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FARMERS' PREFERENCES FOR GOAT BREEDS IN PUNJAB, PAKISTAN

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ABSTRACT

Goat keepers prefer some breeds on the others due to their indigenous knowledge about breeds. The aim of present study was to gather firsthand knowledge about farmers' preferences for certain goat breeds by using household survey technique. Six villages at two diverse sites were randomly selected and 55 households keeping goats were interviewed in each village in the Punjab province of Pakistan. Stratified random sampling was conducted by stratification of houses based on ownership of goats. Distribution of breeds showed highest average number of Beetal brown (8.12±9.13) and crossbred goats (5.50±2.12) at sites I and II, respectively. Among does, Beetal×Teddy cross and Beetal black had the highest number at sites I and II, respectively. Percentages of farmers who preferred Beetal brown-splashed for maturity, conception rate and number of kids at Site I were 33.3, 45.4 and 41.9%, respectively and 25.6%, 31.9% and 25.3% farmers chose Beetal Black for these traits at Site-II, respectively. Birth weight, twinning percentage, preweaning survival rate were preferred for Beetal brown splashed by 46%, 46.9% and 52.2% farmers at Site-I and Beetal black by 22.9%, 31.9% and 31.5% farmers for the same traits at Site-II, respectively. Farmers showed preference for Beetal brown-splashed for growth rate (45.0%), dressing percentage (49%) and meat quality (46%) at Site-I and Beetal black was preferred for the same traits by 33.5%, 24.5% and 30.8% farmers at Site-II, respectively. For high milk yield and milk quality 34.5% and 29.2% farmers preferred Beetal brown-splashed at Site-I, while 24.4% and 7.14% farmers preferred Beetal black for these traits at Site-II, respectively. 46.7%, 45.8% and 43.4% farmers preferred Beetal brown-splashed for survival rate, resistance to parasites and disease resistance at Site-I while 26.6%, 26.5% and 24.7% farmers preferred for Beetal black for these traits at Site-II, respectively. Nice physical appearance, skin colour and large body size were preferred traits for Beetal brown-splashed by 41.3%, 43% and 56% farmers at Site-I and for Beetal black 24%, 36% and 31% farmers at Site-II, respectively. It was suggested that more emphasis should be given for the improvement of rural goat flocks considering preferred traits and flock size should be increased to provide more financial benefits to the rural farmers.

Key words: goat performance and conformation, household survey, farmers' choice, goat breeds

INTRODUCTION

Pakistan is an agricultural country where livestock is providing ample share in national and agricultural GDP (11.4 and 55.4%, respectively, GOP 2012-13). Punjab is the most populated province that sustains large number of livestock including goats and goat keeping is common practice in rural areas. Goats play an essential role in the social setup and culture in rural areas as well as providing a potential source of prompt income. It is a side business in many instances. Goat population in the country is numerated around 64.9 million heads (GOP, 2012-13) and serving the meat, milk, hair and other byproducts (skins, bones, offal, meals).

Goat keeping needs small cash investment. Goats are kept on nearly zero inputs in villages. Goats have an important role in the livelihood of a large proportion of small rural farmers particularly women, landless and marginal farmers lacking other means of survival. The other roles include clearing crop fields, the green leaves and unripe/leftover cotton bolls in cotton fields.

Farmers knew the useful features and select goats of their choice and keep them for specific purposes (home consumption, income, gifts etc.). Due to selective approach of farmer appreciable diversity among and within goat breeds therefore, exists for morphological, growth, fertility and other traits. The worth of each trait is well known to farmers in their territories.

