Milking Procedures and Milk Quality on U.S. Dairy Goat Operations

NAHMS Goat 2019 Study

Information Brief

November 2022

INTRODUCTION

Goat milk production in the United States has experienced continuous expansion over the last decade. Specifically, the dairy goat inventory increased by 60.7 percent from 334,754 head in 2007 to 537,799 head in 2017.[1] Furthermore, the number of farms raising dairy goats has grown from 27,481 in 2007 to 35,682 farms in 2017.

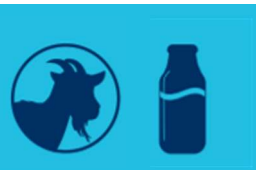
Goat milk has many uses, such as feeding goat kids, lambs, veal calves, piglets, and human consumption. The demand for goat milk and goat milk products, such as cheese, yogurt, candy, soaps, and lotions, has increased in the United States. Due to goat milk's unique nutritional and biochemical properties, consumption of goat milk is climbing, especially by people with cow milk allergies or gastrointestinal disorders. Management and biosecurity practices are typically more rigorous on dairy goat operations than meat or other goat operations due to the more intensive management required for milk production. Enhanced management and biosecurity practices help to ensure milk quality and goat health.

NAHMS GOAT 2019 STUDY

In collaboration with the National Agricultural Statistics Service, the U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) conducted its second national study of the U.S. goat industry in 2019. The NAHMS Goat 2019 study gathered information on goat health and management practices on U.S. goat operations. The study occurred in 24 of the nation's major goat-producing states on selected operations with five or more adult goats (figure 1).

As part of the effort to collect information on goat management, NAHMS requested producers who milked any dairy does in the previous 12 months and had five or more dry or in-milk dairy does on September 1, 2019, complete a dairy-specific questionnaire[2]. This information brief covers the milking procedures, milk quality, and dry doe procedures on these dairy goat operations.

KEY TERMS



This information brief applies to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had five or more dairy does, whether dry or in-milk, on September 1, 2019.

Herd Size
(by dairy doe inventory)

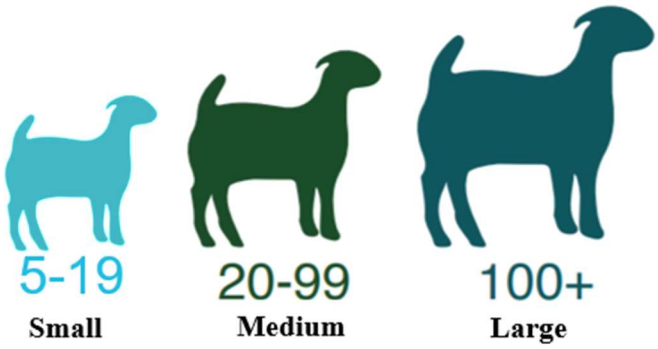
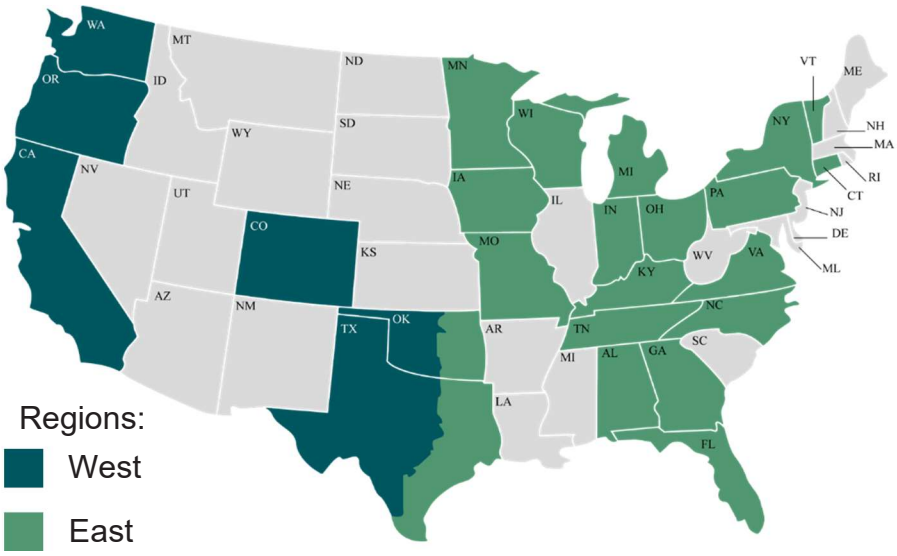


