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## Dairy Goat Wellbeing Modules for Dairy Goat Producers

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# Dairy Goat Wellbeing Modules for Dairy Goat Producers

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## Overview

The demand for dairy goat products like cheese, fluid milk, ice cream, and keifer has increased in the last decade. There has been an increase in number of producers raising goats with little prior goat experience as well as investment of large cheese processors into the market (Saputo, Emmi, and Feihe). Notably, national herd sizes are growing. In 2020, the total number of goats in the US was 2.66 million which included 440,000 dairy goats. Canada had a 79% increase in goat numbers from 2001 to 2016. Despite this growth, a very limited number of evidence-based resources are available for North American producers to educate themselves on dairy goat wellbeing. The goals of this project was to provide the dairy goat industry with education and training materials on dairy goat wellbeing. Four topics were prioritized based on their importance to the industry including disbudding, euthanasia, hoof trimming, and transportation.

## Cautery Disbudding

Disbudding is a management practice performed to prevent growth of the horn buds by destroying the cells responsible for producing horn. Disbudding is recommended in order to reduce injuries to goats and their handlers. This module emphasizes the goal of having a welfare-conscious disbudding practice. The primary goal is to minimize the pain, stress, and tissue trauma associated with disbudding.

The potential for pain and stress are most severe during the following: 1) when the disbudding iron is placed on the horn bud, 2) during the period of restraint, and 3) during the period the kid is separated from pen mates.

Technical factors that influence the pain and stress associated with the iron making contact with the skin surrounding the horn bud include heat, application time, and pressure. Along with these factors, we consider administering drugs to mitigate the pain. We emphasize that the kids' skull is typically about the thickness of a business card, much thinner than that of calves. As a result, heat can rapidly transfer through the skull and cause brain damage. Although rare, brain damage is generally heat and application time dependent with longer

periods of thermal exposure and hotter irons potentially increasing the risk of damage. The easiest of these factors to control and think about when disbudding, is the amount of time the iron is in contact with the skin.

Several factors affect the time required for the disbudding iron to be in contact with the horn bud in order to achieve successful cautery disbudding. Our recommendation is to perform disbudding at the youngest age practicable while assuring that the bud can clearly be identified. This minimizes the time necessary to effectively remove the bud, duration of restraint and the time away from the pen-mates, which helps to reduce pain and stress of the process. The exact age at which this occurs may vary and will be influenced by breed, how rapidly the horn bud is growing, and sex.

Preparation of the poll is helpful in shortening the period of disbudding. Clipping hair around the horn buds helps minimize heat loss from the iron due to burning hair, allows for better visualization of the bud assuring proper iron placement, and decreases smoke. Proper restraint of a kid's head is also important because it allows for quicker disbudding time.

Before disbudding, have equipment at hand, in good working order, and ready to go. During disbudding, clean the disbudding iron with a steel brush between uses so the iron has consistent contact with the skin. Retrieve kids from the pen once all supplies are ready to go.

Employees should be well trained and knowledgeable on disbudding practices. This includes knowledge of the dairy's standard operating procedures for disbudding. Employees that are well trained will accomplish disbudding quicker and more consistently.

We also recommend drugs to mitigate pain associated with disbudding. It is important to recognize that all drugs require veterinary prescription, so farmers need to work with their local veterinarian. Non-Steroidal Anti-Inflammatory Drug (or NSAIDs) are the easiest option and are used prior to or at the time of disbudding. Advantages of using a NSAID include low cost, ease of administration (does not require direct veterinary involvement to administer), has minimal negative impact on the duration of the procedure, and has a proven benefit in pain reduction.

As with many management practices, monitoring the success of your disbudding program is important for animal health and wellbeing. This is accomplished by assessing kids for evidence that they

are being disbudded too late and for other complications. Indications that kids are getting disbudded too late include identification of an excessive number of kids or adults with scurs re-growing, a large number of kids needing to be “re-disbudded” due to continued horn growth, and the need to remove or cut part of the horn off prior to disbudding to allow the disbudding iron to fit over the bud. Indications of other complications with disbudding include development of neurologic signs and infections of the disbudding site.

Infected disbudding sites are generally associated with either poorly maintained or dirty equipment, or less than ideal environmental cleanliness where the procedure is performed or how the animals are housed. When observed, a significant rate of infections should prompt the evaluation of equipment and environmental cleanliness.

Although not always recognized by farmers, goat kids do routinely demonstrate altered behaviors including an increase in head shaking and head scratching. These are behaviors of kids trying to alleviate the pain caused by disbudding and should not be ignored.