Unplanned breeding of indigenous breeds has put the breeds in endangered zone and result is poor diversity and/or enhanced genetic erosion. This trend has been worsened over time by farmers and stakeholders' negative perception towards the indigenous breeds associated with lack of knowledge on the values of maintaining this diversity and their production potential. In addition, the importance of the indigenous goat breeds have often been undervalued with the focus mainly directed towards the physical benefits while limited attention is given to the social roles which is a key factor in the *in situ* conservation of the indigenous breeds (FAO, 2007). Similarly, production systems and socio-economic

settings of goat farmers are continuously changing. Currently, both live goats and products are targeted for the export market. However, strategies to respond to the potential growth for domestic use and export of goat and goat products are non-existent. Basic information about valuable indigenous goat breeds is, therefore, needed as is the capacity to prioritize, monitor and manage them at both scientific and farm operational levels (ILRI, 2011). To achieve this and other objectives, a regional project "Development and Application of Decision Support Tools to Conserve and Sustainably use Genetic Diversity in Indigenous Livestock and Wild Relatives" is being executed in four countries including Pakistan (Bangladesh, Sri Lanka and Vietnam) by ILRI. Breeding, genetics, socioe-conomic and policy aspects of raising goat are being targeted along with capacity building of various stakeholders.

Household surveys are an important source of retrieving information on gross root level as they provide a cheaper alternative to censuses for timely data. Usually the HH surveys are used for collection of detailed and varied socio-demographic data pertaining to field of interest. Firsthand knowledge about farmer's preferences about goat breeds of Punjab, Pakistan was unavailable. Hence the present study was conducted to know about the choice of farmer about performance traits in goats through household surveys.

MATERIALS AND METHODS

Household surveys were conducted in two districts, Bahawalpur (Site-I) and Faisalabad (Site-II), representing southern and central Punjab in the present study under the project "Development and application of decision support tools to conserve and sustainably using genetic diversity in indigenous livestock & wild relatives"(www.fangrpk.org). Site-I is located south of the Sutlej River and lies in the *Cholistan* region. Three villages were randomly selected from this site. Farming is the main occupation of these villages. The male households usually do farming while females look after the livestock. The second site (Site-II) is located in Faisalabad district. This district has an area of 5,856 sq km with the rivers Ravi flowing on the Eastern and the Chenab on the Western boundaries. It is endowed with rich soils and is an important grain belt of the Punjab province. The important crops in the area are maize, rice, sugarcane and wheat and majority of the farmers cultivate sugarcane, wheat, alfalfa, lucerne, oat and rapeseed. The common livestock species found in these villages were cattle, goat, chicken and donkeys. Three villages were also randomly selected at this site.

The household (HH) surveys were conducted using stratified random sampling method, stratified by ownership of goats and households (n=55) were randomly sampled within each category. In each village, from a complete list of households, owners of the goats were identified. Five "replacement" households were selected in case a household refuses to participate in the survey. A community leader, or someone else, was tasked to inform the selected households in advance of the survey and make sure that they were willing and available for the interview. Preferences for different traits were recorded including goat breed distribution, colour, reproductive performance etc. The collected data were subjected to statistical analysis with SPSS software (SPSS, 1999).

RESULTS AND DISCUSSION

Beetal brown and crossbred goats had the maximum average number at sites I and II, respectively. Distribution of goat breeds showed the highest average number of does Beetal×Teddy and Beetal black at sites I and II, respectively. The highest average number of bucks of Beetal-brown and Beetal black-splashed was found at two sites, respectively. Wethers of Beetal brown and crossbreds, youngs of Beetal brown and kids of Beetal×Teddy had the highest average number at Site I (Table 1). The highest number of farmers preferred Brown splashed Beetal and Black Beetal for maturity, conception rate, twinning percentage, pre-weaning survival rate, growth rate, dressing percentage, meat quality, high milk production, survival rate, resistance to parasites & diseases, nice physical appearance, large body size, more number of kids and docile nature at Site-I and II, respectively (Table 2-9). For birth weight more farmers selected Beetal-brown splashed at Site-I and Beetal-black & Teddy goats at Site-II. As far as milk quality was concerned more farmers chose Teddy & Beetal brown-splashed at Site-I but only Teddy at Site-II. Highest overall ranking was given to Beetal-brown splashed at Site-I and Beetal-black at Site-II by the majority of farmers.