Figure 1. States/regions that participated in the NAHMS Goat 2019 study

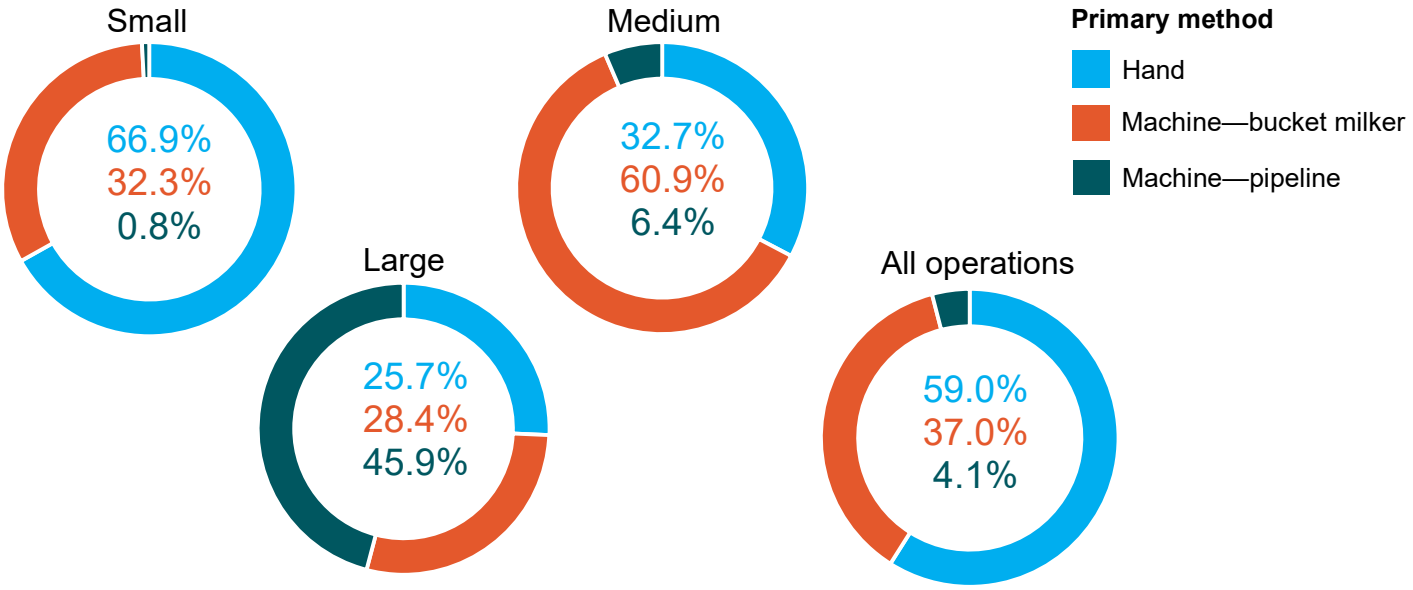


**Texas and Oklahoma were divided on a line corresponding to north-south Interstate 35. The western halves of the States were included in the West region, and the eastern halves were included in the East region.*

