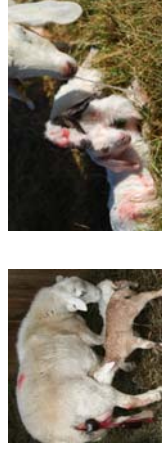


Lambing and Kidding in the Fall



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Reproductive Efficiency



- Efficient reproductive management is essential for profitability in any livestock enterprise
- Efficiency of production can be characterized by the number of lambs weaned per ewe/kids weaned per doe per year
- Two approaches to increase the numbers of lambs/kids produced per female per year are to:
 1. increase lambing/kidding frequency
 2. increase the lambing/kidding rate

Reproductive Efficiency



- Current production strategies do not take full advantage of the short gestation period of ewes and does
 - 3 lamb/kid crops per 2 years
- Seasonality of reproduction could hamper a consistent supply of sheep and goat meat and other products

Seasonal Effects on Reproduction

- Seasonal anestrus occurs when the day length increases
- This period is associated with an absence of estrus and ovulation and decreased secretion of the reproductive hormones
- Sheep and goats are considered short day breeders
 - Maximum fertility in the late summer and fall months (shorter days)
- Seasonal species are responsive to melatonin – produced by the pineal gland in response to declining periods of light
- Increased levels of melatonin resulting from increased levels of darkness (such as in the fall) stimulates reproductive cycling in the ewe and doe
 - Increasing Gonadotropin releasing hormone (GnRH)
 - April – June (most anestrus months)

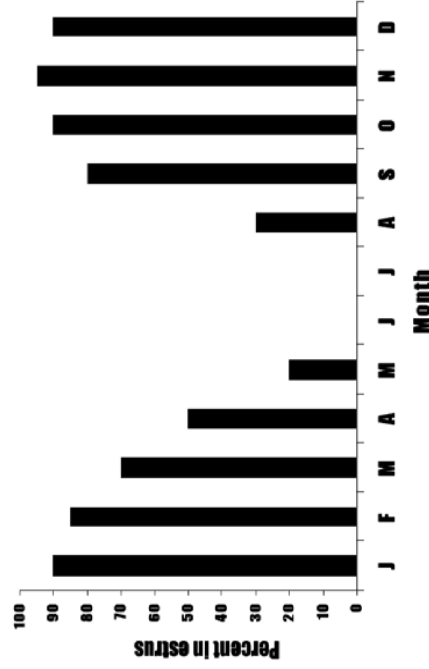


Figure 1. Anticipated proportion of ewes exhibiting estrus in different months.

*Adapted from: D. R. Notter, 2002. Opportunities to Reduce Seasonality of Breeding in Sheep by Selection. Sheep and Goat Res. J. 17 (3), 21-32

What is Out-of-Season Breeding?

- Breeding to have kidding/lambing in the fall months (September – October or December)
- Out-of-season breeding (OSB) allows for 3 lamb/kid crops every 2 yrs



Why kid/lamb in the fall?



- 1) Greater production - increased number of lambs produced per ewe or kids produced per doe
- 2) Lambs/kids can usually be sold when prices are the highest
- 3) Fewer problems with parasites and predators with fall lambing/kidding
- 4) More consistent supply of goat and sheep products
- 5) Facilities, labor, resources are better utilized

Out-of-Season Breeding Methods

- Hormonal control - Progesterone
 - Vaginal Sponges
 - Intravaginal progesterone sponges (pessaries)
 - CIDRs – (controlled intravaginal drug-releasing devices)
 - Synchro-mate-B®
 - Melengestrol Acetate (MGA)
- Light control
- Male Effect
- Genetic Selection



How does hormonal control work?



