

GENDER DIFFERENCES IN AN ON-LINE CERTIFICATION PROGRAM  
FOR GOAT PRODUCERS

[DIFERENCIAS DE GENERO EN UN PROGRAMA DE CERTIFICACIÓN  
EN-LINEA PARA PRODUCTORES DE CABRAS]

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SUMMARY

In 2006, Langston University unveiled an on-line training and certification program for meat goat producers consisting of 22 learning modules. Participants take pre- and post-tests and must record a minimum score of 85% to pass the 16 required and a minimum of 3 elective modules for certification. As of May 31, 2008, 638 participants had registered for the program and 64 had completed the requirements for certification. An equal proportion of males (335) and females (303) have registered for the certification program ( $\chi^2=1.61$ ;  $P=0.21$ ). The same nearly-equal gender frequency of registered participants also existed for those becoming certified, 39 males vs. 25 females, ( $\chi^2=3.06$ ;  $P=0.08$ ). A higher proportion of registered females ( $\chi^2=17.38$ ;  $P<0.01$ ) and certified females ( $\chi^2=11.52$ ;  $P<0.01$ ) were engaged in full- vs. part-time farming than registered and certified males. There were no gender differences for farm size ( $\chi^2=7.98$ ;  $P=0.33$ ) or for herd size ( $\chi^2=2.89$ ;  $P=0.58$ ). For all participants over all tests, there were no differences in pre- or post-test scores between genders ( $P=0.23$ ). For those participants required to take post-tests for the 16 required modules, females scored higher on pre-tests than males (66.8 vs. 62.1%,  $P<0.05$ ). For the 6 elective modules, there were no gender differences in pre-test or post-test scores. Results show that both women and men goat farmers will equally access and use an on-line certification program. Pre- and post-test scores show equivalent knowledge of goat production for female and male goat producers. The greater proportion of females than males who characterize themselves as full-time farmers illustrates the importance of women in the goat industry.

**Key words:** *Certification, meat goat, web-based, training, gender*

INTRODUCTION

Goat production, and especially meat goat production, is one of the fastest growing livestock production

systems in the United States. While total U.S. goat numbers increased by 19% in the period from 2002 to 2008, meat goat numbers increased by 29%, from 1.94 to 2.5 million head (USDA Census of Agriculture on-line database 2002, <http://www.agcensus.usda.gov>; NASS, 2008). In 1997, the USDA Census of Agriculture reported 63,422 goat farms whereas by 2002 that number had increased to 74,980 (USDA Census of Agriculture on-line database 2002, <http://www.agcensus.usda.gov>). It is anticipated that the number of goat farms in the U.S. will increase even further when data collected in the recent 2007 USDA Census of Agriculture is tabulated and released. As the number of goat farms has increased, the number of women engaged in small ruminant farming has also risen. From 1997 to 2002, the number of women principal operators of sheep and goat farms increased from 7,305 to 9,808 (USDA Census of Agriculture on-line database 2002, <http://www.agcensus.usda.gov>).

These increases in goat numbers and goat farms have been accomplished through established meat goat producers increasing herd size and through new producers entering the goat industry. Scientists at the American Institute for Goat Research of Langston University (AIGR/LU) field numerous information requests from new goat producers, many of whom with little to no livestock experience, and requests from producers who have raised other livestock species, usually cattle, but have no direct experience with the main constraints to goat production. All of these goat producers, as well as many veteran goat farmers, express the desire for information specific to goats.

In response to this stated need, and recognizing that few training programs existed specifically for goat production in the U.S., in 2006 AIGR/LU led a consortium of 11 universities and 5 meat goat breed organizations in creating a web-based training program for individuals interested in obtaining a certification in meat goat production technologies (<http://www2.luresext.edu/goats/training/qa.html>). In

addition to the certification program, all of the information contained in the training modules is freely browsable for interested persons who may not wish to obtain certification.

## MATERIALS AND METHODS

The web-based curriculum consists of 22 learning modules covering all major aspects of meat goat production (Table 1). Registered participants must take pre- and post-tests to pass the 16 required and a minimum of 3 elective modules for certification. Individuals must obtain a score of 85% or higher on either a pre- or post-test to pass a module. Optional demographic data collected at enrollment included gender, ethnicity, farming occupation (full- or part-time), farm size (Less than 5 acres; 5 - 20 acres; 21- 40 acres; 41 -80 acres; 81 -160 acres; 161 -320 acres; 321 -640 acres; More than 640 acres), herd size (Less than 25 head; 25 – 49; 50 – 99; 100 – 250; More than 250), total income and percentage of income generated by farm sales. Only gender and farming occupation were reported in sufficient numbers for both all registered users and certified users for analysis. Farm size and herd size were analyzed for all registered users only.

