

SUPERFOETATION

1. It is produced when a pregnant female, carrying one or more live foetuses comes in oestrus, is bred again, and a second conception occurs in a uterus already containing at least one live foetus.
2. This condition is seemingly authentically reported more often in multipara and only rarely in unipara.
3. It appears unlikely that in unipara animals, even if ovulation occurred, the spermatozoa could pass through a cervix closed by an adhesive cervical seal and through the pregnant uterus to the oviduct.
4. If the ovum was fertilized and reached the uterus, the endometrial area of both horns would in most instances already be utilized by the first embryo or foetus.
5. If by chance the second zygote should develop in the horn opposite to the one containing the embryo, when the earlier foetus was expelled the latter foetus would probably be expelled at the same time.
6. These vicissitudes cause many authors to doubt the occurrence of superfoetation in uniparous animals.
7. Although the literature includes many reports of alleged cases of superfoetation, most are unauthentic and lack essential details.
8. Twin foals are usually of different sizes, one large and one small. The expulsion of unequal size twins, even though the mare has been bred twice, does not constitute a claim for superfoetation.
9. In cases in which one cow in a herd gave birth to twins on pasture with one of the twins being adopted and suckled by a second cow in advanced pregnancy, superfoetation is often claimed when this second cow, especially if it had been bred twice at the proper intervals gives birth later to her own calf.
10. A third condition may possibly occur wherein a cow or mare carrying bicornual twins in separate membranes gives birth to one twin a number of weeks or months before the second twin.
11. The first twin is always smaller at birth than the twin born several weeks or more later.
12. Arthur reported on several ewes that aborted one of twin foetuses at 105 days of gestation.
13. The retained placentas were expelled after putrefying. The ewes delivered normal lambs at term over a month later. This phenomena, although rare, has been reported in cattle, swine, sheep and humans as double parturition.
14. It seems a more logical explanation for the birth of young at different periods following service than does superfoetation.
15. In multiparous animals with a poorly defined cervix and cervical seal, superfoetation is more likely to occur.

16. Someone reported delivering 2 normal feline foetuses from one uterine horn by caesarean section. A small 5 week old foetus, 33 cm CR length, was found in the opposite horn of the uterus.
17. They cited references to indicate that pregnant cats will develop mature follicles and ovulate as late as 6 weeks after conception.
18. All the foetuses of one service might develop in one horn and then subsequently an estrum occur with ova fertilized from the second service developing in the opposite horn.
19. Parturitions could occur at different times from each horn.
20. Vanderplassche believes this unlikely, as in double parturition in swine, foetuses are expelled from both horns at each farrowing period.
21. This possibility might occur in cows with a true uterus didelphys or double uterus with a separate cervix for each horn.
22. In the apparently authentic bovine case cited by several workers, a double uterus was not present.
23. Although superfoetation may occur very uncommonly in multipara and rarely in unipara, it would appear highly improbable in most reported instances.
24. Many reports on superfoetation was obviously incorrectly diagnosed without proper information and sufficient detail on which to base a claim.
25. A few rare reports, however, appear sufficiently authentic to make one unwilling to state positively that superfoetation does not occur in domestic animals, especially swine and cattle.

PSEUDO-PREGNANCY IN THE DOG AND CAT:

1. False pregnancy or pseudocyesis is common in the bitch because the metestrus, luteal, or proestrous phase of the cycle is about 8 to 9 weeks long, or approximately the same duration as pregnancy.
2. During this metoestrus period in the bitch the endometrium resembles that in pregnant dogs.
3. The corpora lutea are large and active during post estrus but gradually reduce in size and become inactive at 8 to 9 weeks after estrum or sterile coitus.
4. At this time many bitches exhibit mammary development and will lactate if nursed.
5. The mammary development is not as great as in pregnant bitches.
6. Towards the end of pseudo-pregnancy, false pregnancy or pseudocyesis certain dogs may be nervous, aggressive, excitable, restless or withdrawn and many even exhibit "Phantom whelping" by making a nest and mothering and protecting some inanimate object.
7. Often certain bitches in pseudo-pregnancy will put on weight and their abdomen will increase in size.
8. Most dogs do not exhibit these signs.
9. If the symptoms at the termination of this period are objectionable to the owner about 5 mg of stilbesterol or 2 to 10 mg of testosterone daily may possibly aid in hastening the return to normal.
10. The use of tranquillizers in the affected bitch may reduce the objectionable behaviour patterns during this transient period.
11. In the cat pseudo-pregnancy or metestrus last about 30 to 40 days without noticeable signs.