- Progesterone inhibits estrus and ovulation until treatment is withdrawn
- Progesterone is usually secreted by the corpus luteum (CL – formed at the site of ovulation) and maintains pregnancy
- When the source of progesterone has been removed, progesterone levels fall and GnRH should once again be released
- This allows for ovulation and estrus within a predictable time

Hormonal Control



- Options for hormone control
 1. Intravaginal progesterone sponges (pessaries)
 2. EAZI-Breed CIDRs – (controlled intravaginal drug-releasing devices)
 3. Synchro-mate® (not discussed because no longer manufactured)
 4. MGA

**None of the pharmacological treatments described above have been approved by the U.S. Food and Drug Administration (FDA) for use in goats; two are approved in sheep (Synchro-mate® - no longer manufactured and EAZI-Breed CIDRs).*

Intravaginal sponges and CIDR protocol

- Examples: Flurogestone Acetate (FGA-Cronogest 45) and methyl acetoxy progesterone (MAP; Veramix®) – available in Australia and UK.
- 20 – 60 mg progesterone



Intravaginal sponges and CIDR protocol



- EAZI-Breed CIDR sheep insert
- Approved for use in sheep by FDA on November 16, 2009
- Vesperats Consulting – (530) 668-4884

Intravaginal sponges and CIDR protocol



- Intravaginal sponges and CIDRs usually have similar protocols
- Day 1: Insert sponge or CIDR for 8 – 14 days (lubricate first and insert at an upward angle)
- At time of sponge/CIDR removal: inject with pregnant mare serum gonadotropin (PMSG; 300 IU or 600 IU depending on species, breed, and time) or 1.5 cc intramuscular injection of PG 600
 - Remove sponges/CIDRS gently at a downward angle
 - If not visible use fingers or forceps to find

Advantages and Disadvantages

- **Advantages**
 1. Great for estrus induction and/or synchronization
- **Disadvantages**
 1. Sponges can fall out
 2. Somewhat labor intensive
 3. Possibility of vaginal infection
 4. Conception rates vary

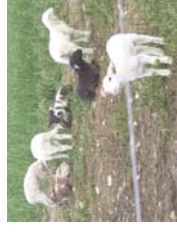


Intravaginal sponges and CIDR protocol

- **Buck/Ram**
 - Introduced to the group at time of sponge removal or 48 hr after sponge removal
 - Females should be in heat within 24 - 48 hr
 - 1 buck/ram to 10 females
- **Artificial insemination**
 - Cervical in goats: 36 – 54 hrs after device removal
 - Laparoscopic in sheep: – 50 – 54 hrs after device removal



Melengestrol Acetate (MGA)



- Melengestrol acetate is a synthetic progestagen feed additive
- Commonly used in feedlot heifer rations to prevent estrus
- MGA blocks the release of luteinizing hormone (LH), preventing ovulation
- PMSG stimulates the estrus cycle to begin again

Advantages and Disadvantages

- **Advantages**
 1. Great for estrus induction and/or synchronization
- **Disadvantages**
 1. Sponges can fall out
 2. Somewhat labor intensive
 3. Possibility of vaginal infection
 4. Conception rates vary

MGA Protocol

- MGA is fed at a rate of 0.125 mg, twice a day for 8 - 16 days
- Feedings should be 12 hrs apart same time each morning and evening
- Higher estrus response - PMSG/estradiol is part of the hormone treatment
 - PMSG: 5 – 10 hrs after last feeding
 - 17 Beta Estradiol: 54 hrs after last feeding



MGA Protocol

- Ewes/does typically come into heat within 48 – 76 hrs
- Introduce the ram after 48 hr
- Average conception rate 50%-80%



Advantages and Disadvantages

- **Advantages**
 1. Availability as a feed additive
 2. Could be less labor intensive
- **Disadvantages**
 1. Not labeled for sheep and goats
 2. Varying conception rates—typically 50-80%
 3. Animals must be fed twice daily



Light Control

- **How does it work?**
 - Estrous cycle is affected by the changing length of daylight
 - Sheep and goats (some breeds more than others) are considered short day breeders (late summer and fall months)
 - Pineal gland secretes melatonin (produced in the dark)
 - Increased levels of melatonin (resulting from longer nights in the fall) stimulates the ewe's/doe's reproductive cycle

