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ABSTRACT

In the United States, meat goat production has increased as the demand for goat meat has expanded due to immigration from Central and South America, Africa, Asia, and the Middle-East. Mail survey data were collected from US meat goat farmers during the summer of 2012, to examine the current status of US meat goat farms. Results obtained from the survey provide a snapshot into meat goat farmers' adoption of technology, management practices, and production systems in the United States.

Meat Goat Production in the United States: Adoption of Technologies, Management Practices, and Production Systems

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Introduction

Worldwide, goats are a major source of meat, milk, fiber, and other products. Meat goat production has become more common in the US in recent years as the demand for goat meat has increased. Meat goats need little or no supplemental grains and minimal shelter and are relatively easy to care for. In most countries of the world, goat meat is consumed and locally-produced goat meat is sold in local or regional markets (Dubeuf, Morand-Fehr, and Rubino, 2004). Increasing numbers of immigrants into the US from Africa, Asia, the Middle-East, and Central and South America have contributed to the increased demand for goat meat in the United States. In recent years, restaurants throughout the US (especially in the larger Northeastern and Pacific coastal cities) have developed menus including goat meat (Dubeuf, Morand-Fehr, and Rubino, 2004). Americans have had exposure to goat meat partly due to their increased interest in ethnic foods. One of the reasons for the expanding meat goat enterprise in the US is that goats can be produced with limited resources, including land, time, and capital. Because of their efficient conversion to quality meat, meat goats have become popular among farmers (Solaiman, 2007).

Globally, goat meat production was 4.9 million metric tons in 2007 (FAOSTAT, 2008). In 2012, there were 100,910 meat goat farms with 2,053,228 total meat goats in the US (USDA-NASS, 2012). The US was a net exporter of goat meat until 1990. After 1994, however, exports dropped and the US became a net importer of goat meat due to increased domestic demand for goat meat (USDA-NASS, 2012). Although the production of domestic goat meat in the US has increased over the last two decades, the gap between the demand for and supply of goat meat has been filled by importing frozen

meat from New Zealand and Australia. Goat meat imports significantly increased to 15,752 metric tons (approximately equivalent to 1,052,340 live meat goats) in 2011 from 1,749 metric tons in 1991 (Stanton, 2012).

During the 1990s, several producer organizations were formed because of increased interest and potential for meat goat production in the US. The American Meat Goat Association and the American Boer Goat Association were formed in 1992 and 1993, respectively, and began to support the industries as well as design educational outreach efforts to benefit potential and ongoing producers (Spencer, 2008). After the revocation of the Wool Act of 1954 in 1993, the mohair and wool incentive program was lost by 1995. Many Angora goat producers opted to produce meat goats instead. Another factor that resulted in increased numbers of meat goats was the US tobacco settlement in 1998. After that settlement, goat numbers increased in the major tobacco growing states such as Tennessee, Georgia, Kentucky, and North Carolina (Shurley and Craddock, 2008). More recently, meat goat production has been increasing particularly in Hawaii, Oklahoma, Louisiana, New Mexico, and Idaho (USDA-NASS, 2013). The majority of meat goats are produced in the Southern Plains and Southeastern regions of the US. In the US, goat meat is imported mainly from New Zealand, Canada, Australia, the Republic of South Korea, Mexico, and Poland (Solaiman, 2007).

In determining why farmers were motivated to produce meat goats in the United States, Gillespie et al. (2014) found the top reasons to be: farmers enjoyed raising goats; goat production fit well into their land management plan; and they could raise goats on a relatively small acreage. Gillespie et al. (2013) found that four major challenges were particularly important to US meat goat producers.

Those challenges were the high cost of goat production, the lack of a clear marketing system for goats, the lack of goat meat processors close by their farms, and dealing with internal parasites. Besides those challenges, the lack of a grading system for goats, pasture management problems, diseases, and little government support for the industry were other important problems that goat producers were facing (Gillespie et al., 2013).

For a successful meat goat farm enterprise, management issues such as control of parasites and predators, selection of marketing channels, nutrition management, selection of breeding stock, and adoption of technology are important factors to be considered (Coffey, 2006). Considering this, the objective of this study is to describe the present scenario of meat goat production in the US, focusing on the production practices used by meat goat farmers. This information will be useful to farm managers with an interest in meat goat production, particularly those who are already producing meat goats and would like to compare their farms to “typical” ones and those who are considering introducing a meat goat production enterprise to their farms. This study is based on mail survey data collected from US meat goat farmers during the summer of 2012.