MILKING METHOD AND FREQUENCY

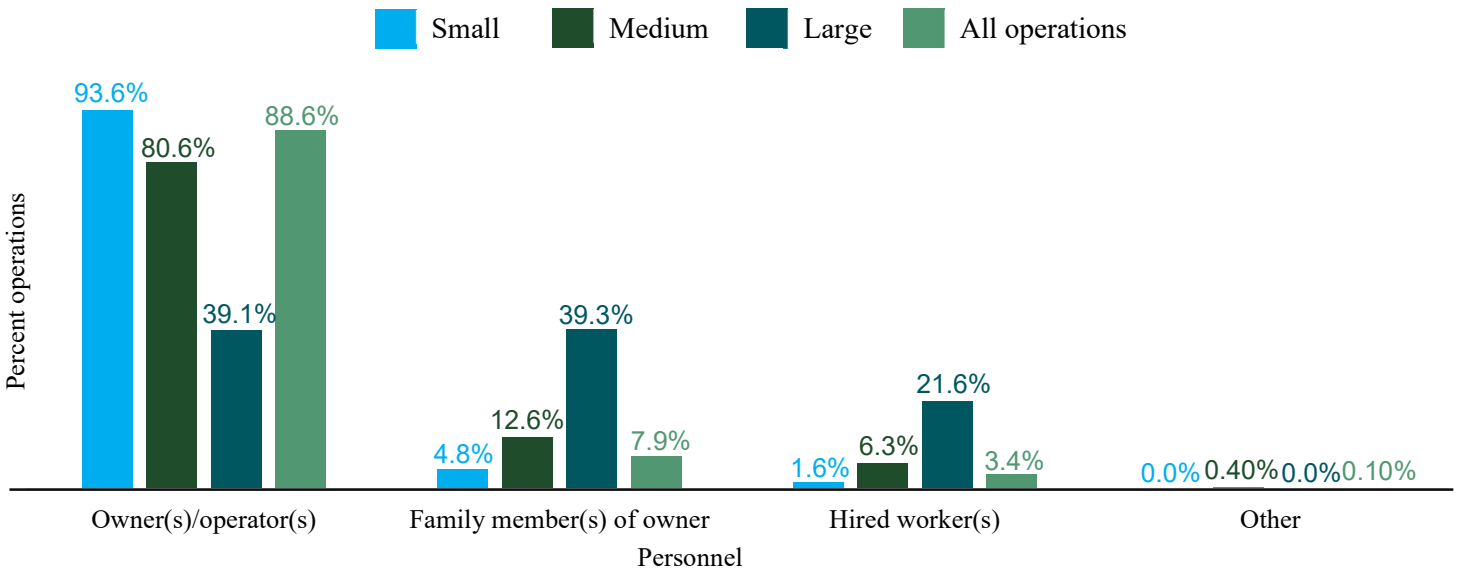
The methods and frequency used to milk dairy does may vary based on the operation's size and goals. Over half of all operations (59.0 percent) hand-milked does (figure 2). A higher percentage of medium operations (60.9 percent) used a bucket milker than small operations (32.3 percent). A higher percentage of large operations (45.9 percent) used a milking machine with a pipeline than small and medium operations (0.8 and 6.4 percent, respectively). For the 4.1 percent of all operations that used a pipeline system as their primary method for milking does, the majority of operations (88.1 percent) used a side-by-side (parallel) parlor.

Figure 2. Percentage of operations by primary method used to milk does, by herd size



Operators may milk all their own goats or have help, such as family members or hired workers who milk goats. The highest percentage of all operations (88.6 percent) had owner(s)/operator(s) who milked the majority of the does on the operation in the previous 12 months (figure 3). As herd size increased, the percentage of operations that had owner(s)/operator(s) as the primary milker decreased, with 93.6 percent of small operations, 80.6 percent of medium operations, and 39.1 percent of large operations having the owner(s)/operator(s) as the primary milker.

Figure 3. Percentage of operations by who milked the majority of does, by herd size



The milking frequency may depend on the operation's availability of milkers and use of milk. Operations that milk for sale may choose to milk does more frequently than operations that milk for show purposes or other reasons. The majority of operations (75.2 percent) milked does twice a day in the previous 12 months (figure 4). A higher percentage of small operations (28.3 percent) milked does once a day than large operations (4.3 percent). No operations milked does more often than twice a day. In general, most operations (72.8 percent) milked does in no particular order (figure 5).

