SELECTION OF BREEDING STOCK BY U.S. MEAT GOAT PRODUCERS: A CONJOINT APPROACH

Nyaupane N.P.[1], J.M. Gillespie[1], R.W. Harrison[1], and K.W. McMillin[2]

[1]Department of Agricultural Economics and Agribusiness

[2]School of Animal Sciences

Louisiana State University Agricultural Center, Baton Rouge, LA

Overview

- In recent years, the meat goat industry has been one of the fastest growing livestock industries in the United States.
- The quality and quantity of meat goats produced is largely dependent upon the farmer's initial investment in breeding stock (Casey and Webb, 2010).
- There has been little previous research on the meat goat attributes producers prefer when making breeding stock purchase decisions. These decisions have implications for meeting specific market demands for goat meat.
- Information about the types of animals that meat goat producers prefer under different production systems could help guide the industry in designing better breeding strategies.

Objectives

- To assess the selection characteristics of breeding stock used by U.S. meat goat producers.
- To determine the preferences for meat goat breeding stock among different segments of the industry.
- To determine producer willingness to pay for meat goat breeding stock attributes.

Data and Methods

- A mail survey was conducted with U.S. meat goat producers during late summer - early fall, 2012. Of 1,600 surveys sent to U.S. meat goat farmers, 584 usable responses were obtained.
- Five of the most important attributes and their levels for bucks/does were included in the study.
- A split sample was used, with half of the producers receiving conjoint questionnaires for bucks and the other half receiving conjoint questionnaires for does.

Table 1: Attributes and Levels Used in the Study for Bucks and Does

Attributes, Buck/Doe	Levels
Masculinity (Bucks) / Femininity (Does)	High
	Low
Structure & Soundness	Good
	Poor
Age	≤2 years
	>2 years
Breed	Kiko
	Spanish
	Boer
	Others
Price (Bucks / Does)	$1500/$1250
	$1100/$900
	$700/$550
	$300/$200

- A balanced and orthogonal fractional factorial design produced 16 animal profiles each for bucks and does. From these, 8 choice sets were created randomly for both (Kuhfeld et al., 2010).
- A choice-based conjoint study with a split-sample questionnaire was used.
- Example question:

Attributes	Buck A	Buck B
Masculinity	Low	Low
Structure & Soundness	Good	Good
Age	≤2 Years	>2 Years
Breed	Kiko	Boer
Price	$300	$1500

Which buck would you buy if these were the only bucks available in the marketplace?

- □ Buck A
- □ Buck B
- □ Neither

- Mixed logit and latent class models were used in the analysis.
- Willingness-to-Pay (WTP_α) = $-\beta_d/\beta_p$

Results

Table 2: Simulated Maximum Likelihood Estimates from the Mixed Logit Model

Buck Traits	Mean Coefficient (Standard Error)	Standard Deviation (Standard Error)
Masculinity	0.9432***(0.0675)	-0.0867 (0.1641)
Structure & Soundness	1.8488***(0.0973)	-0.3653***(0.1334)
Age	-0.1110** (0.0503)	0.0043 (0.0685)
Kiko	-0.8352***(0.2251)	2.6663***(0.2728)
Boer	1.0198***(0.1324)	0.8652***(0.1833)
Spanish	-1.0262***(0.2212)	-1.6652***(0.2419)
Price	-0.0021***(0.0002)	-0.0013***(0.0001)
Observations	7242	
Likelihood Ratio Test	389.42***	
Simulated log likelihood	-1652.9295	
Doe Traits		
Femininity	0.4359***(0.0665)	0.2561 (0.2017)
Structure & Soundness	1.9553***(0.1174)	0.5799***(0.1243)
Age	-0.0153 (0.0544)	0.0168 (0.0951)
Kiko	-0.1348 (0.2188)	2.6375***(0.2800)
Boer	1.2820***(0.1670)	1.1999***(0.1992)
Spanish	-0.3507* (0.2073)	1.9016***(0.2523)
Price	-0.0031***(0.0002)	0.0020***(0.0002)
Observations	6312	
Likelihood Ratio Test	398.46***	
Simulated log likelihood	-1511.8693	

Table 3: Producer Willingness-to-Pay for Animal Attributes

Buck Traits	Willingness to Pay Values
Masculinity	445.91*** (38.94)
Structure & Soundness	874.07*** (56.31)
Age	-52.50* (24.61)
Kiko	-394.86***(113.05)
Boer	482.10*** (54.63)
Spanish	-485.14***(119.77)
Doe Traits	
Femininity	142.44*** (22.23)
Structure & Soundness	638.87*** (40.52)
Age	-5.01 (17.82)
Kiko	-44.03 (72.00)
Boer	418.88*** (47.20)
Spanish	-114.58* (70.28)

Latent Class Results

Preferences for Bucks

- High masculinity and good structure and soundness were consistently preferred.
- Larger-scale producers tended to have a greater preference for Boer bucks.
- Producers residing in the Southeastern or Northeastern U.S. (relative to the Southern Plains) and those who sold higher percentages of slaughter goats tended to have greater preferences for Kiko and Spanish bucks.
- Older producers tended to have a greater preference for Kiko bucks.

Preferences for Does

- High femininity and good structure and soundness were consistently preferred.
- Producers holding college Bachelor's degrees and those selling higher percentages of goats for slaughter or as meat tended to have greater preferences for Kiko does.

Conclusions

- Producers generally preferred Boer goats with high masculinity (bucks) / femininity (does), and good structure and soundness.
- Price was the most important attribute, followed by breed, structure and soundness, masculinity/femininity, and finally age.
- The Boer breed was highly preferred for bucks, whereas for does, producers tended to also select from Kiko and Spanish goats, depending upon market used and region of production.

Bibliography

- Casey, N.H., and E.C. Webb. 2010. "Managing Goat Production for Meat Quality." *Small Ruminant Research* 89(2): 218-224.
- Kuhfeld, W.F., R.D. Tobias, and M. Garratt. 2010. "Efficient Experimental Design with Marketing Research Applications." Reviewed Chapter (MR-2010D) of the Article published in Journal of Marketing Research (1994): 545-557. http://support.sas.com/techsup/technote/mr2010d.pdf

SELECTION OF BREEDING STOCK BY U.S. MEAT GOAT PRODUCERS: A CONJOINT APPROACH

Nyaupane N.P.[1], J.M. Gillespie[1], R.W. Harrison[1], and K.W. McMillin[2]
[1]Department of Agricultural Economics and Agribusiness
[2]School of Animal Sciences
Louisiana State University Agricultural Center, Baton Rouge, LA

Selected Poster prepared for presentation at the Agricultural & Applied Economics Association's 2014 AAEA Annual Meeting, Minneapolis, MN, July 27-29, 2014.