In summary, in preparation for disbudding we recommend you consider how hot your iron is, and how much pressure and application time you are using. Employee training and having the equipment set up before starting the procedure are also essential. Importantly, pain relief options should be explored and discussed with your veterinarian.

### **Timely and Humane Euthanasia of Adult and Neonatal Dairy Goats**

In cases where animals are suffering or welfare is compromised, humane euthanasia is sometimes necessary. The key outcome of euthanasia is to induce an immediate and sustained loss of consciousness followed by cardiac arrest and death.

Personnel who perform euthanasia procedures should be well trained by a veterinarian or other experienced person. Training should include a discussion of proper methods and secondary steps when applicable to assure death. People who apply these techniques should be familiar with the proper anatomic sites for conducting these procedures and take advantage of opportunities to practice these procedures on cadavers when possible.

Euthanasia is emotionally disturbing for anyone required to perform the procedure. Persons who euthanize animals repetitively can become desensitized to animal suffering and death. Emotional and psychological problems including irritability, difficulty sleeping, loss of job satisfaction, and careless or poor handling of animals are indicators of

euthanasia fatigue that signal a change in duties is necessary.

Indications for euthanasia include fractures, emaciation, non-ambulatory conditions such as paralysis or muscular weakness, advanced disease, traumatic injuries, and disease or injury resulting in extreme pain that cannot be relieved by medical or other means. Failure to act by waiting to see if the animal gets better without treatment is not an acceptable option. When serious disease or injury occurs, producers must decide what is best for the animal. If the choice is medical treatment, appropriate supportive care and specific treatment should be initiated. If the animal is unlikely to benefit from treatment, slaughter or euthanasia should be considered. Euthanasia should be reserved for animals in which treatment is unlikely to improve the outcome and the animal does not meet the requirements for slaughter.

Acceptable methods for the euthanasia of adult goat and neonates are the overdose of an anesthetic, captive bolt, and gunshot. When a captive bolt is used, a secondary step is required. Secondary methods to ensure death in animals euthanized by captive bolt include exsanguination (or bleeding), pithing, or the intravenous administration of a saturated solution of either potassium chloride (KCl) or magnesium sulfate (MgSO<sub>4</sub>, Epsom salts). It is important that secondary steps never be used until the animal is confirmed to be unconscious.

The ideal anatomic site for euthanasia of adult dairy goats is determined by the intersection of two lines drawn from the outside corner of each eye to the middle of the base of the opposite ear. Hold the muzzle of the penetrating captive bolt perpendicular to this site.



Loss of consciousness is defined by the American Veterinary Medical Association Euthanasia Guidelines as “the loss of individual awareness which occurs when the brain’s ability to integrate information is blocked or disrupted. When physical methods directly destroy the brain, signs of unconsciousness include: immediate collapse and a several-second period of tetanic spasm; loss of righting reflexes; an absence or lack of corneal reflexes. There should be an immediate and sustained

cessation of rhythmic breathing; and absence of vocalization.” The primary indicator of death is cardiac arrest. Cardiac arrest is determined by the placement of a stethoscope under the left elbow or by placing one’s hand over the chest beneath the elbow and documenting a loss of heart beat. It is important that death be verified after euthanasia and before disposal of the animal.

There are two options for determining the ideal anatomical landmarks for neonates. First, similar to mature goats: on the intersection of 2 lines drawn from the outer corner of each eye to the middle of the base of the opposite ear. A second option is to hyperflex the neck by rotating the chin to the chest and drawing a straight line from the base of one ear to the other ear; placement of the muzzle of the captive bolt is on the middle of that line.

In summary, the methods of euthanasia in adult goats are barbiturate overdose, penetrating captive bolt, and use of a firearm. In neonates, the methods of euthanasia are barbiturate overdose, a firearm, and non-penetrating captive bolt. Proper application of these methods is essential to adult and neonate wellbeing.

### **Best Practices for Proper Foot and Hoof Care in Goats**

Lameness disorders directly affect performance and welfare in goats. Lameness is a painful condition that impedes the animal’s normal behaviors. Research in dairy cattle clearly demonstrates that lameness negatively impacts milk production and decreases fertility. Lameness impedes the animal’s normal behaviors, ability to access feed and water, and the normal maneuvering around the pen. A high incidence of lameness or severe overgrowth of hooves should be avoided.

