BACKYARD LIVESTOCK REPRODUCTION

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Introduction

In recent years, there has been an increased desire on the part of the consumer to know where their agricultural products are produced. Many consumers have embraced the homestead movement to become more self-sufficient and produce their own meat and milk products. Consequently, increases in small livestock farms in suburban or metropolitan areas have led to an increase in demand for veterinary services to care for these animals.

According to a USDA survey conducted in 2011, there were 350,000 farms fitting the definition of small scale livestock production and raising species such as cattle, poultry, sheep, swine, and goats. Nearly 40% of these small scale livestock farms were located in metropolitan counties with a population over 50,000 people and in close proximity to urban areas. Many small scale producers focus on raising swine and small ruminant species as these species are more suitable to the suburban areas and can be raised with less land than is required for grazing cattle. In addition, proximity to metropolitan areas increases the opportunities for marketing meat and milk products in farmer’s markets and community supported agriculture programs thereby driving the growth of small scale agriculture.

As the small scale agriculture movement grows, the need for veterinary expertise for these backyard livestock species will increase. Clients will seek information on basic herd health concepts such as husbandry, biosecurity, and disease prevention. For clients focused on reproduction to provide a continual supply of market age animals for the production of lamb, pork, and goat, veterinarians need to be prepared to provide valuable information on breeding, pregnancy diagnosis and management, and dystocia management.

Sheep and Goats

Sheep and goats are seasonal breeders that experience reproductive cyclicity in the fall when day length is becoming shorter. However, some breeds are less affected by season and may be able to reproduce up to three times in a two year period. Breed, age, day length, and nutritional status all play a role in the reproductive cycle of the ewe and doe. For sheep, an increased the plane of nutrition just prior to the breeding season may be beneficial to increase ovulation and lambing rates. This can be accomplished by feeding 1 pound/head/day of a supplemental concentrate source such as corn, oats, or barley two to three weeks prior to the intended breeding season.

Does and ewes will attain puberty between 6 and 8 months of age. However, there are some breed differences with pygmy does reaching puberty as early as 3 months of age. To avoid
Dystocia, ewes should be bred to lamb no earlier than a year of age while does should attain 60-70% of their mature body weight prior to breeding.

During the breeding season, the ewe will cycle every 17 days, on average, while the estrous cycle of the doe is 21 days in length. A ewe or doe in estrus will display signs such as vulvar swelling, small amounts of mucus discharge, and standing for or seeking out the male. One main difference in the doe is the presence of a cloudy white discharge near the end of estrus. This is a normal finding in the doe and should not be confused with an infection of the genital tract.

The ram or buck effect may be used as a method to synchronize breeding in a group of females, especially during seasonal transition. However, it is important to note that the male must be housed separately from the females for at least 4-6 weeks prior to introduction. Once the male is introduced, most females should express estrus within six days.

PGF$_{2\alpha}$ can be used to induce estrus in a group of cycling females. The CL will be responsive to PGF$_{2\alpha}$-induced luteolysis after day 5 or 6 of the estrous cycle. Following an injection of prostaglandin, 60-70% of females would be expected to display signs of estrus within 30-60 hours. A second dose of PGF may be administered 9-11 days later to improve synchrony. The method of breeding following synchronization may include natural mating or artificial insemination.

Pregnancy diagnosis in sheep and goats can be performed via ultrasound or blood-based pregnancy testing. Ultrasound examination may be performed transabdominally using a 5 MHz linear transducer with a reported sensitivity and specificity of 100% by 39 days gestation (Jones et al, 2016). Blood-based pregnancy testing relies on the detection of pregnancy associated glycoproteins (PAG) in maternal serum. Blood-based pregnancy tests have a sensitivity and specificity of 100% and 99.2%, respectively, at 29 days after breeding (Karen, et al, 2003). In addition to being detected in serum, PAG cross the blood milk barrier and enter the milk of a lactating female; the availability of the milk-based PAG assay could be a viable option for pregnancy diagnosis for the small scale goat producer.

Gestation length in sheep ranges from 145 to 150 days while the gestation length of the doe is 147 to 155 days. Knowledge of the physiology of pregnancy maintenance is important for selecting the appropriate pharmaceutical agents in the event that pregnancy termination is warranted. Prior to day 50 of gestation, the corpus luteum (CL) provides progesterone to maintain the pregnancy. Around day 50 of gestation, the placenta becomes the primary source of progesterone in the sheep. In contrast, there is no placental progesterone produced in the doe and she remains CL dependent throughout pregnancy. If pregnancy termination is elected prior to day 50 of gestation in a ewe, a luteolytic dose of prostaglandin F$_{2\alpha}$ (10-20mg dinoprost or 75µg/45kg of body weight cloprostenol, IM) may be used. After gestational day 50 until term, induction of parturition in sheep requires dexamethasone (15-20mg, IM); parturition is expected to occur within 36-48 hours. Since the doe is dependent on luteal progesterone throughout gestation, elective termination of pregnancy may be achieved at any time with a luteolytic dose of prostaglandin F$_{2\alpha}$ (5-10mg dinoprost or 75-100 µg/45kg of body weight cloprostenol, IM). Parturition will occur within 30-35 hours following induction in the doe. Induction of parturition
should only be performed if breeding dates are known and the ewe is at least 142 days gestation or the doe is at least 144 days gestation.