Figure 4. Percentage of operations by how many times per day does were usually milked

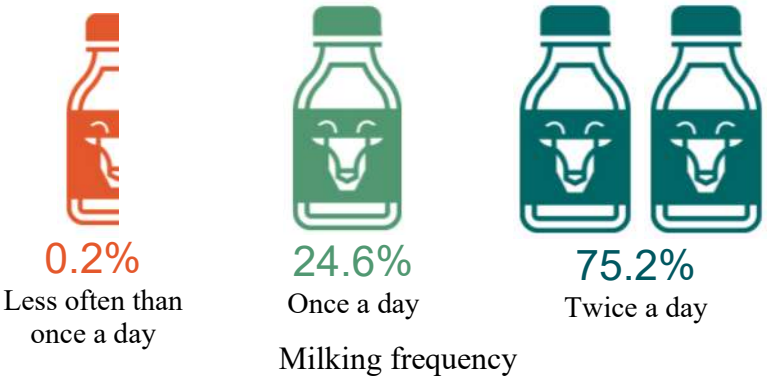
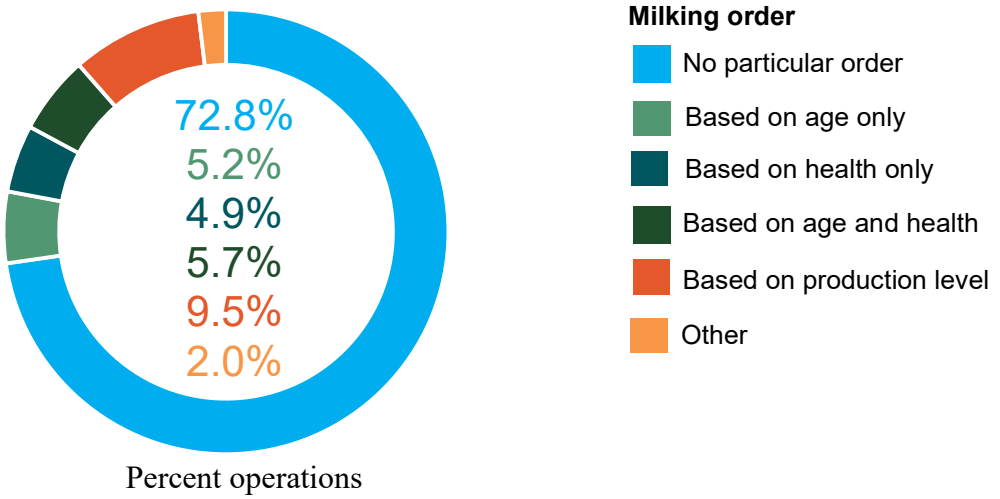


Figure 5. Percentage of operations by the order in which goats were milked

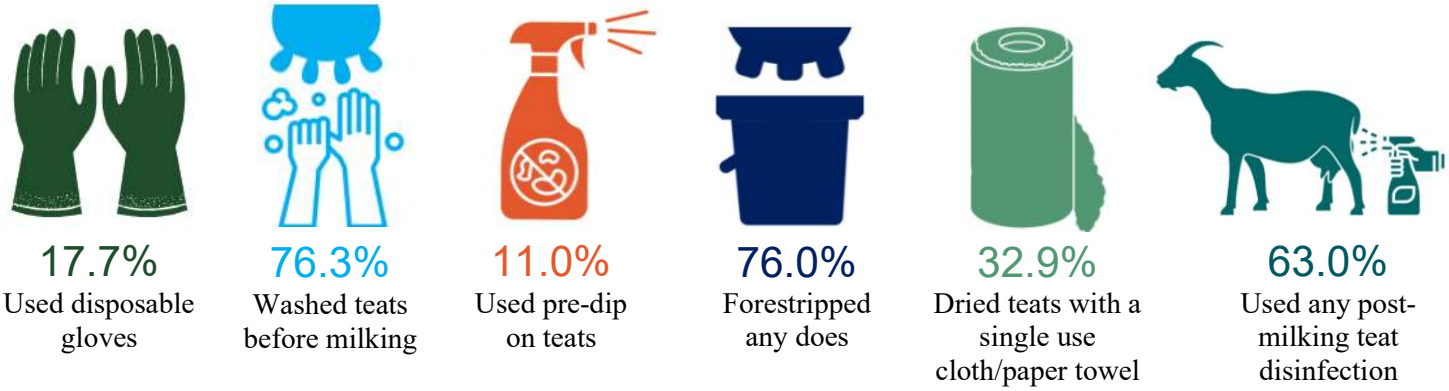


MILKING PROTOCOLS

Milking protocols implemented on an operation may depend on the number of does milked and management concerns on the operation. In general, milking steps include cleaning the teats as necessary, applying an effective disinfectant to teats, forestripping milk into a cup, wiping dry the udder, completing the milking, and applying a post-milking disinfectant. However, the order in which the milking steps occur may differ by operation.

