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Reproduction Management in Goats

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Reproductive management is a critical component of profitable and sustainable goat farming. It involves the selection of genetically superior breeding bucks and does, identification of oestrus, appropriate mating systems, and effective management of pregnant animals and newborn kids. Goats generally exhibit an oestrous cycle of approximately 19–21 days, with a gestation period of about 147 days. Common signs of oestrus include vulval swelling, vaginal discharge, frequent tail wagging, bleating, restlessness, and acceptance of mounting. Individual mating, pen mating, flock mating, and artificial insemination are important breeding methods. Oestrus detection can be facilitated using teaser or vasectomized bucks and appropriate marking techniques. Balanced nutrition, flushing, controlled breeding, and avoidance of inbreeding improve reproductive efficiency. During late pregnancy, adequate feeding and suitable housing are essential. Prompt colostrum feeding, umbilical cord care, and hygienic kidding facilities improve kid survival and growth. Overall, scientific reproductive management enhances herd productivity, genetic improvement, and farmers' profitability.

Keywords: Goat, reproductive management, oestrus synchronization, breeding systems, artificial insemination, kid survival.

Introduction

India has 45 registered indigenous goat breeds. Indigenous goats generally possess good resistance to diseases and climatic fluctuations, apart from their production potential. However, their full productive capacity has not been realized because of traditional management practices. To exploit the full potential of goats, it is necessary to develop organized breeding programmes, appropriate feeding and housing systems, effective health management, and suitable marketing infrastructure. Proper selection and management of breeding animals are essential for the success of breeding programmes, the production of superior offspring, and increased productivity and income for goat farmers. Goat rearing is mainly practised by landless and small or marginal farmers, particularly rural women with limited formal education. Consequently, maintaining production records such as birth records, breeding records, feed and fodder records, health records, and mortality rates may be difficult. Therefore, farmers often record easily observable indicators, such as the time of tooth eruption and tooth wear, to estimate the age of animals.

Reproductive Parameters of Goats

The normal lifespan of a goat is approximately 12–13 years. However, under ordinary management conditions, female goats are generally maintained for only 6–8 years, whereas breeding bucks may be kept for 4–6 years to obtain efficient production. Breeding at a very young age is associated with poor reproductive performance and may result in greater losses. At the time of mating, the body weight of a goat should generally be appropriate for its age and physiological condition rather than being below the mature weight of the breeding animal. For indigenous breeds, the appropriate age for first breeding is generally around 18–

24 months, depending on body development and management. The most productive offspring are generally obtained from does between 2 and 5 years of age. Female goats usually attain puberty and experience their first oestrus at 6–8 months of age. The oestrous period lasts approximately 19–21 days, although the reported range may be 17–24 days. During this period, the female undergoes reproductive and behavioural changes that indicate readiness for mating. The duration of oestrus is approximately 36–48 hours. Since the reproductive system develops gradually, the appropriate breeding age for female goats is generally considered to be 9–12 months or later, depending on breed, body weight, and management. Does may return to oestrus approximately 21 days after kidding. The gestation period is approximately 147 days, generally ranging from 144 to 152 days. The recommended male-to-female ratio is approximately 1:20. A healthy buck may be sufficient for breeding 25–35 does under suitable management conditions. However, during the initial stage of a breeding programme, 10–15 does may be allotted to a buck to allow proper monitoring and management. Young bucks may be introduced to experienced, mature does, while older bucks can be used for mating young does when appropriate. Inbreeding should be avoided by replacing or rotating breeding bucks periodically, preferably once every two years, depending on herd size and pedigree records.

Selection of Goats for Breeding

The selection of high-quality breeding stock is essential for successful meat and dairy goat production. Goat farming should preferably begin with 30–50 animals of high genetic merit so that farmers can learn the various aspects of goat production and management. These animals can subsequently serve as foundation stock. The breeding herd should consist of healthy animals with high genetic potential and good performance records. Breeding animals should preferably be purchased from a reliable farm or an established individual farmer rather than from an unverified market source. Young animals are generally easier to adapt to a new environment. Whenever possible, animals should be purchased from a disease-free, vaccinated herd. Breeding bucks should be unrelated to the females with which they will mate. Females should be selected on the basis of body size, milk production, reproductive performance, and the quality of their offspring.