**Pigs**

Some small scale producers have begun raising pigs as a meat source due to their ability to reach a market weight in 7-8 months. Niche markets have developed for breeds with a higher fat content in the meat such as Berkshire and Mangalitsa. For the small scale producer focused on breeding females to maintain a constant supply of pigs for market, there are a few key points they should be aware of regarding swine reproduction.

Although gilts attain puberty between 6 and 7 months of age, breeding should not be performed prior to 8 months of age or a body weight of approximately 300 pounds to prevent dystocia at the time of parturition. Ideally, gilts should farrow for the first time at approximately one year of age. Pigs are non-seasonally polyestrous and will continue to cycle every 21 days throughout the year, unless pregnant.

Heat detection can be difficult for the small scale swine producer if there is no boar on the premises. Synthetic boar pheromones can be purchased and used to detect standing estrus in gilts or sows. The length of estrus varies amongst females with a range of 1 to 4 days. To effectively detect estrus, the female should be housed away from any boar scent, either natural or synthetic, and taken to a separate area for heat detection twice daily. Standing estrus can be confirmed if the female stands when pressure is applied to her back or flanks. Other signs of estrus in the sow and gilt include vulvar swelling and decreased appetite. If using artificial insemination, it should be performed at the first sign of standing estrus and again in 24 hours if the sow is still displaying standing estrus. Pharmacologic synchronization of estrus is not easily achieved in pigs as their response to exogenous GnRH is variable and the CL is not responsive to prostaglandin until after day 12 of the estrous cycle.

Pregnancy diagnosis in pigs can be achieved using transabdominal ultrasound to visualize the developing embryo at 25 to 32 days gestation. A 3.5 MHz sector scanner or a 5 MHz linear transducer placed in the flank of the animal lateral to the nipples and directed caudally will provide the most diagnostic image for confirmation of pregnancy. In my experience, as pregnancy progresses and proportionally less fluid surrounds the developing fetus, identification of the uterus and fetus becomes more difficult compared to ultrasonographic examinations performed at 30 days gestation.

Gestation length in pigs ranges from 112 to 118 days depending on the farm and breed of pig. The average gestational length is 114 days. Since the pig is dependent on luteal progesterone throughout pregnancy, a single luteolytic dose of prostaglandin F$_{2\alpha}$ (10mg dinoprost IM) is effective for inducing parturition within 36 hours of administration. Induction of parturition should not be performed in sows or gilts that are not showing signs of udder development. In addition, induction of parturition prior to 114 days of gestation will decrease survivability of the piglets.
Dystocia in pigs is rare, with the incidence estimated at less than 1%. However, it is important to recognize the signs of dystocia and the steps required for resolution. Signs that a sow may be experiencing dystocia include failure to deliver piglets within 1 to 2 hours of the onset of parturition, greater than 1 hour between the delivery of piglets, or abnormal vulvar discharge at the end of gestation. Causes of dystocia in pigs include feto-maternal disproportion, fetal postural abnormalities, and uterine inertia secondary to obstructive dystocia. Dystocia resolution in the sow is often accomplished by correction of any fetal postural abnormalities and manual traction.

Oxytocin may be used during resolution of dystocia to increase uterine contractions and move piglets closer to the birth canal. However, a vaginal examination prior to administration of oxytocin is imperative to ensure that the cervix is dilated and there is no obstruction in the birth canal. Administration of oxytocin when an obstruction is present may result in uterine rupture. The recommended dose of oxytocin is 10 IU administered subcutaneously in the vulvar lips and may be repeated once. Higher doses of oxytocin or lower doses administered more than twice will result in uterine fatigue and diminished contractions in response to subsequent doses. Although oxytocin can be helpful in the resolution of dystocia, its use may also increase the risk of fetal hypoxia due to strong uterine contractions that restrict blood flow through the umbilical cord resulting in an increased rate of stillbirths and decreased performance of surviving neonates due to poor suckling and failure of passive transfer of immunity (Alonso-Spilsbury et al, 2005).

**Summary**

Small scale livestock producers represent an opportunity for veterinarians to provide education and services to a unique subset of clients. These clients will need the expertise of a veterinarian to care for their livestock and help ensure their self-sufficiency and ability to produce a sustainable source of food. The ability to field questions and provide services to this growing agricultural group will increase caseload, especially for practitioners seeking mixed animal work in areas located on the periphery of metropolitan centers.

**References**