Wearing disposable gloves while preparing the udder for milking and during hand milking can help reduce the spread of bacteria from the hands to the teats. Overall, 17.7 percent of all operations always or sometimes used gloves while milking, 76.3 percent washed teats before milking, and 11.0 percent used a pre-dip (figure 6). Forestripping is the process of expressing the first several streams of milk from the teats before milking begins. Forestripping allows the milker to evaluate the milk for abnormalities, such as clots, and check the teats and udder for heat, swelling, or pain. The majority of operations (76.0 percent) forestripped any does, with 71.9 percent of all operations forestripping any fresh does and 58.5 percent of operations forestripping any does with mastitis (among those operations that had does with mastitis). Depending on the type of teat wash used, drying the teat will help remove any additional dirt and debris and help prevent slippage of a milking machine if used. Overall, 32.9 percent of operations used a single-use cloth/paper towel to dry teats. Applying disinfectant post-milking will kill bacteria that may have been present during milking and can help reduce the spread of contagious mastitis pathogens. Overall, 63.0 percent of all operations used any post-milking teat disinfection.

Figure 6. Percentage of operations by milking procedures used in the previous 12 months



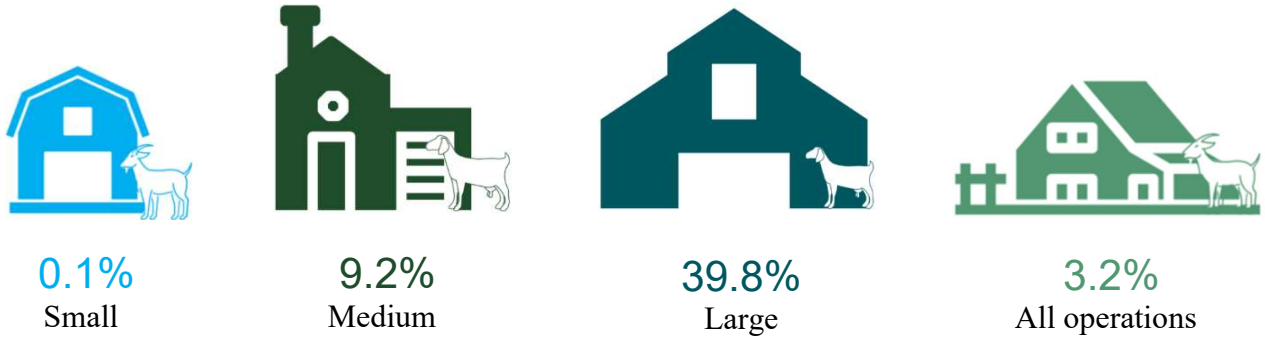
MILK TESTING

Testing somatic cell counts (SCC) and for antibiotic residues in milk before distribution can help producers understand more about the safety and quality of milk produced. The legal limit for bulk tank SCC for goats is 1,500,000 cells/mL. Overall, 19.8 percent of all operations routinely performed SCC testing on the milk from the herd in the previous 12 months (figure 7). A higher percentage of medium and large operations (39.7 and 66.5 percent, respectively) routinely performed SCC testing on the milk than small operations (12.4 percent). For operations that routinely performed SCC testing on the milk from the herd, **the operation average was 439,783 cells/mL** (data not shown).

Figure 7. Percentage of operations that routinely performed somatic cell count (SCC) testing on milk, by herd size

Milk distributed through commercial channels for human consumption receives testing off the operation for antibiotic residues. However, operations that regularly use antibiotics and have concerns that residues may be present in the milk should test milk on-farm for antibiotic residues to prevent any citations. Overall, 3.2 percent of all operations tested milk on-farm for antibiotic residues. The percentage of operations that tested milk on-farm for antibiotic residues increased as herd size increased, with 0.1 percent of small, 9.2 percent of medium, and 39.8 percent of large operations testing milk (figure 8).