Selection of breeding bucks

In the absence of reliable breeding values and production records, visual appraisal is an important practical method for selecting breeding bucks. A common saying in livestock breeding is that the buck is the foundation of the herd. A breeding buck contributes approximately 50% of the genetic makeup of each offspring. Therefore, choosing a genetically superior buck is essential for improving the overall performance of the herd. The following points should be considered when selecting a buck:

1. **Age:** The buck should be sufficiently mature for breeding, with an age of approximately 1 year or more generally preferred for initial selection, depending on breed and body development.
2. **Body weight:** The buck should be well grown, with a mature body weight appropriate for its breed. The text mentions a body weight of approximately 30–35 kg as a selection criterion.
3. **Body conformation:** The body should be well developed, strong, and symmetrical.
4. **Legs and feet:** The legs should be straight and strong, with sound feet.
5. **Coat:** The coat should be smooth and shiny.
6. **Reproductive soundness:** The buck should possess good semen quality and normal reproductive organs.
7. **Health:** The animal should be free from physical defects and clinical disease.

Breeding bucks showing cryptorchidism (failure of one or both testes to descend into the scrotum), malformed or underdeveloped testes, or other serious reproductive abnormalities should be excluded from breeding. Such abnormalities may be hereditary and can negatively affect reproductive performance. Libido, or sexual desire, is another important trait in

selecting a buck. Poor libido may result from inadequate nutrition, excessive heat, stress, or poor health.

Selection of breeding does

A breeding doe should possess the desirable characteristics of the breed and generally be around 1–2 years old when selected for breeding, depending on maturity and body condition. Important selection criteria include:

- A long, well-proportioned body.
- A broad hindquarters region.
- A well-developed, flexible abdomen.
- Good appetite and efficient feed intake.
- Sound legs and feet.
- A well-formed udder with functional teats.
- A healthy, glossy coat.
- Good maternal behaviour and reproductive performance.

A broad hindquarters region may indicate good pelvic development and is useful when assessing suitability for kidding. The udder should be well attached, symmetrical, and free from abnormalities. Pendulous udders and poorly formed teats should be avoided. The doe should be healthy and free from infectious diseases. Females that fail to conceive repeatedly, have a history of difficult kidding, produce very small or weak offspring, or have persistently poor milk production should be considered for culling. Good reproductive traits include conception at an appropriate age, successful kidding with minimal assistance, adequate milk production, good kid growth, and the ability to rear healthy offspring. Animals with small jaws, broken teeth, or poorly developed udders should be examined carefully before being included in the breeding programme. Breeding animals should be purchased from a reliable source rather than selected solely on the basis of appearance in a weekly livestock market. Before purchase, the udder and reproductive organs should be examined for abnormalities.

Preparation for Breeding

Preparation of the buck

A. Identification of the buck

Identification of the buck during breeding is useful for determining which females have been mated and for detecting repeat breeding. A marking paste can be prepared using lampblack or Venetian red mixed with linseed oil. The paste is applied to the brisket region of the buck at least once a week during the breeding season. When the buck mounts a doe, the marking paste leaves a visible mark on the female, indicating that mating has occurred. The colour should be changed every 16–18 days so that repeated matings can be identified. A marking harness or raddle can also be used. It consists of a harness fitted with a coloured crayon that leaves a mark on the doe's rump during mating. This method is commonly called raddling.

B. Disbudding or dehorning

In some breeding bucks, horn growth may be undesirable because horns can cause injuries to other animals and handlers. Disbudding refers to preventing horn development at an early age, whereas dehorning involves removing established horns. These procedures should be undertaken only when appropriate, by trained personnel, and in accordance with animal-welfare requirements.

C. Feeding bucks for breeding

Under normal conditions, bucks require balanced nutrition. However, additional nutrients may be necessary before and during the breeding season. Overweight bucks may need gradual adjustment of their diet and exercise programme before breeding. Feeding should maintain good body condition without excessive fat deposition. A gradual increase in high-quality feed and suitable exercise may help prepare the buck for the breeding season. Supplementary ration containing approximately 300–500 g of concentrate, with a mixture of cereal grains such as maize, barley, or wheat. Actual feeding levels should be adjusted to body weight, forage quality, workload, and body condition.

