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Reproductive Management of the Dairy Goat Doe

by
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INTRODUCTION

With the slow but steady increase in interest in dairy goats, our profession finds itself facing the problems of this unique species with increasing frequency. This creates a special challenge for us in two respects. First, our medical knowledge about the goat is still sparse and is just now beginning to expand due to an increased interest within the veterinary profession. Second, the variety of reasons for owning goats covers a broader range than for most species, being kept purely as pets in some cases and purely as commercial dairy animals in others. The practitioner is thus faced with this extra, very important variable when dealing with any caprine problem.

The purpose of this paper is to provide the foundation for a herd reproduction program, either for a commercial dairy herd or a small hobby herd.

GENERAL CONSIDERATIONS

Onset of puberty varies with the breed. For the Swiss dairy breeds the first estrus is usually at 6 to 8 months of age, or at the onset of the first breeding season after this time. Evidence in Angora goats suggests that the ovulation rate of this first heat is about twenty percent lower than that of the second heat. In any event, does should not be bred until reaching at least sixty percent of their expected adult weight (approximately 32 to 42 kg, depending on the specific breed).²⁷

Goats, as implied above, are seasonally polyestrous. They are short day breeders, with the breeding season in this area being approximately September through January.^{14,15,25,27}

The typical estrous cycle is 19 to 21 days, which may vary widely at the beginning and at the end of the breeding season. This variation is especially prevalent in young does, and the periods of estrus associated with these variable cycles are frequently anovulatory (in old and young does alike).^{18,27}

The duration of estrus ranges from 12 to 36 hours,^{13,27} with cited examples of up to 96 hours.¹⁵ Ovulation occurs 24 to 36 hours after the onset of standing estrus.^{13,15,27} Breeding, with either hand breeding or artificial insemination, is usually done at the onset of standing estrus and at twelve hour intervals after that (artificial insemination is usually done only twice — once at the onset of estrus and again twelve hours later).²⁷

Since hand breeding is the method of choice with many owners, and with artificial insemination increasing in popularity, estrus detection is an important part of the reproduction program. There may be visible swelling and reddening of the external genitalia as well as increased moistness.^{15,27} Common behavioral changes include tail wagging, bleating and urination near the buck, as well as active seeking for the buck or buck rag.^{13,15,18,27} There may also be an increased production of milk about eight hours prior to the onset of estrus.⁹ The definitive sign of estrus is whether the doe will stand for mounting. This is best evaluated using a teaser. The first indication of impending heat is a proestrus period of about a day when the teaser will closely follow the doe but she will not stand for mounting.²⁷ This will be followed by estrus as described earlier.

ESTRUS SYNCHRONIZATION

Onset of the breeding season and of regular, ovulatory cycles can be stimulated and to some degree be synchronized by exposure to a buck

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or to a buck rag. Introduction of a buck to a group of anestrus does during the breeding season will stimulate estrous behavior in 5 to 7 days in a high percentage of the does. A high proportion of these will be ovulatory cycles.^{18,25}

Although the use of a buck or buck rag may be the most common method and the least expensive, it may be desirable to use some other method of manipulation in order to deal with specific circumstances or to allow for more precise control. Indications for estrus synchronization during the breeding season include scheduling of artificial insemination, limited time available with the buck, and some control of the kidding season.

The most practical method available at this time appears to be the use of two intramuscular injections of 5 to 10 mg (possibly as low as 2.5 mg) of prostaglandin $F_{2\alpha}$ with an eleven day interval between treatments.^{5,15,21,27} Estrus behavior will be observed approximately 50 hours after the second treatment. Indications are that postsynchronization fertility, based on first service conception rate, is equal to that of unsynchronized does.^{15,21}

Other methods in the literature include the use of progesterone-impregnated vaginal pessaries for 16 to 20 days^{6,13} and the use of oral medroxyprogesterone (MAP) at 50 mg per day for 16 days.²⁷ Fertility using these methods may be somewhat decreased on the induced heat but usually returns to normal on the subsequent cycle.¹³ An additional problem with the pessaries is the occasional development of adhesions.^{13,15}