Figure 8. Percentage of operations that tested milk on-farm for antibiotic residues, by herd size



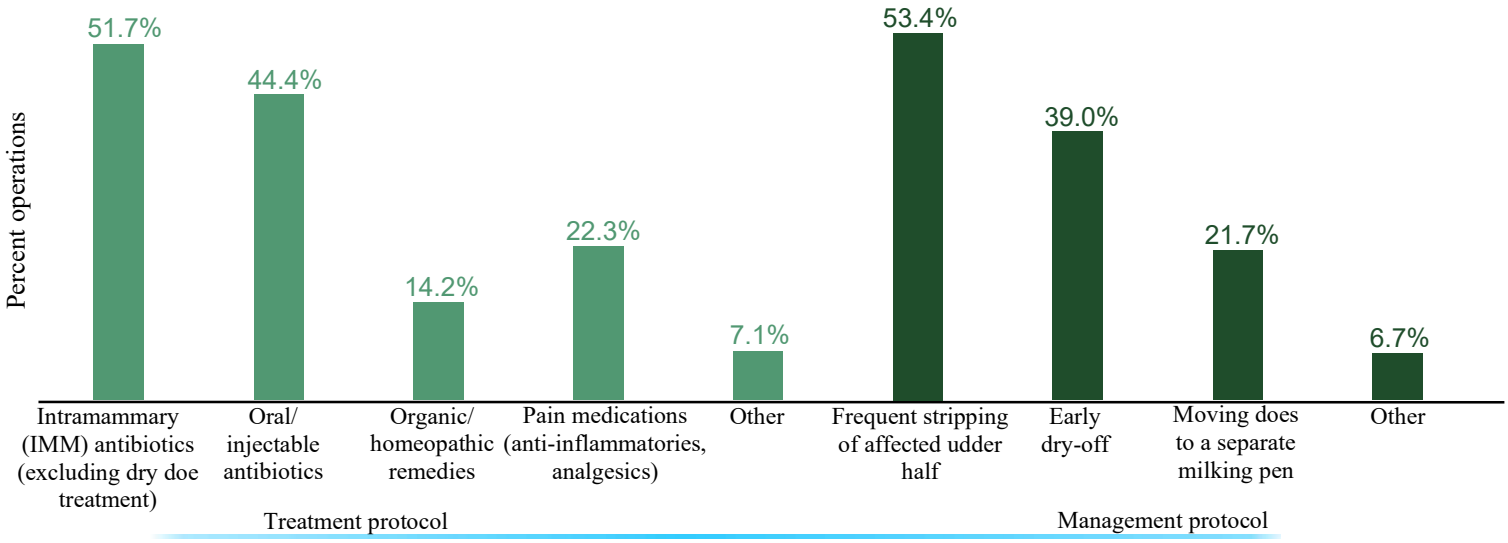
MASTITIS MANAGEMENT

Although the California Mastitis Test (CMT) can be a tool to help identify subclinical mastitis, milk culture remains the gold standard for identifying and monitoring goats with intramammary infections. Goats that develop signs of clinical mastitis may receive treatment with antibiotics and non-steroidal anti-inflammatory drugs. Operations can implement other management techniques, such as milking does with mastitis separately or drying off does with mastitis, to help prevent the spread of mastitis.

Overall, 33.7 percent of all operations had any does with clinical mastitis in the previous 12 months. A higher percentage of large operations (88.2 percent) had any does with clinical mastitis than small operations (26.6 percent). Overall, 16.1 percent of all operations performed any cultures on milk produced on the operation. For operations with does that had clinical mastitis in the previous 12 months, there was no predominant method for milking does with mastitis. Of those operations, 39.6 percent milked does with mastitis at the end of milking, 21.4 percent milked does in a separate string from healthy goats, 23.6 percent used a separate milking unit from healthy goats, and 8.2 percent did not follow any specific procedure (data not shown).

For operations with does that had clinical mastitis in the previous 12 months, a higher percentage of all operations used intramammary antibiotics or oral/injectable antibiotics (51.7 and 44.4 percent, respectively) than organic/homeopathic remedies (14.2 percent) (figure 9). For operations with does that had clinical mastitis in the previous 12 months, 53.4 percent used frequent stripping of the affected udder half, and 39.0 percent used early dry-off.