Materials and Methods

To collect information about meat goat production in the US, a mail survey questionnaire was prepared. The questionnaire contained questions concerning meat goat producers' demographic and financial information, production practices, breeding practices, marketing practices, knowledge of pricing in the meat goat industry, perception of important challenges facing the meat goat industry, farmers' goal structure, grading systems, and preferences for breeding stock. A total

of 1,600 addresses of US meat goat producers were gathered from the website www.eatwild.com, meat goat producer associations, and other sources as identified via the Internet. Dillman's Tailored Design Method (2007) was used as a guide for preparing and conducting the survey. A total of 584 meat goat farmers responded to the questionnaires. Considering “bad” addresses and respondents who indicated they were no longer involved in meat goat production, this constituted an adjusted 43 percent response rate.

For the first mailing of the survey, a signed, personally-addressed letter, postage-paid return envelope, questionnaire, and complimentary pen were sent via first-class mail. This was followed by a postcard reminder. Two weeks after the postcard reminder, a new cover letter, questionnaire, and business-reply envelope were sent to non-respondents via first-class mail. Finally, a second postcard reminder was sent to non-respondents.

To determine whether our sample is representative of US meat goat farms, we compare it to US Department of Agriculture population estimates. The USDA-NASS Census of Agriculture (2012) data show that the average number of meat goats per US meat goat farm was 20. Our survey data for the same year, however, show an average of 62 goats per meat goat farm. USDA-APHIS (2011) indicated that 52.4 percent of US goat farms included in the USDA-NASS Census of Agriculture had fewer than 10 goats, suggesting that the USDA-NASS Census of Agriculture (2012) data would not represent commercial meat goat farms. Many of the small farms in the census included one or two goats as pets and for other purposes such as brush clearing or 4-H projects for children. In our sample, producers were commercial producers in the sense that they were advertising via the Internet and/or

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were members of meat goat associations. Our sample includes responses from all of the US states except for AK, CT, HI, MT, NV, and NY. Those excluded states represented less than three percent of all of the US meat goat farms in 2007 (USDA-NASS, 2012).

Results and Discussion

Means and standard deviations of meat goat production practices (including farm size, farm facilities, numbers of goats kept of different breeds, involvement in other goat enterprises along with the meat goat enterprise, animal identification methods used for meat goats, management practices, and involvement in other farm enterprises) are presented in Tables 1-5. Based on the survey data, we find that US meat goat farms had an average of 200 acres of land for farming, of which 58 were used for the meat goat enterprise. In terms of production facilities, 74 percent had working pen facilities on their goat farms. Similarly, 56, 77, 42, 71, 75, 52 and 98 percent of the farms were equipped with breeding pens, kidding pens, working chutes, weaning pens, quarantine pens, scales, and sheds, respectively.

A wide variety of goat breeds were used for meat goat production in the US, of which the most common have typically been Boer, Kiko, and Spanish (USDA-APHIS, 2005). Our data suggest that the average meat goat farm in the US included 61 goats, of which 30 were Boer, 14 were Kiko, 2 were Spanish, 12 were mixed, 1 was Angora, and 2 were of other breeds. Clearly, Boer was the dominant breed. Overall, 200 farms had mostly Boer goats, 110 farms had mostly Kiko goats, 42 farms had mostly Spanish goats, 8 farms had mostly Angora goats, 116 farms had mostly mixed goats, and 81 had mostly other goat breeds.

There are four general categories of production systems used on US meat goat farms. An average of 23 goats were kept in pastured and rotated systems where the pastures were cross-fenced into paddocks and goats were periodically moved among the paddocks to fresh pasture. This system is a management intensive rotational grazing system. An average of 13 goats were pastured without using a management intensive rotational grazing system. On average, eight goats were kept in extensive-range or pasture/woods systems where goats were kept on large tracts of rangeland or pasture and mostly “fended for themselves.” In this system, goats generally care for their young and forage for food with minimal assistance. An average of seven goats were kept in a dry lot where there was no growing forage, but feed and/or hay were purchased for the goats. Thus, among the survey respondents, the pastured and rotated system accounted for the largest share of meat goat production.