Synchronization outside of the breeding season is a bit more complicated, but may be indicated in order to maintain a steady production level or to rebreed a doe which has aborted or failed to conceive. The first step in out-of-season synchronization is to stimulate ovarian activity. One method is the use of artificial lighting, keeping the does under 14 to 18 hours of light per day for three months in midwinter, then cutting back, either suddenly or gradually.²⁷ This has resulted in a spring conception rate of more than fifty percent in some studies.²⁷ One should keep in mind that the buck may need to be included in this regimen, as sperm production and libido both decrease greatly out of the breeding season. Another practice worth including in this program is exposure of the does to the buck on a regular basis to take advantage of the stimulatory effect of the buck scent.

Medical methods of stimulating and synchronizing ovarian activity include the use of an intramuscular dose of 400 IU of pregnant mare serum gonadotropin (PMSG), which resulted in a forty percent conception rate in one study.²⁷ In lactating does a 600 IU dose may be necessary. Better results have been obtained using 500 IU of PMSG simultaneously with 250 IU of human chorionic gonadotropin (HCG). In both cases, estrus begins 2 to 3 days after administration of treatment.²⁷

Again, vaginal pessaries have been used, with mixed results, especially with progesterone-impregnated pessaries. Flurogestone sponges for 16 to 20 days have resulted in a forty percent conception rate when coupled with artificial insemination.^{5,15} This has been improved with the use of 400 to 600 IU of PMSG forty-eight hours prior to removal of the pessary and by increasing the number of live sperm per insemination.^{15,27}

ANESTRUS

As in other polyestrous species, the most common reason for the failure to return to heat is pregnancy. Other considerations are whether or not the methods of heat detection are reliable and whether or not the doe has been exposed to buck scent. A month of exposure to buck scent should be a routine part of the therapeutic and diagnostic approach to a case of anestrus. This is not to imply, however, that these are the only reasons for anestrus. There are several other problems that may be present and should be ruled out.

The intersex condition must be a primary differential if the doe is naturally polled, especially if both parents are polled. The polled trait is dominant and is a completely penetrant trait whereas the hermaphroditic trait is recessive, sex linked, and incompletely penetrant.^{13,27} Therefore, if one parent is horned the offspring will very rarely be an intersex. In any case a thorough physical is indicated. Physical examination may reveal a phenotypically normal female, but findings frequently reveal a bulbous vulva, enlarged clitoris, penile clitoris, a shortened penis, hypospadias, or hypoplastic testicles.^{19,27} In the phenotypically normal female only biopsy of gonadal tissues will give the final diagnosis of an intersex, as these individuals have ootestes.²⁷ The standard means of preventing the intersex condition is the use of a horned buck. Some herds will establish a vigorous culling program, but this is far less common.

Nutrition and parasitism, symptoms of a poorly managed herd, may play a role in the problem of anestrus does. Frequently the apparently malnourished goat has a concurrent parasite problem, but undernutrition or malnutrition can be a primary problem as well. An excellent source of basic nutritional information about goats is presented by R. S. Adams;¹ also the Nutrition Research Committee is in the process of preparing a publication on nutrition in goats.¹⁶

In general, grass hays should be accompanied by a 16-to-18 percent protein grain mix while legumes should be accompanied by a 12-to-14 percent protein mix. A general guideline is 1.4 kg of good hay per day with 0.5 kg of grain per kg of milk production.¹

In terms of management, always check the doe for the dental problems that could be interfering with eating. One should also keep in mind that subordinate does eat less, lose weight, and are more susceptible to parasites because they get leftovers and contaminated feed. In such cases the doe should be isolated from the herd, at least for a few hours each day, until she can build up to a point of effectively competing for full ration again.¹⁷

Another recommendation is that all animals in the herd get at least 4 to 6 weeks a year with over 50 percent of the ration consisting of green chop or pasture. This may serve to replenish body stores of fat soluble vitamins and to increase hormone intake, and has been associated with increased reproduction, health, and production.¹