Figure 9. For operations with does that had clinical mastitis in the previous 12 months, percentage of operations by treatment and management procedures used to treat mastitis

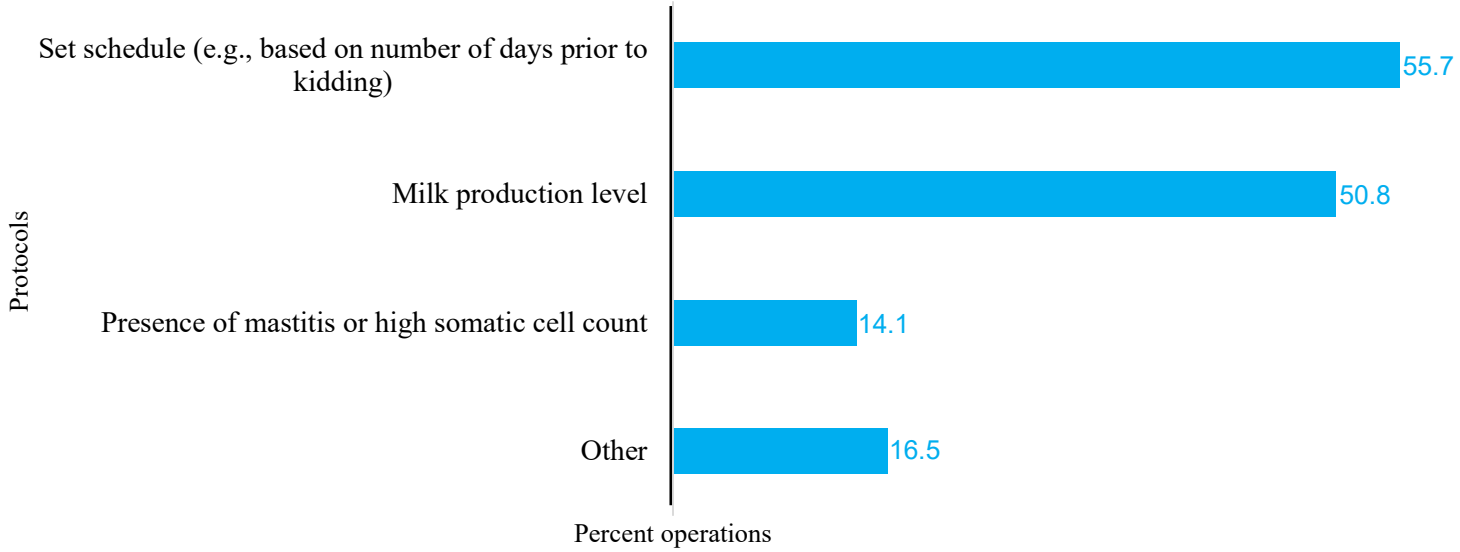


DRY DOE PROCEDURES

Operations may choose to dry-off does for multiple reasons, such as on a set schedule due to seasonal milking, a decrease in milk production, or health reasons. An operation's goals and the health of the goats will help determine the method used to dry-off does and any management practices to implement at dry-off, such as limiting feed or water or using intramammary antibiotics.

A higher percentage of operations used a set schedule or milk production level (55.7 and 50.8 percent of operations, respectively) to determine when to dry off any does compared with the presence of mastitis or high somatic cell count or other protocols (figure 10).