At two sites, different goat breeds were kept that included Beetal (Black, brown, black splashed, brown splashed, Beetal others), Teddy, Beetal×Teddy. Most of the farmers were interested in Beetal brown splashed at Site-I for its early maturity while at Site-II most of the farmers were interested in Beetal black for the same trait (Table 2). Beetal brown splashed at Site-I and Beetal black at Site-II were preferred for conception rate and number of kid/doe. Most of the farmers at site-1 preferred Beetal brown splashed for birth weight, following Teddy goats. At Site-II Beetal black and Teddy were given equal importance for this trait (Table 3). Beetal black splashed and other were opted as second option. Twinning ability was another trait of economic importance. Farmers preferred Beetal brown splashed at Site-I and Beetal black at Site-II. The second option at Site-I was Beetal black splashed, followed by Teddy and other breeds. Pre-weaning survival rate is another economically important

trait as it forms the basis of maximum returns to the farmers. Majority of the farmers (more than one half) preferred Beetal brown splashed at site-1 and most of the farmers (1/3rd) liked Beetal black at Site-II. Beetal black splashed was the second breed of choice at Site-I while Beetal others at Site-II (Table 3). Production traits included high growth rate, dressing percentage, meat quality and milk production. Farmers liked Beetal brown splashed at Site-I followed by Beetal black splashed. At Site-II, farmers preferred Beetal black, followed by Beetal black splashed, Teddy and Beetal x Teddy crossbred for high growth rate (Table 4). Again for dressing percentage, farmers' first choice at Site-I was Beetal brown splashed followed by Beetal black splashed. The breed of first choice at Site-II was Beetal black followed by Beetal black splashed, Teddy and crossbreds (Beetal x Teddy). Beetal brown splashed was preferred by farmers at Site-I and Beetal black at Site-II for meat quality. Beetal black splashed was the second option at both Site-I and II. For high milk production, again Beetal brown splashed was the preferred breed at Site-I and Beetal black at Site-II. The second choice was Beetal black splashed and Teddy at Site-II (Table 5). High survival rate was another trait of interest. Majority of farmers at Site-I preferred Beetal black splashed followed by Beetal black splashed and Beetal black at Site-II followed by Teddy and Beetal ×Teddy crossbreds. Farmers preferred Beetal brown splashed breed and Beetal black splashed at Site-I for high resistance to parasites. The breeds of choice for this trait at Site-II were Beetal black and Teddy. High resisting breeds can flourish well and show good production performance even under threatening environments. Parasitic infestations were common at the experimental sites, and high resisting breeds were the choice for such territories. For nice physical appearance Beetal brown splashed stood on number 1 position, Beetal black splashed on second, Teddy on 3rd and Beetal black on 4th position at Site-I. At Site-II the situation was quite different; Beetal black on 1st, Beetal black splashed on 2nd, Teddy and Beetal × Teddy on 3rd position, with regards to the preference by the farmers. Choice of breeds for these traits at two sites differed significantly, showing that farmers were well aware of the characteristic features of these goat breeds. Beetal brown splashed followed by Beetal black splashed was preferred for disease resistance at Site-I but Beetal black followed by Beetal black splashed, Teddy and crossbreds (Beetal ×Teddy) at Site-II, by the farmers. Most of the farmers (56%) at Site-I liked Beetal brown splashed for large body size. Farmers (31%) at Site-II showed their likeness for Beetal black for this trait. Large sized animal looks beautiful and fetches good amount of money for the farmers, therefore preference would natural for large body size. For docile nature 43% farmers at Site-I preferred Beetal brown splashed while 36% farmers at Site-II preferred Beetal black. The second choice at both sites was Beetal ×Teddy crossbred goats. Docility is related to handling ease and these breeds showed more human friendly behaviour. Goats are usually famous for docile nature but breeding for such characters has not been practiced in these areas. In overall ranking, most of the farmers at Site-I ranked Beetal brown splashed in first and Beetal black splashed in 2nd. At Site-II, Beetal black in 1st, Beetal black splashed & Beetal others in 2nd, Teddy 3rd and Beetal×Teddy in 4th position (Table 8).