Light Control Protocol



- Ewes/does are usually exposed to 8-12 weeks of “long” days (16 hrs)
- Followed by 8-12 weeks of “short” days before breeding
- > 100 luxes of light – daylight
- < 10 luxes of light - darkness
- Rams should also be exposed to this cycle to increase their fertility

Advantages and Disadvantages

- **Advantages**
 1. Natural manipulation of the cycle
- **Disadvantages**
 1. Labor intensive
 2. All lighting must be tightly controlled
 3. Not practical in a producer setting



Male/Ram/Buck Effect



- **Introducing a buck or ram into a herd of females induces ovulation**
 - It is not effective if the males and females are together all the time
 - Sudden placement of male with females induces an LH surge and ovulation in days
 - Rams release a pheromone that induces spontaneous ovulation

Male Effect Protocol

- Males are separated for at least 21 – 28 days
- Preferably at different farms (at least 1 mile away)
- Reintroduce the rams/bucks to the ewes/does
- Females exhibit estrus within 72 – 144 hrs
- 60-70% conception rates
- Less seasonal breeds respond the best



Advantages and Disadvantages

- Advantages
 1. Not labor intensive
 2. Effective synchronization tool
 3. Natural and inexpensive
- Disadvantage
 1. Must have separate off farm site for rams
 2. More effective during the transitional time (time right before females start to cycle)



Genetic Selection



- There is a large variation between breeds in the length of breeding season
- Certain breeds with longer breeding seasons will be more likely to breed out of season
 - Dorset, Rambouillet, Finnsheep, Hair sheep
 - Nubian, Pygmy, Spanish
- There is variation within breeds
- Heritability is generally thought to be less than 10%

Selection Protocol – between breeds

- Choose breeds with greatest capacity for out-of-season breeding
- Breeds with shortest anestrus periods
 - Moderate in size and growth rate, early maturing
 - Dorset, Rambouillet, Merino, Polypay, Finnsheep, Romanov, Dorper, Karakul, Katahdin, St. Croix, Barbados Blackbelly
 - Nubian, Pygmy, Spanish



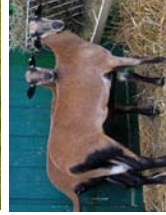
Selection Protocol – between breeds

- Terminal sire that's typically out-of-season (promotes growth rate)
 - Suffolk, Hampshire, Texel, etc.
- Low male: female ratio
- Multiple sire breeding systems



Selection Protocol – within breed

- Females - select those who are less seasonal in their breeding ability
- Males - select rams that are not infertile during the anestrus season
- Young - select those born early in the lambing season



Advantages and Disadvantages

- Advantages
 1. Natural process
 2. Heritable trait
 3. Reduces seasonality
 4. 50-70% fertility levels
- Disadvantages
 1. Low heritability, so takes a long time
 - More successful in some breeds than others



Success of Out-of-season Breeding Program



- Ewes/does must be in good body condition, preferably gaining body weight at the time of mating
- All animals should be fed a flushing ration prior to and during breeding
- Breeding ewes/does should have a body condition score 3-3.5

Success of Out-of-season Breeding Program



- Minimize/avoid stress and handling during treatment
- Mate young females separately from mature ones
- Ensure good care and management of the rams
 - Poor nutrition can decrease testicular size and sperm reserves at a time when the size and reserves are already smaller

Success of Out-of-season Breeding Program



- Begin supplementary feeding 4-6 weeks prior to mating to increase sperm reserves
- Shear rams 2 months prior to breeding and ensure that all wool is removed from the scrotum
- Maximum of 10 ewes to each ram be used out of season

Summary

- Variety of methods for inducing estrus during the non-breeding season
 1. Hormonal control
 2. Light control
 3. Male Effect
 4. Genetic Selection
- Choice depends on practicality in terms of labor and costs
- It is important to ensure that ewes and rams are managed to optimize success

Conclusions

- Hormonal control, light manipulation, and the male effect are all successful alternatives to enhance an out-of-season breeding program
- Genetic differences in seasonal breeding patterns are clearly present among and within sheep and goat breeds and provide an opportunity to make choices among and within breeds to reduce seasonality