Many owners may advocate the necessity of providing browse for their goats. There is no evidence to indicate that this is necessary, but since goats do very well on browse, it may serve as an economical use of otherwise marginal pasture as long as overall nutrition is still well monitored.^{1,10,11}

Another point to keep in mind is to avoid overconditioning, as it will predispose does to a variety of problems, especially milk fever and pregnancy toxemia.¹⁷

Another part of the problem in the poorly conditioned doe may be parasitism. The best approach is prevention, including a diagnosis and treatment quarantine for new animals, good nutrition, clean lots, pasture rotation, and feed bunks that can be kept clear of fecal contamination. Too frequently these recommendations will be made in the context of limiting

a problem that is already out of control or in the aftermath of a bad problem.

Mineral deficiencies of goats are still being worked out. Estrus may be affected by phosphorus deficiencies and by copper, manganese, or iodine imbalances.²⁷ Current recommendations include the use of trace mineralized (at sheep levels) salt, provided as loose mineral or in soft blocks. In selenium-deficient areas, prophylactic treatment with Vitamin E-selenium is indicated.⁷ Adams¹ provides a detailed breakdown of mineral rations for goats.

The incidence of pyometra in goats is generally considered to be low, but if present the doe will be febrile and anorectic. There may be a vaginal discharge with a foul odor, and the history will usually include dystocia, fetal maceration, or a retained placenta. In the case of a retained placenta, removal should not be attempted unless it is clearly unattached. Treatment consists of intrauterine antibiotic boluses and parenteral antibiotics (penicillin-streptomycin or oxytetracycline) until the placenta has been expelled and the doe is clinically normal. Mummified fetuses will frequently cause no problem and will be expelled with normal kids or with the placenta of the normal kids at parturition.^{13,27}

In the case of a macerated fetus, fetal mummy or a retained placenta in the presence of a closed cervix, a Cesarean section is indicated. Although the doe's fertility may be unimpaired after this, if the infection has ascended too far and caused a salpingitis, permanent infertility can be the result.²⁷

Pseudopregnancy may be part of a pseudopregnancy-hydrometra syndrome or it may be a separate problem. The condition is characterized by the accumulation of a large volume of thin, clear to cloudy fluid in the uterus. As this accumulates, abdominal distension becomes obvious.¹³

In some cases, pseudopregnancy will spontaneously correct when the fluid is voided in a so-called "cloudburst". The abdominal distension will disappear and lactation will begin, though production will be low. Subsequent fertility is usually normal.^{13,27}

In other cases (with hydrometra), surgical and medical correction may be required. The fluid can be drained through a surgical incision and further involution can be stimulated by the use of 0.5 to 1.0 mg of PGF_{2α} twice a day for several days.²⁷ Alternatively, the condition can be treated with only the PGF_{2α}. The breeding

prognosis is currently unknown as is the etiology of the syndrome.^{13,27}

The incidence of cystic follicles in goats is unknown, but a clinical history of nymphomania and irregular estrous cycles may indicate this diagnosis. Note that irregular cycles early and late in the breeding season may be physiological. Also, the use of diethylstilbestrol, sometimes used as part of the treatment regime for metritis, has been associated with an unresponsive nymphomania in goats. In any case, the diagnosis will be tentative without a laparotomy. The condition may be treated with 250 to 1,000 IU of HCG parenterally or with 10 mg per day of progesterone for 18 days. The etiology of the condition is unknown, but heredity and high calcium (relative phosphorus deficiency) have been proposed.^{13,27}

PREGNANCY

The average duration of gestation of the dairy breeds is 150 days, with a usual range of 147 to 155 days.^{9,13,15,27} The pregnancy is maintained by the corpus luteum, and progesterone levels remain high until about four days before parturition.²⁰ There appears to be little or no tendency for multiple births to occur earlier than birth of single kids²⁷ although there is some disagreement on this point.¹⁵

Pregnancy detection is necessary for a variety of reasons. Does frequently show signs of estrus during pregnancy, and diagnosis can reduce the time, trouble, and unnecessary expense of rebreeding. Also, pregnant does should be dried off for 6 to 8 weeks and should have their grain ration gradually increased to prevent pregnancy toxemia. On the other hand, open does can be culled, milked through until the next breeding season, or put on an artificial lighting regimen for spring breeding. It is also desirable to distinguish from a pseudopregnancy-hydrometra or a metritis if these are suggested by the history of the doe or herd.

