pneumonia.
* Practice rotational grazing to control parasites such as round worms.
* Regular deqrming of calves with recommended drugs to control internal parasites.
* Hand spraying calves with suitable chemicals in clean utensils to avoid scours
* Provided calves with antibiotics to treat bacterial infections.
* Disinfect the navel cord using iodine tincture to prevent entry of germs.
* Fencing the farm to exclude ticks which are vectors of East Coast fever.
* Ensure that calf pens are cleaned regularly to reduce spread of disease.
* Treat the calf immediately in case of sickness.

**LACTATION PERIOD**

Lactation period is the time when a female animal is producing milk.

It is often from the birth of the young animal to the time of weaning or drying off milked animals.

Animals continue to produce milk after birth as long as milk is continuously removed from the udder.

However, this milk production reaches time when it stops. Farmers often milk their cows up to nine months and leave three months between the birth of a calf and the cow becoming pregnant again.

It is always advisable to give the cow three months before it can be served again to allow the uterus to fully recover, to allow both the calf and embryo to get enough nutrients and to synchronise the time of rapid foetal growth (increased nutrient demand) with drying off which usually occurs at seven months of pregnancy. This allows more nutrients which would otherwise be lost in milk to be channeled to rapidly growing foetus.

If the farmer serves the cow later, there will be a longer time when the cow is not producing milk. If the farmer serves the cow earlier, less milk will be provided because the larger embryo in the uterus will take the cow’s nutrients first.

**Lactation curve**

* Milk yield increases steadily/progressively from calving and reaches the peak at service, then declines steadily up to calving.
* The foetus increases steadily from the time of service up to calving

**Lactation anoestrus**

This is a phase of sexual inactivity that usually follows parturition in farm animals.

During lactation, the presence of certain hormones such as prolactin suppresses normal sexual behaviour in females.

Sometimes however, the animal may show signs of heat (post partum heat) though no ovulation occurs hence rendering animals infertile.

**Ways of reducing lactational anoestrus**

* Giving animals adequate and well balanced feeds to enable them return to heat earlier.
* Early weaning of youngones to reduce production of prolactin that suppresses normal oestrus.
* Treating animals with oestrogen to induce heat.
* Introduction of mature males to the females. The males produce hormones that induce heat in females.
* Introduction of creep feeds to the young to reduce suckiling pressure on the mother and reduce the suckling stimulus responsible for release of prolactin.