Along with the commercial meat goat production enterprise, 13 percent of the farms also included dairy goat production and 1 percent included fiber goat production. About 59 percent of the respondents were involved in the sale of breeding stock and 46 percent sold meat goats for show herds. About seven percent used meat goats purely for brush control. On average, farmers sold 48 percent of their total sales of meat goats for slaughter or as meat (Table 2). Meat goat sales for breeding stock, for show, and other purposes accounted for 33, 17, and 2 percent of total meat goat sales, respectively.

Animal identification for individual animals in a large herd is important for animal management record-keeping purposes (Neary and Yager, 2002). Numerous individual animal identification practices have been adopted by meat

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goat farmers. Our results suggest that 86, 65, 11, 2, 2, 1, 1, and <1 percent of farmers, respectively, used tagging, tattooing, microchips, painting, chalk, ear notches, body branding, and horn branding as animal identification methods. Thus, tagging followed by tattooing were clearly the most common identification methods. Some farmers adopted more than one animal identification method for their goats.

Approximately 73, 38, and 91 percent of the respondents castrated males, disbudded, and trimmed hooves, respectively, in their meat goat herds. Farmers who castrated bucks used various tools for castration: 84 percent used an elastrator, 9 percent used a knife, and 3 percent used the burdizzo. Eighty-three percent of the producers kept individual animal records to track the performance of offspring.

Meat goat farmers were engaged in farm enterprises other than goats. Approximately 29 percent were involved in beef cattle production, 3 percent were engaged in bovine dairy production, 2 percent were involved in exotic animal production, 21 percent were involved in horse enterprises, 12 percent were involved in sheep production, and 33 percent were involved in other livestock or poultry production. In addition, other than animal production, 21, 9, and 12 percent were involved in field crops, forestry, and fruit/vegetable production, respectively. About 62 percent of the farms were involved in the production of another livestock or poultry species and 75 percent included another agricultural enterprise of any type, plant, or animal. Thus, a strong majority of meat goat farms was not specialized completely in meat goat production and most included another livestock species.

About 99 percent of meat goat farmers bred does on their farms (Table 3). On average, 36 does were bred. An average of 51 kids were born alive, 3 were stillborn, and 1 was aborted. We estimate that about 73 percent of the does kidded twins or triplets. Farmers weaned bucks and does at average ages of 12 and 13 weeks, respectively.

Gillespie et al. (2015) provides extensive information on breeding practices using the present survey, so we simply summarize the information here, do not include it in the tables, and the reader is referred to that paper for detailed meat goat breeding information. Of six selected reproductive practices used by meat goat producers, the most frequently used was examining the breeding soundness of bucks, at 24 percent, followed in order from most to least-used, flushing does, using artificial insemination, exposing non-cycling females to sterile bucks for inducement of ovulation, using embryo transfer, and finally using a controlled lighting system to manipulate the breeding season of does. Only 38 percent of the meat goat farmers checked goat pregnancy. The most common method was using an ultrasound scanner, at 17 percent usage, followed in order from most to least-used by bumping, using a blood or urine test, performing a vulva examination, and finally using a cervical examination, which was used by <1 percent of the producers. About 88 percent of meat goat farmers timed the breeding of their does to synchronize the kidding period. Most used one breeding season per year, followed by the use of two breeding seasons per year. The reasons for adjusting breeding times were to make available enough meat goats during the peak marketing seasons, for the efficient use of bucks, for the efficient use of breeding and production facilities, and/or for facilitating the uniformity of kids.

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Nyaupane et al. (2015) provides extensive information on marketing practices using the present survey, so we simply summarize the information here, do not include it in the tables, and the reader is referred to that paper for more detailed statistics on meat goat breeding. Most of the meat goats sold on meat goat farms were in the 30-120 pound range, listed in order from most to least-sold categories: (1) younger does (31-100 lbs.); (2) wethers (>30 lbs.); (3) younger bucks (31-120 lbs.); (4) older does (>100 lbs.); (5) weaned kids (\leq 30 lbs.); and (6) suckling kids, older bucks >120 lbs., and others. The most common marketing channel used was direct to consumer, followed in order from most to least: live auction; dealers, brokers, or meat packers; market pooling; and wholesale. About 11 percent sold goat meat.