There are several methods available to the practitioner, covering all stages of gestation. Cervical palpation is fast and inexpensive. The technique consists of sterile digital palpation per vagina of the cervix. After about thirty days of gestation the cervix softens, blunts, and sags. After fifty days it will be pulled down into the abdomen out of reach of the examiner. The nonpregnant cervix is very firm and projects into the vagina. A diagnosis of pregnancy using this technique is very reliable.¹³

Abdominal palpation is another fast and inexpensive test. After fasting the doe for 12 to 24 hours, the examiner can encircle the abdomen (from behind the doe) and lift to ballotte the fetus. Ballottement can be performed with just the hands from this position or by palpating the lower right flank. It may help to withhold water for a few hours, then to offer cold water and palpate for the kicking of the fetus just cranial to the udder. All of these techniques are useful after about 100 days gestation.^{13,27}

In special cases, a laparotomy can be performed. Fast the doe for 12 to 18 hours, tranquilize and place in dorsal recumbency, then line block the linea or use a general anesthetic. With a 5 to 6 centimeter incision, 2 or 3 fingers can be inserted and the uterus, placenta, fetus(es) and ovaries can be palpated. Close with mattress sutures and follow with intraperitoneal and parenteral antibiotics. This method is useful after 42 days.²⁷

For individual pets and valuable animals, radiology is a very accurate technique for the last half of pregnancy. From about day 38 on, enlargement of the uterus will be apparent, but this alone cannot differentiate pregnancy from other causes of a fluid-filled uterus. However, once the skeletons are radiopaque after 50 days of gestation, even the number of kids can in most cases be determined. A twelve hour fast is useful, and an acepromazine premed (0.9 mg/kg) may be used to minimize human exposure.^{13,23}

Rectoabdominal palpation using a 1.5-by-50 cm plastic rod, as used in sheep, may be used in goats as well. The doe must be held in dorsal recumbency and the lubricated rod inserted about 35 cm into the rectum. The rod is then arced from the spine toward the abdominal wall while the examiner palpates the abdominal wall with the free hand. This procedure is then repeated arcing the rod along the other side. After about 70 to 100 days the pregnant uterus can be palpated. Sedation may be required as goats are generally too nervous to stand for this procedure. The technique is very accurate, especially with experience, but it is dangerous to the fetus and to the doe and is best avoided.²³

Doppler ultrasound techniques by either intrapelvic or transabdominal examination are available and are quite good. Frequencies that are available are 5 and 2.5 MHz, with the 5 MHz frequency being superior, at least early in gestation. For transabdominal examination a site immediately in front of the right udder or

lateral to the left udder is clipped and lubricated (K-Y jelly^c or mineral oil are adequate), but the intrapelvic probe is probably superior to the external probe. The fetal pulse, which is much faster than the maternal pulse, is detectable after about two months gestation. Although the technique requires fairly expensive equipment, it is fast and safe, is very accurate, and offers the bonus of detecting a viable fetus.²³

Echodetection (amplitude depth) has been reported. It is good from about 60 to 90 days, but later the fluid is difficult to detect due to the increase in fetal volume. With this method, the examiner cannot differentiate a hydrometra or a pyometra from a pregnant uterus.²⁷