Distribution of gender was tested for equal frequencies using a goodness of fit  $\chi^2$  (SAS, 1990). Crosstabulation frequencies of gender by occupation, gender by farm size, and gender by herd size were tested using a contingency table  $\chi^2$ . Gender differences among elective module selection were tested similarly. Pre-test scores, post-test scores and differences between the two scores were analyzed using mixed model methodology with user being the random effect and gender, modules (16 required or 6 elective) and two-way interaction being the fixed effects (SAS, 1990).

## RESULTS

As of May 31, 2008, a total of 638 participants have registered for the program and 64 have completed the 16 required and at least three elective modules for certification. An equal proportion of males (335) and females (303) have enrolled in the certification program ( $\chi^2=1.61$ ;  $P=0.21$ ; Table 2). Of all registered users responding, a higher proportion ( $\chi^2=17.38$ ;  $P<0.01$ ) of females (33%) vs. males (18%) were engaged in full-time than part-time farming. There were no gender differences for farm size ( $\chi^2=7.98$ ;  $P=0.33$ ) or herd size ( $\chi^2=2.89$ ;  $P=0.58$ ). The majority of respondents were small-scale farmers as 62% farmed on 40 acres or less and 72% owned less than 50 goats.

The same nearly-equal gender frequency of all registered participants also existed for those becoming

certified, 39 males vs. 25 females, ( $\chi^2=3.06$ ;  $P=0.08$ ; Table 2). A higher proportion ( $\chi^2=11.52$ ;  $P<0.01$ ) of certified females (55%) vs. certified males (12%) were engaged in full-time than part-time farming. This gender difference is even greater for the certified producers than for the registered users as a whole.

For all participants for the required modules, there was no difference in pre-test scores (72%) between genders ( $P=0.23$ ). For those participants who scored below 85% on a pre-test and were required to take a post-test for any of the 16 required modules, females scored higher on pre-tests than males (66.8 vs.62.1%,  $P<0.05$ ) while there were no differences on post-test scores. (88%;  $P=0.26$ ; Figure 1). There was no gender effect on either pre- or post-test scores for the elective modules ( $P=0.19$ ). There was a tendency for more males than females to be required to take post-tests for all modules ( $\chi^2=3.01$ ;  $P=0.08$ ).

For the 6 elective modules, there were no differences in the proportion of males and females selecting any one module (Table 3). When electives were pooled across gender, there did exist a significant unequal distribution of electives taken ( $\chi^2=12.72$ ;  $P<0.05$ ). However, when Reproductive Technologies was removed from the distribution table, there were no difference in the distribution of remaining five electives ( $\chi^2=4.08$ ;  $P=0.40$ ). Therefore, it appears that Reproductive Technologies was selected less often as an elective than the other five.

## DISCUSSION

Cooper (2006) states that while there are no innate differences between women and men in their ability to use a computer, there is a “digital divide” in computer use and learning using computer-assisted software due to a complex variety of reasons. Women have been reported to have lower levels of computer literacy (Yates, 2001) and lower levels of internet use, possibly due to career and family demands (Wolf, 1998; Jackson *et al.*, 2001). These suppositions are not borne out by the proportions of women and men registering for the on-line certification program. The equal proportions of females and males participating suggest an equality of internet access for female and male goat producers. This is in line with arguments that gender differences in internet access and computer skills are diminishing (Weiser, 2000; Gunn *et al.*, 2003).

Women goat producers expressed an equal desire to men for information and formal certification in meat goat production. This may be due to their active role in the production and management of goats. Another contributing factor may be the proportion of women who characterize themselves as full-time farm operators. In developing countries, women and

children have long been considered as those primarily responsible for goat management and production (Sinn et al., 1999). The relationship between gender and goat production has not been studied in the U.S.

Women have been described as confident on-line learners (Price, 2006) who can outperform males in courses given in an on-line environment (Price, 2006; Gunn et al., 2003; Clark et al., 2007). Women scored equally well on pre- and post-tests as did men. While post-test scores were similar, there is bias in the post-test data as for a score to be recorded, it must be greater than 85%. Users may retake post-tests until the minimum score is achieved. Post-test scores less than 85% are not recorded nor are the number of attempts taken to achieve a passing score. Nonetheless, data show that women are comfortable leaning about animal production in an on-line environment and that their goat production knowledge was on par or above that of male producers. Results also suggest that the internet can be a successful training tool and means of delivering distance education concerning livestock production to both female and male livestock producers.