On average, 8 percent, 24 percent, 36 percent, 58 percent, and 9 percent of meat goat farmers used the extension service, media (TV, radio, magazines), other farmers, the Internet, and farm organizations, respectively, as primary sources for determining market price of meat goats (Table 3). Thirteen percent, however, did not attempt to obtain price information for goats from any of the above sources.

When meat goat farmers brought new goats into the herd, 38 and 44 percent had determined the disease history of the herd of origin and determined pre-purchased disease status of the animal, respectively. Furthermore, 36 percent acclimatized new animals to the local environment, 12 percent exposed a small sentinel group of animals to the new ones, and 75 percent kept new goats in quarantine for a period of time. Goat farmers generally kept the new goats for about 15 days in quarantine to assure there was no new disease introduced to the herd. At the midpoint of the quarantine, 77 percent of those quarantining meat goats conducted a physical examination on them.

About 74, 16, 9, 11, 3, and 46 percent of the meat goat farmers, respectively, considered coyotes, bobcats, mountain lions, red foxes, feral hogs, and domestic and feral dogs as major threats to their goats (Table 4). Nine percent considered another species as a major predator of their meat goats. About 19 percent of the farmers did not experience any predator threats to their meat goats. To protect their goats from predators, 71 percent used animals. Of the farmers who used animals to protect their goats, 79, 17, 14, 1, and 2 percent used dogs, donkeys, llamas, alpacas, and other animals, respectively. Besides using animals, 51 percent used high-powered electric fence to protect their goats from predators. Twenty-nine percent of farmers regularly measured Body Condition Scores (BCS) of their goats. Those who checked BCS indicated that about 70 percent had $BCS \geq 3$.

About 58 percent of the primary operators of meat goat production enterprises were male (Table 5). The average age of the survey respondents was 52 years and they had an average of 11 years of goat farming experience. Approximately 96 percent were white (Caucasian). About 45 percent of the respondents held at least a bachelor's degree and 61 percent held off-farm jobs. Farmers holding off-farm jobs worked an average of 41 hours per week in the off-farm job. About 24 percent of the total meat goat producers considered themselves to be retired. About 57, 30, and 13 percent of producers had debt-asset ratios of ≤ 29 , 30-59, and ≥ 60 percent, respectively. The goat enterprise produced approximately 14 percent of the annual net household income and 40 percent of the net farm income was derived from the meat goat enterprise.

Conclusions

There is growing interest in the meat goat industry in the US. Increased demand for goat meat by consumers and

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other factors have resulted in the growth of meat goat production. In this paper, a snapshot of the US meat goat industry is provided by describing the typical US meat goat farm using data from a national survey.

The average meat goat farm included about 61 goats and 200 acres, of which 58 were devoted to the meat goat enterprise. Thus, about 29 percent of the land on meat goat farms was devoted to meat goats. A wide variety of facilities were used on meat goat farms, with most farms including working pens, breeding pens, kidding pens, weaning pens, quarantine pens, scales, and sheds. The Boer breed was the most common, followed by Kiko. The Boer breed has been popular because of its efficient browsing ability. Furthermore, Boer goats are capable of producing enough milk for kids in the early maturing stage, lowering the cost of maintenance (Burditt, Buchanan, and Fitch, 2000).

Pastured and rotated systems were used for about 45 percent of the breeding-aged goats on the surveyed farms. Most of the meat goat producers sold breeding stock and almost half also sold animals for show purposes. The highest percentages of meat goats sold were for slaughter or as meat. The most commonly used animal identification method was tagging, followed by tattooing, with all other methods used by <11 percent of farmers. Most of the producers castrated bucks, trimmed hooves, and kept individual animal records. About one-third of the farms included another livestock or poultry enterprise, the most common being cattle.

A number of practices were used to prevent the spread of disease and the loss of meat goats to predators. Most of the producers quarantined new animals for a period of time prior to introducing them to the herd

and conducted physical examinations on the animals during the quarantine. Most considered coyotes to be a significant threat to their meat goats and almost half considered domestic and feral dogs to be significant threats. Dogs were the most common animal used to protect meat goats from predators.