Progesterone levels can be run on blood or milk 19 to 24 days after breeding (or whenever the individual's next estrus is expected). High progesterone levels (greater than 1 ng/ml) are consistent with pregnancy, and low progesterone levels indicate an open doe. Use of this technique requires accurate timing during the breeding season (during the nonbreeding season, when progesterone levels are normally very low, the timing is not critical). Diagnosis of nonpregnancy is 100 percent accurate, and diagnosis of pregnancy has been 85 percent accurate, with error probably due to incorrect timing, abortion and embryonic death, and possibly due to some ovarian disorders. Milk or serum (0.5 ml) can be used. Neither needs to be frozen, but milk can be preserved. The laboratory chosen must be one which uses progesterone standards prepared in serum or milk from goats. Currently, labs which do this are Rocky Mountain Laboratories and the labs at Cornell University, Colorado State University, and University of Guelph.¹²

PROBLEMS IN PREGNANCY

Early embryonic death is difficult to establish, but is suggested when an animal fails to return to heat after breeding. Cause of the embryonic death may be even more difficult to establish.

Abortions may be due to a variety of causes. Plants such as *Veratrum californicum* (false hellebore) and *Astragalus sp.* (locoweed) have been implicated, as have wormers such as phenothiazine and levamisole. Nutritional and parasitic problems may play a role as well. Long term Vitamin A deficiencies can cause abortion or

result in kids with diarrhea, corneal opacities or epiphora. Manganese deficiencies may cause abortion at 80 to 105 days gestation as well as leading to low birth weights, paralyzed kids or deformed kids. Although iodine deficiencies are not associated with abortions, it may lead to weak and hairless kids and stillbirths. Also, female kids may be born dead while male kids are born alive.²⁷

There are numerous infectious causes of abortion in goats. Listeriosis is a common disease in goats, and oral exposure will cause stillbirth or abortion, frequently in the last 30 days of gestation. There are no diagnostic fetal lesions, in fact the fetus may be quite macerated by the time it is expelled. There is usually no apparent illness in the doe prior to the abortion, but she may die soon after due to a necrotic metritis. If the doe recovers, she may abort again if bred too soon due to microabscesses in the endometrium. Treatment is futile if central nervous system signs are advanced, but if cases occur in a herd, prophylactic treatment may prevent abortions and CNS disease. One such regimen is the use of injectable oxytetracycline intramuscularly at 3 mg/kg for three days followed by feeding chlortetracycline at 100 to 250 mg per day for one week.²⁷

Leptospirosis is another infectious cause of abortion in goats. Unlike cattle, does abort at the time of the septicemia. Thus there may be a concurrent anemia, icterus, or hemoglobinuria, and there may be a few sudden deaths in the herd. The majority of infected goats, however, become carriers without showing any clinical signs, thus there may be minimal evidence indicating leptospirosis. Treatment of the sick does consists of 11 mg/kg of streptomycin intramuscularly twice a day for three days to aid in recovery and to prevent the carrier state. To prevent recurrence, the strain should be identified and the herd should be vaccinated annually.¹³

Enzootic, or chlamydial abortion, typically occurs in the last two weeks of gestation. The doe is clinically normal and the fetus is normal or only slightly autolyzed. The placenta is usually not retained and subsequent fertility is normal. In the herd there may be a moderate number of goats and kids with pneumonia and up to ten percent may show some signs of arthritis or conjunctivitis. For diagnosis the surface of a cotyledon can be scraped and smeared, and the smear stained with Giemsa to look for elementary bodies. Serum tests, by comple-

^cK-Y Lubricating Jelly, Johnson & Johnson Inc., New Brunswick, NJ 08903.

ment fixation, can be run on second samples taken about one month after the abortion. To prevent abortion, feed 100 to 250 mg of chlor-tetracycline per head per day for the second half of gestation.^{27,28}

Toxoplasmosis may lead to abortions, mummified fetuses and neonatal deaths. There may also be some macerated fetuses and retained placentas. Although this may be a sporadic problem it may emerge as a herd problem. Diagnosis is made by serum tests (fluorescent antibody). Prevention and control is dependent on controlling the cat population on the farm.²⁷

The primary cause of brucellosis in goats, *Brucella melitensis*, is very rare in the United States, but is present in Central and South America as well as in the Mediterranean area. It should probably be kept in mind particularly in areas along the Mexican-United States border. Another disease that is uncommon in the United States and is not often a cause of an abortion storm is Q-fever, caused by *Coxiella burnetii*. This particular disease should be kept in mind primarily because of its public health significance.²⁷