Preparation of the doe

A. Trimming and cleaning

Trimming, also called crutching, involves removing excessive hair and dirt around the tail, perineal region, and hindquarters. This improves hygiene, reduces contamination during mating and kidding, and facilitates examination of the reproductive area.

B. Flushing

Flushing is the practice of improving the nutritional plane of female goats before breeding by providing additional energy and nutrients. It is generally carried out about 3–4 weeks before mating, particularly when does are in declining body condition or when feed availability is limited. Flushing is most effective in does that are underfed or in moderate body condition. Excessive feeding of already overconditioned animals should be avoided. The benefits of flushing include:

- Improved reproductive performance.
- Increased ovulation rate.
- Better conception and pregnancy outcomes.
- Increased likelihood of twins or triplets in suitable animals.
- Improved embryo survival and reduced early embryonic losses.

Reproductive Management

Breeding season

In tropical regions, female goats may exhibit oestrus throughout the year. In temperate regions, reproductive activity is more strongly influenced by day length, with breeding activity often increasing as the days become shorter. In some indigenous goat breeds, breeding activity is influenced by seasonal rainfall and feed availability. In India, many goats show increased reproductive activity during the monsoon and post-monsoon periods, although this varies by breed and location. Three broad periods of reproductive activity:

- Summer: Around April–June.
- Monsoon or rainy season: The period following the onset of the monsoon.
- Autumn or post-monsoon: Around September–November.

Breeding should be planned according to forage availability, climatic conditions, and the desired kidding season. For example, kidding may be scheduled for spring (February–March) or autumn (October–November), depending on the production system. This helps ensure that pregnant does receive adequate nutrition and that newborn kids are born under favourable conditions.

Appropriate time for mating

Does should be bred only after attaining adequate body weight and physical maturity. A general guideline is to breed a doe when she has reached approximately 70% of the expected mature body weight of her breed. A high conception rate may be achieved when the buck and doe are healthy and breeding is performed at the appropriate stage of oestrus. Allow a buck to remain with the doe for an extended period or arranging repeated mating. However, breeding should be supervised, and the number of matings should be managed to avoid unnecessary exhaustion of the buck.

Methods of Synchronizing Oestrus

Oestrus synchronization is the process of manipulating the reproductive cycle so that several does come into heat within a relatively short period. It facilitates planned mating, artificial insemination, and the management of kidding.

Male stimulation (male effect)

A sexually active buck is introduced to a group of does after a period of separation. The sudden introduction of the buck stimulates reproductive activity in the females and may induce or synchronize oestrus and ovulation in some animals. This method is relatively simple and inexpensive. Its effectiveness depends on the reproductive status of the does, the duration of separation, season, and the condition of the buck.

Oestrus synchronization

The reproductive cycles of several does are synchronized so that a larger number come into heat within a short period. Synchronization facilitates organized breeding, artificial insemination, and planned kidding. It can also reduce the labour required for repeated heat detection. Synchronization may be achieved through management practices or hormonal protocols, depending on the production system.

Buck effect

When a buck is suddenly introduced to a group of does after a prolonged period of separation, the stimulus may induce reproductive activity in a proportion of the females. The effectiveness of this method depends on the season, breed, nutritional status, and reproductive condition of the does.

Teasing or controlled exposure to males

A teaser buck may be introduced to the female group to stimulate and help detect oestrus without allowing uncontrolled mating. Separating bucks from does for approximately 2–3 months before their reintroduction. The sudden introduction of the buck may result in a concentrated period of oestrus in some females.

Hormonal Methods of Oestrus Synchronization

Hormonal synchronization involves the use of reproductive hormones or their analogues to control the oestrous cycle.

General procedure

1. A progesterone-containing device or preparation is administered for a prescribed period.
2. The device or treatment is withdrawn according to the selected protocol.
3. In some protocols, PGF_{2α} or an appropriate analogue is administered.
4. Does are observed for signs of oestrus, or insemination is performed according to the veterinary protocol.