There is striking variability in the nature of size, structure, and management practices used on meat goat farms. Note the large standard deviations in farm size measures, showing that meat goat farms range from just a few animals and a few acres to very large-scale farms. A wide variety of goat breeds are used and the production systems range from very extensive where the animals are not handled much to intensive, dry lot operations. There is a wide variety of breeds and management practices used, as well. Like beef cattle, goats are raised outside, mostly on grazed forage, so different production environments are likely to lead to different management practices. There appears to be, however, room for additional extension educational programs that can assist meat goat farmers in determining the best practices to use for maximizing profit.

There is significant interest among farmers and potential farmers in the meat goat enterprise. This interest seems to be particularly strong for those who operate relatively small farms or larger farms with smaller parcels that could be grazed by small ruminants. Results obtained from this study should be helpful to new and existing farmers who are interested in determining the most common production practices used in the industry. Furthermore, the information will be valuable to economists who are working to establish estimates of cost of production in this industry.

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Table 1. Means and standard deviations of meat goat farm descriptors: Farm Size; Facilities; Breeds; Systems; and Other Goat Enterprises.

Variables	Description	Mean	Standard Deviation
<i>Farm Size Measures</i>			
Total Land	Total farm acres operated	199.62	709.37
Goat Land	Acres devoted to the meat goat enterprise	58.30	424.37
Number Goats	Total number of goats on the farm	60.97	74.94
<i>Facilities on the Farm: 1=Adopted, 0=Not Adopted</i>			
Working Pen	Whether the farm has working pen facilities	0.74	0.44
Breeding Pen	Whether the farm has breeding pen facilities	0.56	0.49
Kidding Pen	Whether the farm has kidding pen facilities	0.77	0.42
Working Chute	Whether the farm has a working chute	0.42	0.49
Weaning Pen	Whether the farm has weaning pen(s)	0.71	0.45
Quarantine Pen	Whether the farm has quarantine pen(s)	0.75	0.43
Scale	Whether the farm has scales	0.52	0.50
Sheds	Whether the farm has shed(s)	0.98	0.13
<i>Goat Breeds Used</i>			
Boer	Number of Boer goats on the farm	29.69	42.71
Kiko	Number of Kiko goats on the farm	13.57	41.84
Spanish	Number of Spanish goats on the farm	1.51	14.53
Mixed	Number of mixed-bred goats on the farm	11.97	36.66
Angora	Number of Angora goats on the farm	0.97	20.88
Other Breeds	Number of meat goats of other breeds on the farm	2.16	9.12
<i>Production Systems Used</i>			
Pastured and Rotated	Number of breeding aged goats kept in a pastured and rotated system	23.21	43.53
Pastured but not Rotated	Number of breeding aged goats kept in a pastured but not rotated system	13.30	29.27
Extensive	Number of breeding aged goats kept in an extensive system	7.74	30.87
Dry Lot	Number of breeding aged goats kept in a drylot system	7.10	23.93
<i>Goat Enterprises on the Farm Other than Meat Goat: 1=Present, 0=Not Present</i>			
Dairy Goat	Whether the farm includes a dairy goat enterprise	0.13	0.33
Fiber Goat	Whether the farm includes a fiber goat enterprise	0.01	0.10
Breeding Stock Sales	Whether the farm sells breeding stock for commercial herds	0.59	0.49
Show Sales	Whether the farm sells animals for show purposes	0.46	0.49
Brush Control	Whether the farm has goats purely for brush control	0.07	0.25
Other	Whether the farm includes goats for other purposes	0.15	0.41

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Table 2. Means and standard deviations of meat goat farm management variables: Sales by Segment; Identification Methods; Management Practices; and Other Farm Enterprises.