PARTURITION

Perhaps the most neglected phase of a doe's pregnancy is the last one-half to one-third of the gestation period. It is, however, a very critical period of time. Periparturient care of the doe should begin with drying off 6 to 8 weeks prior to parturition.^{2,15} This not only leads to better production during the next lactation, but allows the doe to channel energy into building up herself and the developing fetus. If the doe has had a history of mastitis, a culture and sensitivity should be done and appropriate therapy instituted. Some people advocate the use of one-half tube of dry cow treatment in each side of the udder even in a doe with no mastitis problems. Four weeks prior to parturition the doe should be given tetanus toxoid, an enterotoxemia vaccination product utilizing *Clostridium perfringens* Types C and D, Vitamin E-selenium (in selenium-deficient areas), and thiabendazole.²⁴

The level of nutrition must also be adjusted to avoid overconditioning yet allowing the doe to build up some energy reserves. She should be on good hay, some grain, Vitamain A supplementation, and plenty of exercise. During the last four weeks she should be on good grass hay (maximum of 25 percent legumes, preferably less), at least 0.5 lbs of grain per day, and continuing exercise.^{1,2,17,24}

Does which are poorly nourished or are over-conditioned are predisposed to pregnancy toxemia. Early signs of pregnancy toxemia are twitching of the ears, muscle spasms, and anorexia. This is followed by rapid respiration, ataxia, and frequent urination, and progresses to coma and death. For diagnosis the presence of ketone bodies in the urine is the most reliable test. Blood glucose levels are not reliable.¹⁷ Treatment must be early for the prognosis to be very good. In mild cases oral dosing with 3 mg/kg of glycerol and 60 ml of propylene glycol twice a day should result in a rapid response. In severe cases 200 ml of 5 percent dextrose intravenously along with 40 IU of insulin subcutaneously may help. If the doe is recumbent, administer antibiotics, 25 mg of dexamethasone (to induce parturition) and 3 liters of fluid with 150 mEq of bicarbonate.²⁷ If response is not prompt, a Cesarean section may be necessary. At least one author feels that goats do not respond well to therapy for pregnancy toxemia, and that a Cesarean section is always indicated.³ At this point, it should be noted that ketosis can also occur after kidding, as in the bovine.⁹

If vaginal prolapses occur they will frequently occur 4 to 5 weeks prior to parturition. Clean and disinfect the prolapse as necessary with warm water and a mild disinfectant, give an epidural, and gently replace. If the urinary bladder is within the prolapse, manipulation of the prolapse toward the tail may allow for urination, making the prolapse much easier to replace. After the prolapse is replaced, 3 or 4 pairs of umbilical tape loops can be placed along the side of the vulva and laced closed. This will serve to prevent recurrence yet allows the owner to unlace when parturition is imminent.²⁷

As parturition approaches, the udder fills and the vulva enlarges.¹⁵ The doe should be cleaned up and placed in a clean well-bedded stall and the water bucket should be removed to prevent accidental drowning of the kid. There will be a variable period of 1 to 10 hours of uterine contractions. With the initiation of an abdominal press the water bag will protrude. This will usually rupture within a short time after protruding; if it does not rupture it will help the doe to slit this. The first kid will appear within the first hour of abdominal press and all kids should be born within a total time of 1 to 3 hours. The placenta should be expelled within 2 hours after the last kid. Kids are usually on

their feet within 30 minutes and, if they are to be left on the doe, the first two or three hours will be critical. Licking the kids for 5 to 10 minutes is usually sufficient for acceptance.^{15,27,14}

Anterior presentation occurs in 70 to 90 percent of normal births though posterior presentation is quite common. With either presentation a dorsosacral position with extension of the limbs should occur.

Lochia, normally red and odorless, will be present for a maximum of three weeks. By six weeks the cervix is closed and uterine involution is complete.²⁷

Dystocia occurs in 3 to 5 percent of births. If the kid is not born after about one-and-a-half hours of active labor or if the doe stops laboring after the water bag or an extremity is visible through the vulva, the doe should be examined. An epidural may be necessary to make examination easier.