Oestrus may occur within approximately 72–96 hours after certain treatments. The actual timing varies with the hormone protocol and reproductive status of the animals.

Signs of Oestrus (Heat) in Goats

The following signs indicate that a female goat is in oestrus:

- Redness and swelling of the vulva.
- Vaginal discharge.
- Frequent tail wagging.
- Attempting to mount other animals.
- Seeking the buck.
- Standing still and allowing the buck to mount (standing reflex).
- Frequent bleating and restlessness.
- Attracting the buck through smell, sight, and sound.
- Repeated urination and characteristic behavioural changes.
- Stretching the neck and mounting other animals.

Identification of Does in Oestrus

Use of a breeding buck

A buck can be introduced to a group of does to identify females in heat. However, if the buck is not properly controlled, unwanted mating may occur.

Use of an apron on the buck

An apron is tied around the abdomen of the buck to cover the penis and prevent mating. An apron made from a soft piece of cloth measuring approximately 60 × 45 cm, fitted with straps to secure it. The apron should be washed daily and inspected for tears or damage. If it is not properly secured or regularly checked, accidental mating may occur. Friction or contamination around the penis and preputial region may also cause irritation or infection. The buck may be allowed to remain with the herd for approximately 15–20 minutes in the

morning and evening to identify females in heat. Does showing signs of oestrus can then be marked and separated for mating with the selected buck.

Use of a vasectomized buck

A vasectomized buck is one that has undergone a surgical procedure in which the vas deferens is interrupted. Such a buck can detect and stimulate does in oestrus but cannot normally fertilize them through natural mating.

A vasectomized buck may be introduced to the herd to identify females in heat without the risk of unwanted pregnancy.

Types of Mating Systems

Individual mating system

In this system, each doe is mated individually with a selected buck.

A buck should not be allowed to mate with more than approximately three does in one day under the management system. Individual mating allows the farmer to record the mating date and estimate the expected kidding date. Advantages include:

- Accurate identification of the sire.
- Better control over breeding.
- Reduced risk of injury during mating.
- Improved monitoring of the buck's reproductive performance.
- Easier planning of kidding.

This method is particularly useful when a young doe is mated with a mature buck. It also helps reduce unnecessary mating and may improve the management of reproductive performance.

Pen mating system

In the pen mating system, does are divided into separate groups, generally containing around 20–25 females per group. A buck is kept with the assigned group during the night and separated during the day. This method can reduce injuries during prolonged mating activity, provide the buck with adequate rest, and allow sufficient time for feeding and recovery.

Flock or pasture mating system

In this system, the buck is allowed to run with the does throughout the day and night. Although simple to operate, it has several disadvantages:

- The buck may expend excessive energy chasing females.
- Some does may receive repeated matings while others may be missed.
- The buck may become exhausted.
- Mating dates and parentage may be difficult to determine.
- The kidding period may become prolonged or less predictable.

Therefore, flock mating requires adequate supervision and an appropriate buck-to-doe ratio.

Artificial insemination

Artificial insemination (AI) involves introducing semen collected from a selected buck into the reproductive tract of a doe without natural mating. AI can be particularly useful in small herds where access to genetically superior breeding bucks is limited. It allows the genetic material of superior males to be distributed among a larger number of females. Fresh or frozen semen may be used, depending on the protocol and available facilities. In goats, the insemination technique and timing must be selected according to the semen type, reproductive status, and veterinary guidance. Conception rates following artificial insemination may be lower than those achieved by natural service in some circumstances, and that results vary with semen quality, timing, technique, and management. Skilled personnel and appropriate semen-handling procedures are essential for successful artificial insemination.

Care and Management of Pregnant Goats

During the advanced stages of pregnancy, does should be separated from the main flock and given special attention, particularly regarding nutrition and housing. Additional feed during

the last 3–4 weeks before kidding is beneficial because it supports fetal growth, milk production, and the development of healthy kids. Inadequate or poor-quality nutrition may lead to pregnancy complications, premature kidding, weak offspring, and increased kid mortality.