### CONCLUSIONS

Using a web-based approach to disseminate goat production information and confer certification status to individual producers is effective as seen by the total numbers of registrants and by the number becoming certified. Results show that both men and women goat farmers will equally access and use an on-line certification program. Pre-test scores show an equivalent or better knowledge of goat production information for women than men. That a greater proportion of females than males characterize themselves as full-time farmers illustrates the importance of women in the goat industry. This has a myriad of implications from methods of information dissemination by extension personnel to the design and marketing of goat production equipment and supplies. The issue of gender and main responsibility in the care and production of goats in the U.S. is worthy of further study.

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Table 1. Modules contained in the on-line goat producer certification program designated as either a core or an elective module.

<i>Required core modules</i>			
1.	General Overview	9.	Marketing Slaughter Goats and Goat Meat
2.	Introduction to a Meat Goat Quality Assurance Program and HACCP	10.	Introduction to Goat Nutrition
3.	Meat Goat Management	11.	Pastures for Goats
4.	Goat Facilities	12.	Goat Farm Budgeting
5.	Goat Herd Health I – Procedures and Prevention	13.	Legal Issues
6.	Goat Herd Health II – Common Diseases	14.	Goat Reproduction
7.	Internal & External Parasites of Goats	15.	Genetic Improvement and Crossbreeding in Meat Goats
8.	Biosecurity for Meat Goat Producers	16.	Predator Control
<i>Elective modules (3 must be selected and passed for certification)</i>			
1.	Reproductive Technologies	4.	Livestock Guardian Dogs
2.	Disaster Preparedness for Livestock	5.	Organic Meat Goat Production
3.	Farm Business Planning	6.	Vegetation Management

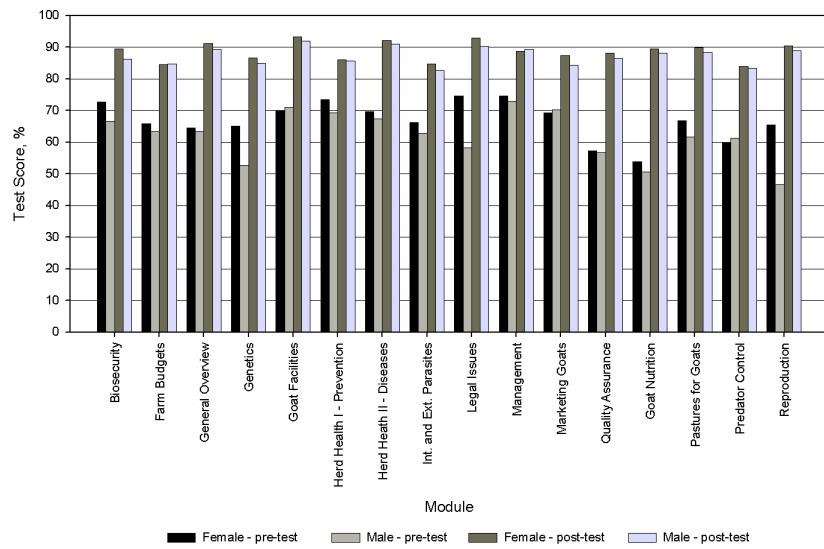
Table 2. Gender differences among users of an on-line certification program for goat producers.

	Female	Male	N	df	$\chi^2$	P
<i>All registered users</i>						
Total enrollment	303	335	638	1	1.61	0.21
Full- vs. part-time farm operator						
Full-time	90	50	548	1	17.38	<0.01
Part-time	179	229				
Farm size, acres						
< 5	23	32	583	7	7.98	0.33
5 – 20	95	109				
21 – 40	51	51				
41 – 80	39	45				
81 – 160	24	38				
161 – 320	25	14				
321 – 640	10	8				
> 640	10	9				
Herd size, head						
< 25	117	126	544	4	2.89	0.58
25 – 49	81	69				
50 – 99	38	41				
100 - 250	28	25				
> 250	7	12				
<i>Certified users</i>						
Total	25	39	64	1	3.06	0.08
Full- vs. part-time farm operator						
Full-time	12	4	55	1	11.52	<0.01
Part-time	10	29				

Table 3. Elective modules selected by females and males in an on-line certification program for goat producers.

Module	Female	Male	Total	n	df	$\chi^2$	P
Disaster Preparedness	26	35	61	376	5	1.45	0.92
Farm Business Management	25	33	58				
Livestock Guardian Dogs	41	50	91				
Organic Meat Goat Production	23	34	57				
Reproductive Technologies	19	19	38				
Vegetation Management	28	43	71				

Figure 1. Pre-test<sup>1</sup> and post-test<sup>2</sup> scores for females and males required to take the post-test for the 16 required modules of an on-line certification program for goat producers.



<sup>1</sup> Pre-test scores; gender P=0.23; module P<0.01; gender\*module P<0.01.

<sup>2</sup> Post-test scores; gender P=0.26; module P<0.01; gender\*module P=0.98.

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