Table 1. Distribution of breeds kept at two sites

Site-I	#Goats	Does	Bucks	Wether	Young	Kids
Beetal-black	2.75±2.05	2.75±1.98	1.00±0.00	-	1.00±0.00	1.75±0.50
Beetal-brown	8.12±9.13	4.00±3.63	3.00±1.73	1.00±1.41	3.00±1.73	3.25±2.22
Beetal-white	3.12±2.53	1.62±0.92	3.00±0.00	-	1.00±0.00	2.00±0.82
Beetal-black splashed	3.44±3.14	2.19±1.55	1.00±0.58	-	1.57±0.98	2.36±1.87
Beetal-brown splashed	7.07±8.35	4.06±5.11	2.38±1.94	0.75±1.50	1.61±0.99	3.11±3.34
Teddy	5.09±3.36	2.91±2.11	1.29±1.25	-	1.33±0.82	2.06±1.73
Beetal × Teddy	6.64±5.26	4.38±4.15	1.75±0.96	1.00±0.00	2.33±1.37	3.50±1.00
Site-II	**#Goats**	**Does**	**Bucks**	**Wether**	**Young**	**Kids**
Beetal-black	4.62±6.48	2.68±3.81	1.82±1.25	1.50±0.71	3.60±4.78	2.36±2.06
Beetal-brown	2.60±1.51	1.43±0.54	1.67±0.58	-	1.50±0.71	1.60±0.55
Beetal-white	2.40±0.00	1.33±0.00	1.00±0.00	-	1.50±0.00	1.60±0.00
Beetal-black splashed	4.32±4.64	2.29±2.24	2.25±2.05	5.00±4.24	1.40±0.55	2.20±1.03
Beetal-brown splashed	4.17±4.26	1.67±0.58	1.00±0.00	2.50±2.12	3.50±3.54	3.50±2.12
Beetal-others	2.00±1.58	1.15±0.77	1.00±0.00	1.00±0.00	3.00±2.83	1.67±0.52
Teddy	3.35±2.92	1.94±0.99	3.60±5.27	1.00±0.00	1.90±1.45	1.67±0.90
Beetal × Teddy	4.04±3.25	2.08±1.47	2.00±0.71	4.00±1.51	1.50±0.76	2.14±1.51
Other crossbred	5.50±2.12	2.50±2.12	1.00±0.00	-	1.00±0.00	2.00±0.00

Table 2. Percentage of farmers interested in reproductive performance of different breeds

Breed	Maturity		Conception Rate		No. of kids	
	Site-I	Site-II	Site-I	Site-II	Site-I	Site-II
Beetal-black	6.67	25.64	6.98	31.88	6.45	25.25
Beetal-brown	6.67	1.28	3.49	0.00	5.38	4.04
Beetal-white	1.33	7.69	1.16	8.70	1.08	6.06
Beetal-black splashed	22.67	19.23	19.77	17.39	19.35	19.19
Beetal-brown splashed	33.33	1.28	45.35	1.45	41.94	1.01
Beetal-others	1.33	8.97	1.16	15.94	1.08	12.12
Teddy	16.00	23.08	15.12	24.64	12.90	18.18
Beetal × Teddy	12.00	12.82	6.98	0.00	11.83	14.14

Table 3. Percentage of farmers showing preference for some performance traits at two sites