The following management practices are recommended:

1. Provide adequate, balanced nutrition throughout pregnancy.
2. Increase nutritional support during late pregnancy according to the doe's requirements.
3. Keep pregnant does in a clean, dry, and well-ventilated shelter.
4. Provide a separate kidding pen approximately 4–6 days before the expected kidding date.
5. Supply clean bedding and adequate space for the doe and newborn kids.
6. Protect pregnant does from cold weather, excessive heat, and other environmental stressors.

Care of Goats During Kidding

Normal kidding

The initial stage of labour generally lasts approximately 20–50 minutes, although the duration varies between animals. Close observation is particularly important when a doe is experiencing difficult labour, is weak, or is carrying a large kid. If labour does not progress normally, or if the doe shows signs of distress, assistance from a qualified veterinarian should be sought promptly.

Care immediately after birth

After kidding, the doe generally licks the newborn kid to remove the fetal membranes and stimulate breathing and circulation. This behaviour also promotes bonding between the mother and her offspring. If the doe does not clean the kid adequately, the caretaker should gently remove membranes and mucus from the nose and mouth and ensure that the kid is breathing normally. The following steps are important:

- Ensure that the newborn is breathing properly.
- Dry the kid and keep it warm.
- Disinfect the umbilical cord using an appropriate veterinary antiseptic.
- Ensure that the kid receives colostrum promptly.
- Keep the newborn in a clean, dry, and safe environment.
- Monitor the doe for retained fetal membranes, excessive bleeding, or other postpartum complications.

Provide colostrum within the first 20 minutes after birth. In practice, the priority is to ensure that the kid receives an adequate quantity of high-quality colostrum as soon as possible, ideally within the first one to two hours, because intestinal absorption of antibodies declines rapidly with time. Colostrum provides immunoglobulins, energy, and essential nutrients that protect the newborn against infection. High-producing dairy goats may be milked according to the farm's management plan, while ensuring that newborn kids receive sufficient colostrum.

Care of the newborn kid

The first one to two hours after birth are particularly important for establishing the bond between the doe and her kid. The doe and newborn should be kept in a quiet, clean area away from aggressive dogs and other animals. The kid should remain with its mother during the initial bonding period and, where appropriate, throughout the first week or longer. Regular observation is necessary to ensure that the kid is suckling effectively, maintaining body temperature, and showing normal activity.

Conclusion

Selection and reproductive management are essential components of successful goat farming. Through the systematic selection of superior bucks and does, farmers can progressively improve the genetic merit and productivity of their herds. Appropriate heat detection, controlled mating, artificial insemination where suitable, balanced nutrition, and proper management of pregnant animals contribute to better reproductive efficiency. Equally

important are hygienic kidding facilities, timely colostrum feeding, and careful newborn management. Selective breeding can help improve milk production, growth, disease resistance, body conformation, and adaptation to local climatic conditions. Choosing animals suited to the local environment, whether hot, cold, or dry, can improve herd resilience, reduce veterinary expenses, and increase farm profitability. Overall, sound breeding decisions combined with good nutrition, health care, and newborn management are fundamental to sustainable and profitable goat production.

References

1. Devendra, C., & Burns, M. (1983). Goat production in the tropics (2nd ed.). Commonwealth Agricultural Bureaux.
2. Chemineau, P., Guérin, Y., Orgeur, P., & Vallet, J.-C. (1991). Training manual on artificial insemination in sheep and goats. Food and Agriculture Organization of the United Nations.
3. Tsuma, V. T., Khan, M. S., Okeyo, A. M., & Ibrahim, M. N. M. (2015). A training manual on artificial insemination in goats (ILRI Manual 19). International Livestock Research Institute.
4. Leboeuf, B., Delgadillo, J. A., Manfredi, E., Piacère, A., Clément, V., Martin, P., Pellicer, M., Boué, P., & de Cremoux, R. (2008). Management of goat reproduction and insemination for genetic improvement in France. *Reproduction in Domestic Animals*, 43(Suppl. 2), 379–385.
5. Rana, T. (Ed.). (2025). Elements of reproduction and reproductive diseases of goats. Wiley.
6. Department of Animal Husbandry and Dairying. (2025). Basic animal husbandry statistics—2025. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India