Variables	Description	Mean	Standard Deviation
<i>Meat Goat Sales by Segment</i>			
Slaughter	Percentage of goats sold for slaughter or as meat	47.79	36.56
Breeding Stock	Percentage of goats sold for breeding stock	32.53	29.77
Show	Percentage of goats sold for show purposes	17.19	25.27
Other	Percentage of goats sold for other purposes	2.48	10.60
<i>Identification (ID) Methods Used; 1=Adopted, 0=Not Adopted</i>			
Tagging	Whether tagging is used for animal ID	0.86	0.34
Tattooing	Whether tattooing is used for animal ID	0.65	0.47
Microchips	Whether microchips are used for animal ID	0.11	0.31
Painting	Whether painting is used for animal ID	0.02	0.16
Chalk	Whether chalk is used for animal ID	0.02	0.15
Ear Notching	Whether ear notching is used for animal ID	0.01	0.12
Body Branding	Whether body branding is used for animal ID	0.01	0.07
Horn Branding	Whether horn branding is used for animal ID	<0.01	0.04
<i>Management Practices Used; 1=Adopted, 0=Not Adopted</i>			
Castration	Whether male meat goats are castrated	0.73	0.44
Disbudding	Whether disbudding is applied to meat goats	0.38	0.48
Hoof Trim	Whether hoof trimming is applied to meat goats	0.91	0.28
Records	Whether individual records of goats are kept to track offspring performance	0.83	0.38
<i>Other Enterprises Included on the Farm; 1=Present, 0=Not Present</i>			
Beef Cattle	Whether the farm includes a beef cattle enterprise	0.29	0.45
Dairy Cattle	Whether the farm includes a bovine dairy enterprise	0.03	0.17
Exotic Animals	Whether the farm includes an exotic animal enterprise	0.02	0.14
Horse	Whether the farm includes a horse enterprise	0.21	0.40
Sheep	Whether the farm includes a sheep enterprise	0.12	0.33
Other Livestock enterprises	Whether the farm includes other livestock or poultry enterprises	0.33	0.47
Field Crops	Whether the farm includes field crop enterprise(s)	0.21	0.41
Forestry	Whether the farm includes a forestry enterprise	0.09	0.29
Fruit, Vegetables enterprises	Whether the farm includes fruit or vegetable enterprises	0.12	0.33

In the survey, for the *Meat Goat Sales by Segment* section, the total sum of the percentages of goats sold for different purposes was not 100%, but instead 93%. We multiplied the raw percentages by 1.07 (100%/93%) to estimate actual percentages for these measures.

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Table 3. Means and standard deviations of meat goat farm descriptors: Breeding Practices, Weaning Ages, Information Sources, and Practices Used When Introducing New Animals.

Variables	Description	Mean	Standard Deviation
<i>Breeding Does</i>			
Breeds Does	Whether does are bred in the operation; 1=Yes, 0=No	0.99	0.07
Number Bred	(If does bred) number bred on the farm in 2011	35.51	50.43
<i>Kidding Statistics</i>			
Born Alive	Number of kids born alive	51.11	63.40
Stillborn	Number of kids stillborn	2.65	3.92
Aborted	Number of kids aborted	1.20	2.26
Twins / Triplets	Percentage of does kidding twins or triplets, coded as 1: $\leq 19\%$; 2: 20-39%; 3: 40-59%; 4: 60-79%; 5: $\geq 80\%$	4.12	1.15
<i>Weaning Ages of Kids</i>			
Weaned Bucks	Weaning age of buck kids (weeks)	11.96	4.07
Weaned Does	Weaning age of doe kids (weeks)	13.41	5.10
<i>Primary Sources of Information for Market Prices for Goats; 1=Yes, 0=No</i>			
Extension Serv	Whether the extension service is a primary source	0.08	0.28
Media	Whether media (TV, radio, magazines) is a primary source	0.24	0.43
Other Farmers	Whether other farmers are a primary source	0.36	0.48
Internet	Whether the Internet is a primary source	0.58	0.49
Organization	Whether farm organizations are a primary source	0.09	0.28
No Information	Whether the producer does not attempt to obtain information for market prices of goats	0.13	0.34
<i>When Bringing New Goats into Your Herd, Which of the Following Practices Are Used?</i>			
Disease History	Whether the disease history of the herd of origin is determined; 1=Yes, 0=No	0.38	0.49
Disease Status	Whether the pre-purchase disease status of the animal is determined; 1=Yes, 0=No	0.44	0.49
Acclimatize	Whether animals are acclimatized to the local environment; 1=Yes, 0=No	0.36	0.48
Exposure	Whether animals are exposed to a small sentinel group of animals; 1=Yes, 0=No	0.12	0.33
Quarantine	Whether animals are quarantined for a period of time; 1=Yes, 0=No	0.75	0.43
Quarantine Days	(If quarantined) number of days, coded as: 1: ≤ 5 , 2: 6-10, 3: 11-15, 4: 16-20, 5: 21-25, 6: ≥ 26	3.59	1.74
Physical Exam	(If quarantined) whether physical exam conducted on new goats at midpoint of the quarantine; 1=Yes, 0=No	0.77	0.42

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Table 4. Means and standard deviations of meat goat farm variables: Predator Threats and Protection, and Body Condition Scoring.