If the cervix is dilated and the pelvic canal is normal, it may be possible to extract the kid using hands and possibly a head snare. Ten percent boric acid can be used as a lubricant. It is noteworthy that a kid can be delivered with one leg retained.²⁷

A Cesarean section is indicated if the cervix is not dilated or if it has closed, as it may after 2 to 3 hours of labor. In some cases, however, incomplete dilation and weak labor may respond to subcutaneous calcium and magnesium (50 ml of 20 percent calcium borogluconate).

Unproductive labor may be due to a uterine torsion. Upon examination, spiral folds can be palpated in the birth canal. If the doe is in good condition, it is worth rolling her in an attempt to correct the torsion. If a fetal limb is projecting into the birth canal, one person may be able to grasp it while rolling the doe to aid in stabilizing the uterus. If the torsion can't be corrected, a Cesarean section is indicated.²⁷

After any dystocia, the uterus should be examined for another kid and for lacerations. Antibiotic boluses should be placed in the uterus and 5 to 20 IU of oxytocin should be administered paenterally. The placenta should be left alone unless it is clearly unattached. A tetanus toxoid booster should be given at this time as well.

In the case of a malformed, dead, or emphysematous fetus, a subcutaneous fetotomy may be performed using a finger knife and gloved hands. There is not much space for the

use of fetotome wire, but it is usually not necessary anyway. Most of the bones can be fractured manually or disarticulated with the knife. After the fetotomy the uterus should be lavaged with a tamed iodine disinfectant.

Uterine prolapse may occur occasionally, especially in underexercised or hypocalcemic does. In such cases, give an epidural, wash and disinfect the prolapse and scoop it up in a moist towel. With the hindquarters elevated, or with the doe in sternal recumbency with hindlimbs straight out behind, gently replace the prolapse to the tip of each horn, place antibiotic boluses, and either pursestring the vulva or use umbilical tape mattress sutures (these can usually be removed in about seven days). After placement of the sutures, administer 50 ml of 20 percent calcium borogluconate subcutaneously and a tetanus toxoid booster.²⁷

INDUCTION OF PARTURITION

Induction of parturition is indicated for does that have been bred too young, mismating, severe pregnancy toxemia, the convenience of the owner, and research purposes. With normal parturition there is an increase in the levels of prostaglandin and of 17α -estradiol, followed by a decrease in progesterone levels and an onset of uterine contractions.⁵

Induction of parturition using PGF_2 is based on this *in vivo* mechanism, basically decreasing the progesterone levels via luteolysis. In one study, does at 144 days gestation kidded 30 to 32 hours post-injection with 20 mg of PGF_2 . This compares favorably with does kidding 93 to 147 hours after treatment with 20 mg of dexamethasone. There was no difference in the viability of the kids or in the incidence of retained placentas. Although minimum doses have not been established, 2.5 mg of PGF_2 intramuscularly is roughly equal to the bovine dose on a weight basis.^{20,21,27}

In addition to the predictability of parturition time offered by PGF_2 when compared to dexamethasone, it also offers the advantage that it will induce parturition/abortion at any time during gestation whereas dexamethasone is ineffective if used more than 10 days prior to normal parturition.

Another alternative is intramuscular estradiol benzoate at 15 mg per day on days 147 and 148. This regimen will result in parturition on day 149. Single doses and smaller doses do not synchronize as well.²⁷

SUMMARY

In conclusion, it is obvious that the methods available for use in reproductive planning for the dairy goat herd are as varied as the herds. If the veterinarian and the owner can establish a good environment, based on a good basic herd health plan and a reliable source of good feed, the reproductive program will fall into place quite easily. The healthy dairy goat is a very fertile animal, and the bulk of the program can concentrate on fine-tuning the herd. The ultimate goal is to establish a program that will allow the owners to look forward to the kidding season and to concentrate on continued enjoyment and improvement of their herd.

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