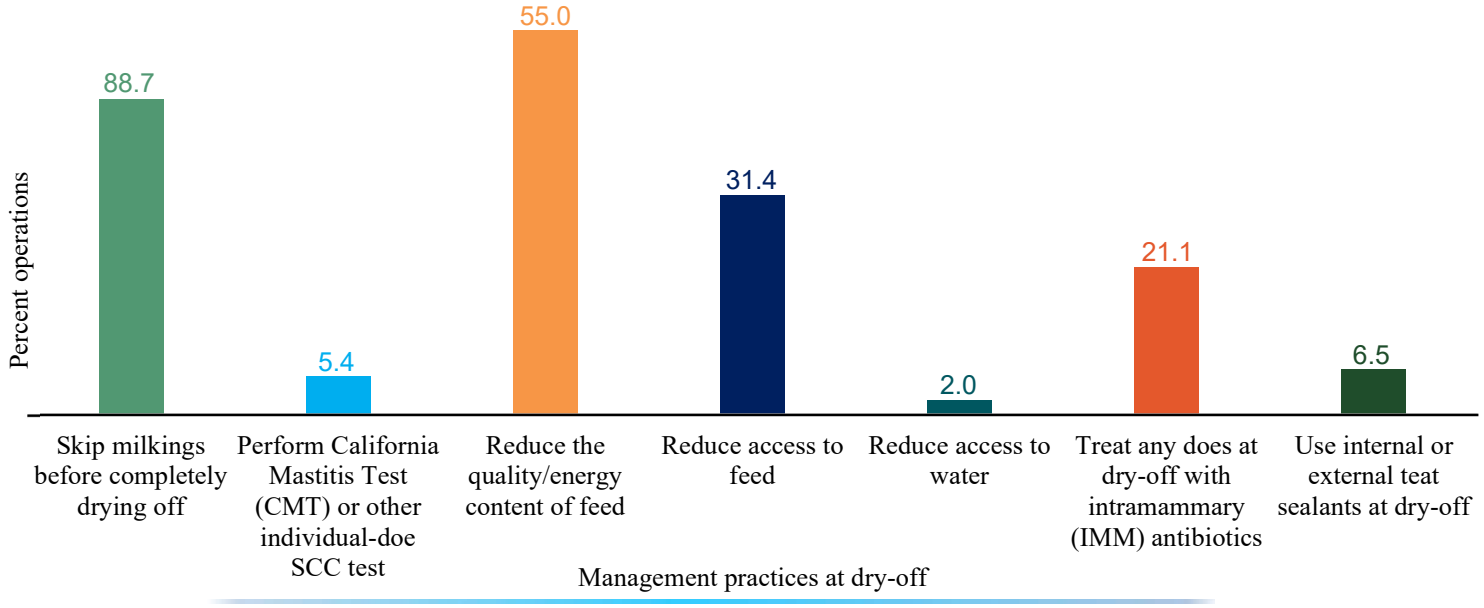
Figure 10. Percentage of operations that used the following protocols to dry-off any does in the previous 12 months



* Common 'other' responses included end of show season, producer's health, producer's preference, time of year, and no longer needing milk.

Most operations (88.7 percent) skipped milkings before completely drying off does, for at least one doe (figure 11). Additionally, the most common management practice routinely used at dry-off on all operations was reducing the feed quality/energy content (55.0 percent of operations). Over 21 percent of all operations treated any does at dry-off with intramammary (IMM) antibiotics, and 6.5 percent of all operations used internal or external teat sealants at dry-off.

Figure 11. Percentage of operations that used the following management practices at dry-off in the previous 12 months



CONCLUSION

Milking procedures vary. Over half of all operations hand milked does and most operations have owners/operators do most of the milking. About three-quarters of all operations milked goats twice a day and did not milk does in any particular order. Nearly 20 percent of all operations routinely performed somatic cell count testing, and mastitis treatment regularly included intramammary antibiotics or oral/injectable antibiotics. Does were frequently dried off based on a set schedule or milk production level. Management of dry does often included skipping milkings before completely drying off and reducing the quality/energy content of the feed. In general, how an operation structures its milking routines, milk quality testing, and dry-off procedures is dependent on its goals for the milk produced.

REFERENCES

1. NASS. 2019. USDA National Agricultural Statistics Service, Sheep and Goat Surveys. https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Sheep_and_Goat_Inventory/index.php
2. USDA. 2022. Goat 2019, "Reference of Health and Management Practices on Dairy Goat Operations in the United States, 2019." USDA–APHIS–VS–CEAH–NAHMS. Fort Collins, CO

To see new and exciting publications regarding this study, please visit www.aphis.usda.gov/nahms or scan the QR code. Materials will be updated regularly as they become available.

FOR MORE INFORMATION

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