Variables	Description	Mean	Standard Deviation
<i>Predators Considered to Be Significant Threats to the Producer's Goats; 1=Yes, 0=No</i>			
Coyotes	Whether coyotes are considered a significant threat	0.74	0.43
Bobcats	Whether bobcats are considered a significant threat	0.16	0.37
Mountain Lions	Whether mountain lions are considered a significant threat	0.09	0.29
Red Foxes	Whether red foxes are considered a significant threat	0.11	0.31
Feral Hogs	Whether feral hogs are considered a significant threat	0.03	0.17
Domestic and Feral Dogs	Whether domestic and/or feral dogs are considered a significant threat	0.46	0.49
Others	Whether animal species besides those listed are considered a significant threat	0.09	0.29
No Predators	Whether the producers experiences no predator threat	0.19	0.39
<i>Practices Used to Protect Goats from Predators; 1=Yes, 0=No</i>			
Animal Use	Whether animals are used to protect goats from predators	0.71	0.45
Dogs	(If animals are used to protect goats) dogs?	0.79	0.41
Donkeys	(If animals are used to protect goats) donkeys?	0.17	0.38
Llamas	(If animals are used to protect goats) llamas?	0.14	
Alpacas	(If animals are used to protect goats) alpacas?	0.01	0.08
Others	(If animals are used to protect goats) other species?	0.02	0.16
Electric Fence	Whether high-powered electric fence is used to protect goats from predators	0.51	0.50
<i>Body Condition Scoring (BCS)</i>			
BCS	Whether BCS is regularly measured on goats; 1=Yes, 0=No	0.29	0.46
Percent High BCS	Percentage of producer's goats with BCS ≥ 3 , coded as: 1: 0-19%, 2: 20-29%, 3: 40-59%, 4: 60-79%, 5: $\geq 80\%$	4.00	1.21

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Table 5. Means and standard deviations of meat goat farmer demographic variables.

Variable	Description	Mean	Standard Deviation
<i>Producer Demographic Characteristics</i>			
Male	Whether goat producer is a male; 1=Yes, 0=No	0.58	0.49
Age	Producer's age in years, coded as 1: ≤30, 2: 31-45, 3: 46-60, 4: 61-75, 5: ≥76	2.95	0.91
Experience	Producers' goat farming experience in years, coded as 1: ≤10, 2: 11-20, 3: 21-30, 4: 31-40, 5: ≥41	1.57	0.83
Caucasian	Portion of producers who are Caucasian; 1=Yes, 0=No	0.96	
Bachelor's Degree	Whether the producer holds a Bachelor's degree; 1=Yes, 0=No	0.45	0.49
Off-Farm Job	Whether the producer holds an off-farm job; 1=Yes, 0=No	0.61	0.49
Off-Farm Hours	(If the producer holds an off-farm job) number of hours per week worked by producer in off-farm job	40.60	12.83
Income	Whether the producer's annual net household income is ≥\$100,000; 1=Yes, 0=No	0.27	
% Household Income Goats	Percent of net household income from goat enterprise, coded as 1: 0-19%, 2: 20-39%, 3: 40-59%, 4: 60-79%, 5: 80-100%	1.20	0.59
% Net Farm Income Goats	Percentage of net farm income from goat enterprise, coded as 1: 0-19%, 2: 20-39%, 3: 40-59%, 4: 60-79%, 5: 80-100%	2.51	1.71
Retired	Whether goat producer considers himself or herself to be retired; 1=Yes, 0=No	0.24	0.43
DA Ratio	Whether debt-asset ratio is ≥30%; 1=Yes, 0=No	0.43	0.52