In this module, we review four topics. First, we discuss anatomy of the foot and hoof. Second, we review hoof horn growth and weight bearing dynamics. Third, we discuss hoof trimming. Finally, we explain how to implement a scoring system for evaluating hoof overgrowth on commercial operations.

We begin with a discussion of foot anatomy. It may be helpful to compare the anatomic structures of the lower leg of the goat to your hand. The goat bears all of its weight on the equivalent of your 3<sup>rd</sup> and 4<sup>th</sup> fingers, while the 2<sup>nd</sup> and pinkie fingers equate to the dewclaws.

External structures of the weight bearing surface of the foot include the white line, sole, inside wall, outside wall, and the heel. The white line is the soft flexible junction between the sole and the wall.

Wall horn or the hoof wall grows down from the coronary band just like your fingernail grows out

from the base of your nail. Overgrowth of hoof horn is normally most significant on the outer claw. This observation can be explained by the nature of weight-bearing within and between the hooves of each foot. In the rear feet for example, the majority of the weight is borne on the outer claws. In the front feet, weight load tends to be greater on the inner claws.

Similar to the foot of humans where callouses form on the weight bearing areas of the foot, so too is the case for goats whereby more hoof horn occurs on outer hooves of the rear feet. Hoof horn is modified skin, but rather than form callouses, the goat forms more hoof horn in response to weight bearing. The goal of hoof trimming is to remove excess hoof horn and restore even weight bearing between the hooves.

The first consideration in hoof trimming is restraint. It is important to restrain animals for hoof trimming in a manner that minimizes stress. One method is to use a stallion or milking stand. Alternatively, a tilt table could be used.

It is important to invest in quality equipment and trimmers that are easy to use and minimize strain. Assess the functionality of your hoof trimmers before starting to trim hooves and replace if necessary.

The goal of hoof trimming is to remove excess hoof horn and restore balance within and between the weight bearing surfaces of each foot. During hoof trimming, it is important to remove undermined or loose horn. Upon completion of the trim, it is critical to evaluate for evidence of disease. A correctly trimmed hoof should balance and distribute weight bearing by assuring that the weight bearing surfaces of each claw are level and flat.

A recent welfare benchmarking study from Iowa State University on 30 dairies in the Midwestern region of the United States found that on average 17% of goats had severely overgrown hooves. It is recommended that farms develop a plan to monitor hoof overgrowth and lameness to determine the frequency of hoof trimming required.

The scoring system that we suggest is a simplified 3-point scoring system. Scores of 0, 1, or 2 are used with 0 being normal, 1 being some overgrowth, and 2 indicating extreme overgrowth. Generally speaking, goats’ rear hooves tend to overgrow or display abnormalities sooner than their front hooves. With a scoring system, we are going to focus on the rear hooves, but evaluating the front hooves as well can be helpful when an animal appears between two scores.

It is important to understand that certain animals may need to be trimmed more frequently. Reasons include: genetics, breed, environment or flooring, and weather.

In conclusion, good hoof care is required for optimal health, production and animal wellbeing. In

this module we discussed anatomy of the foot and hoof, hoof horn growth and weight bearing dynamics, hoof trimming, and present a scoring system that can be easily implemented to assess hoof management on commercial operations. We recommend producers use this knowledge to establish a hoof trimming plan for their operation to maintain the wellbeing of their herd.

### **Best Practices for Transportation of Goats**

Transportation is stressful on goats and may affect productivity and longevity. Major stressors associated with livestock transport include noise, vibration, environmental humidity and temperature, prolonged standing, and an inability to exercise freely. Concurrently, stress results in decreased immune function which increases the risk of infection for goats following transportation.

Our goal is to help dairy goat producers identify critical areas that should be considered in order to optimize welfare during transportation. When making plans and decisions regarding dairy goat transportation, these seven key issues should be considered:

- Determining fitness of the animal for travel
- Milking considerations
- Animal grouping and stocking density
- Trailer specific considerations including non-slip flooring
- Minimizing stressful handling
- Access to feed and water
- Environmental Considerations

Possible reasons for transportation include, but are not limited to exhibition, slaughter, change in ownership, and movement between different management sites owned by the same farm.

Transportation is inevitable, so having an up-to-date standard operating procedure (or SOP) for the operation is in the dairy's and animals' best interest.

In conclusion, transportation is inevitable in dairy goat production, but can be stressful on the animals and has some welfare concerns. In order to proactively optimize dairy goat wellbeing during transportation and to serve as a reminder of these considerations, we provide a list of summary questions that can be reviewed while planning transportation.

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