12. In most affected bitches these symptoms tend to recur following each estrum to ovariectomy may be indicated unless the bitch is to be bred.

THE MAMMARY GLAND AND LACTATION:

1. Although the mammary gland is a highly modified and specialized sebaceous cutaneous gland, it is normally considered as an accessory gland of the reproductive system because of its intimate association with reproductive functions and hormones.
2. In domestic animals the mammary secretion provides early passive immunity to the newborn as well as supplying its nutritive needs.
3. In the cow most of the immune globulins transferred from the blood to the udder secretion or colostrums takes place a short time before, during and after parturition whether the cow has been pre-milked or not.
4. If the cow has been pre-milked the amount of globulin present per unit of lateral of lateral secretion is reduced because of dilution.
5. In the mare, cow, ewe and goat the gland is divided into two halves with a single lactiferous sinus in each half opening into the two teats.
6. In the cow the udder is divided into four quarters, each with its own lactiferous sinus and teat.
7. Supernumerary teats and glands are common in the cow.
8. There is no communication between the halves or quarters of the mammary gland.
9. In the sow, bitch and cat the paired mammary glands are located on the ventral surface of the body in the pectoral, abdominal and inguinal regions.
10. There are from 4 to 9 pairs of glands.
11. The lactiferous ducts or streak canals at the ends of the teats are closed by a sphincter muscle.
12. There is a single streak canal in the teats of cows and ewes but two streak canals in mares and sows.
13. Dogs have 7 to 16 duct openings in the teat.
14. The blood supply of the:
 - i. Inguinal mammae is the external pudic arteries,
 - ii. Pectoral mammae the branches of internal thoracic arteries and
 - iii. Abdominal mammae from both sources.
15. In the cow the main veins of the udder are the external pudic and the subcutaneous abdominal or milk vein.
 - i. The latter empties into the internal thoracic veins.
16. A well developed lymphatic system is also present in mammary tissue.
17. The nerve supply is the inguinal nerve from the ventral branches of the second through fourth lumbar nerves and the mammary branch of the internal pudendal nerve supplies the caudal part of the bovine udder.
18. The motor nerve supply to the udder is entirely autonomic or sympathetic, the cell bodies of these nerves are located in the lateral horns of the spinal cord.
19. Superficial innervations and blood supply of the skin of the udder comes from the subcutaneous vessels and nerves in the skin regions surrounding the udder.
20. Relatively little mammary development occurs before puberty.

