Buck Collection

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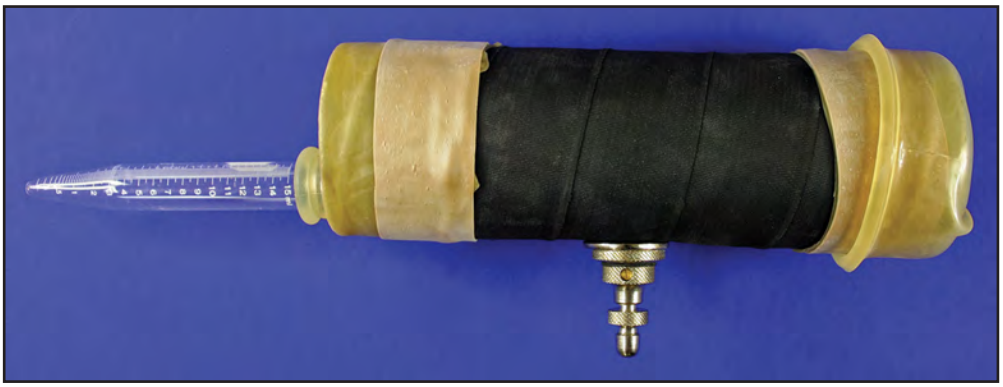
In the last article (**HoofPrint**, Summer 2018–Volume 30, Issue 3), artificial insemination was discussed; however, before artificial insemination can occur, a buck collection has to take place. A collection is simple but needs to be conducted properly to ensure a quality product.

The first step of a buck collection is the physical examination of the buck and his reproductive system. Evaluation of testicular size (circumference) and consistency, and the examination of the sheath and penis are important parts of the external examination. Scrotal circumference is highly correlated to testicular weight which in turn is highly correlated to sperm production. Generally, each gram of testis produces 15 million sperm per day. Total sperm production for both testicles averages 6 billion a day. Palpation of the testicles can determine consistency. Testes should be firm with a slight spongy feeling. A mushy testis or enlarged epididymis could be a sign of infection or other abnormality.

The second step in a buck collection is the collection itself. The collection of buck semen is accomplished, most commonly, by the use of an artificial vagina (AV). The AV uses warmth and pressure to stimulate ejaculation. It is about 8 inches in length and has an inner diameter of about 2½ inches. It has an inner latex liner. A latex rubber collection cone is placed in the AV and a graduated collection tube is placed on the end of the cone. If a thicker-walled silicone collection cone is used, then the initial water temperature should be about 10°F warmer than with a thinner latex collection cone.

For best results, a female in estrus (heat) is restrained and the buck is allowed to mount. A doe in estrus will usually stand for the buck and emits an odor when in heat that arouses the buck, which gives a better quality ejaculate. The buck is allowed to go through his normal courting behavior and is not restrained. The buck is encouraged to perform a few false mounts, the first of which the collector will examine the penis for any abrasions or adhesions by grabbing the sheath and deviating the penis. These false mounts will also increase the ejaculate volume. If a doe in estrus is not available, a doe or a wether can be used but results may vary according to the personality of the buck. Generally, it takes two people in close proximity to the buck to perform a collection; one to restrain the doe and one to direct the penis into the AV.

The natural inclination of the buck is to shy away from people in close proximity. Proper training will overcome this natural shy behavior and also will overcome the buck's hesitancy to ejaculate into the AV. The time required to properly train bucks varies and depends upon the personality of



Assembled artificial vagina (AV)

Estrus female with buck

the buck. Some bucks that are acclimated to human presence and tolerate human touching may need no training. Typically, exposure to a simulated collection event, complete with teaser animal and AV, 2 or 3 times per week with 2 or 3 events per day will provide satisfactory results in 2 to 3 weeks for even the shyest buck. For the shyest, most difficult buck, it is necessary first to habituate the buck to human presence. This first step is to restrain a doe in estrus and have the buck fitted with a breeding apron. On repeated mountings, the collector moves closer and closer to the buck without touching the buck. After the buck becomes accustomed to the collector's close proximity, the collector gently touches the side of the buck. The next step is for the collector to gently grab the sheath and deviate the penis. Now the mating apron can be removed, and the AV used. If at any point in the process, the buck hesitates or stops, the collector should revert to the previous step in the process until the buck is completely habituated.

If time for training is not permitting or a buck absolutely refuses the AV, then collection can be accomplished via electroejaculation (EE); however, this is not the preferred method of collection. If the collector is not well-trained in EE, this method can result in a very unpleasant

Components of an artificial vagina (AV)

AV buck collection process with two handlers.

experience for the buck, maybe even painful, and the ejaculate will be less than desirable. EE generally results in a greater volume of semen but having a lower concentration of sperm than ejaculates collected with an AV. Thus, EE collections have an increased volume of seminal plasma, which may reduce the resistance of sperm to cold shock and decrease the post-thaw survival rate of frozen semen. Further, EE collections tend to be contaminated with urine. Limited comparisons of fertility showed that the conception rate at first insemination was 17% higher when semen was collected with an AV than with EE. However, other reports have not found a significant difference in fertility with semen collected by these two different methods. Regardless of collection method, the collection tube containing the ejaculate should be protected from direct sunlight and cold temperatures.

Semen quality is the third and last step in a buck collection. Immediately after collection, semen should be placed in a water bath at 98°F in order to prevent cold shock. In general, semen quality can be divided into two broad categories: a) the number of sperm cells collected and b) the viability of the collected sperm cells. The number of sperm cells can be readily determined as it is the product of the ejaculate volume times the sperm concentration. The volume of the ejaculate will generally be between 0.5 and 1.5 ml and can easily be measured using a graduated collection tube attached to the AV. The average buck ejaculate usually contains between 1 and 6 billion sperm cells. The accurate measurement of semen is important when semen is to be used in artificial insemination or processed for freezing. The concentration of sperm can be determined by the use of a microscope and hemocytometer, photoelectric colorimetry, or spectrophotometry. The concentration of the ejaculate is a function of several parameters. They include the degree of sexual preparation of the buck, the age of the buck, the time of year the collection is made, the amount of sexual rest before collection, the health of the buck, his nutritional state, inherent sperm storage, and the production capacity of the buck. Semen volume and concentration are important factors in determining the number of straws of semen that can be produced from one ejaculate.

Assessing sperm viability (motility and morphology) is a much more difficult task. Motility is defined as that percentage of the sperm that swim in a more or less straight-forward direction and can be determined by examining a drop of semen, first undiluted for assessing gross motility and then diluted so that individual cells can be evaluated for progressive motility. Morphology is the examination for proper shape, especially noting the percentage of sperm with abnormal shapes of the head and tail. Morphology requires the use of a sophisticated microscope fitted with either phase-contrast or differential interference optics.

After an ejaculate has been properly collected and evaluated, it is ready for processing either for freezing or for artificial insemination using fresh semen.

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