21. In the newborn, slight mammary and teat development is noted along with a slight amount of serous secretion.
22. This is probably due to the placental transmission of some of the circulating maternal steroidal hormones.
23. In rare cases this may be marked in dairy calves.
24. There have been a few instances of dairy heifers 5 to 12 months of age or older that developed marked mammary development with milk secretion.
25. The cause is usually not known.
26. Granulosa cell tumours of the ovary may rarely be the cause.
27. Suckling by other heifers causes udder growth and an increase in the amount of milk secretion.
28. After isolation, usually the mammary development of the heifer will recede spontaneously within four to six weeks.
29. With the onset of estrual periods after puberty there is a slight mammary development.
30. In animals exhibiting pseudo-pregnancy such as the dog, mammary development may be quite marked and be nearly equal to the development in the pregnant bitch, the milk secretion will occur.
31. During the first half of gestation in the cow cellular proliferation of the mammary ducts and alveoli occurs under the influence of the steroid hormones, progesterone and estrogen, from the ovaries and the placenta.
32. By the fifth month growth of the secretory tissue is nearly complete.
33. During the latter half of the gestation cellular hypertrophy and limited secretion is noted.
34. Abortion after the middle of gestation followed by regular milking of a cow or heifer results in lactation.
35. The nearer to the calving date and abortion occurs greater the production of milk.
36. Some workers attributed the failure of animals to reach high levels of production after an abortion to insufficient hormonal stimulation for secretion rather than to incomplete development of the mammary gland.
37. In the normal high-producing heifer or young cows excessive oedema or engorgement of the mammary gland and the adjacent skin and tissues dorsal to the udder and forward on the abdominal floor to the xiphoid region may occur.
38. This is apparently a circulatory phenomena caused by a greater blood supply to the gland than the venous system can accommodate.
39. Excessive oedema of the abdominal floor is sometimes confused with rupture of the prepubic tendon, umbilical hernia, a hematoma, or an abscess.
40. Occasionally the greatly enlarged and oedematous mammary gland may result in pain and discomfort, necrosis of skin, failure to let down milk and stretching or even rupture of its supporting ligaments.
41. Massage, the use of mild counterirritants, pre-milking, udder supports, cold and hot applications, and exercise may be used to prevent or treat excessive udder oedema.
42. In recent years the oral or intramuscular administration of diuretics, specifically the carbonic anhydrase inhibitors with or without corticosteroids, for udder oedema before or after parturition has been particularly helpful especially in young cows.
43. The carbonic anhydrase inhibitors include:

- i. Acetolamide and Chlorothiazide, which can be given at a rate of 2 gm once or twice a day orally for 1 to 3 days.
 - ii. Hydrochlorothiazide at a rate of 0.5 to 1 gm orally or 125 to 250 mg parenterally twice a day for 1 to 3 days.
 - iii. Trichlormethiazide and dexamethasone bolus containing 200 mg of tricholmethiazide and 5 mg of dexmethasone orally as a bolus once daily for 1 to 3 days.
 - iv. Lasix or furosemide may be given orally, 50 mg per 25 lb or parenterally 0.25 to 0.50 ml per 10 lb to dogs or parenterally to horses, 5 to 10 ml per 1000 lb once or twice daily for 1 to 3 days.
44. Large doses or prolonged intake of lower doses of the gluco-corticoids late in gestation may cause premature parturition often associated with retention of the placenta in cattle.
 45. Mammary growth and lactation is mainly under the control of hormones.
 46. Nerves in the teats and skin of the udder may play an indirect part in milk secretion by stimulating the pituitary gland to release prolactin and possibly other hormones necessary to initiate and maintain lactation and oxytocin necessary for milk ejection or let down.
 47. This latter term by signifying the ability of the animal to control her milk flow at will is incorrect.
 48. Vasomotor nerves probably play an indirect role in milk secretion by regulating the blood supply to the gland.
 49. Estrogen and progesterone produced in the ovaries and in the placenta work together in animals to produce mammary development.
 50. The estrogen causes the initial budding and growth of the duct system.
 51. Progesterone causes further duct growth and the alveolar development.
 52. In certain species, such as goats, estrogen alone induces complete udder growth and lactation but some of the female's other endocrine secretions might play a role.
 53. Either one of these hormones or testosterone given in the large doses to the intact or spayed heifers will produce mammary growth and development.
 54. The onset of lactation at the time of parturition coincides with the drop in progesterone and especially estrogen level in the blood that have provided for mammary growth, and with a marked rise in the levels of prolactin from the pituitary gland necessary for the initiation of secretion and maintenance of lactation.
 55. High prolactin levels are favoured by the mammary stimulation of the suckling and removal of colostrums and milk from the alveoli of the mammary gland except in sheep and goats.
 56. Growth hormone or somatotrophic hormone may also be involved in intitation or lactation.
 57. Oxytocin released by suckling might be closely associated or cause release of prolactin and growth hormone.