Breed	Birth weight		Twinning ability		Pre-weaning survival rate	
	Site-I	Site-II	Site-I	Site-II	Site-I	Site-II
Beetal-black	6.58	22.97	4.94	31.88	4.35	31.48
Beetal-brown	3.95	0.00	6.17	5.80	1.45	0.00
Beetal-white	0.00	9.46	1.23	5.80	0.00	9.26
Beetal-black splashed	19.74	16.22	18.52	13.04	23.19	11.11
Beetal-brown splashed	46.05	1.35	46.91	0.00	52.17	0.00
Beetal-others	1.32	16.22	1.23	14.49	1.45	22.22
Teddy	15.79	22.97	14.81	14.49	13.04	14.81
Beetal × Teddy	6.58	10.81	6.17	14.49	4.35	11.11

Table 4. Percentage of farmers showing preference of breeds for meat traits at two sites

Breed	Growth rate		Dressing %		Meat quality	
	Site-I	Site-II	Site-I	Site-II	Site-I	Site-II
Beetal-black	5.00	22.45	6.67	24.39	14.29	30.77
Beetal-brown	6.00	1.02	6.67	1.22	14.29	12.82
Beetal-white	1.00	7.14	0.00	6.10	0.00	2.56
Beetal-black splashed	18.00	20.41	20.00	20.73	10.71	28.21
Beetal-brown splashed	45.00	1.02	49.33	1.22	46.43	0.00
Beetal-others	1.00	14.29	1.33	14.63	0.00	2.56
Teddy	12.00	18.37	10.67	19.51	7.14	12.82
Beetal × Teddy	12.00	15.31	5.33	12.20	7.14	10.26

Table 5. Percentage of farmers showing preference of breeds for milk traits at two sites

Breed	High milk production		Milk quality	
	Site-I	Site-II	Site-I	Site-II
Beetal-black	13.79	24.39	16.67	7.14
Beetal-brown	10.34	0.00	12.50	0.00
Beetal-white	0.00	7.32	0.00	7.14
Beetal-black splashed	10.34	21.95	12.50	28.57
Beetal-brown splashed	34.48	0.00	29.17	0.00
Beetal-others	0.00	9.76	0.00	0.00
Teddy	17.24	21.95	29.17	42.86
Beetal × Teddy	13.79	14.63	0.00	14.29

Overall ranking was based on most important and least important basis, ranked by the farmers on both sites. House hold surveys provide firsthand knowledge about the activities of households and help make appropriate guidelines for the betterment of communities. Such information is useful in understanding the problems

and help in finding the solutions. Panin (2000) reported that farmers showed interest in keeping small ruminants, supported the present findings. The reasons might be lesser investment, less expenditure and ease of keeping and potential source of income, and most probably a potential alternative source of agriculture farm income. Shrinkage of grazing land is responsible for lower productivity and forcing the farming communities towards intensive farming system. This is also affecting the flock sizes and resulting in reduced flock sizes. Therefore farmers prefer to keep small number of animals according to their resources and needs.

Table 6. Percentage of farmers showing preference of breeds for health related traits at two sites

Breed	Survival rate		Resistance to parasite		Disease resistance	
	Site-I	Site-II	Site-I	Site-II	Site-I	Site-II
Beetal-black	5.56	26.60	6.25	26.47	9.43	24.73
Beetal-brown	4.44	4.26	3.13	2.94	4.72	5.38
Beetal-white	0.00	6.38	0.00	5.88	0.94	6.45
Beetal-black splashed	22.22	15.96	22.92	18.63	22.64	18.28
Beetal-brown splashed	46.67	1.06	45.83	0.98	43.40	0.00
Beetal-others	1.11	11.70	1.04	12.75	0.94	13.98
Teddy	14.44	18.09	14.58	17.65	11.32	17.20
Beetal × Teddy	5.56	15.96	6.25	14.71	6.60	13.98

Table 7. Percentage of farmers showing preference of breeds for beauty traits at two sites

Breed	Physical appearance		Skin Colour		Large body size	
	Site-I	Site-II	Site-I	Site-II	Site-I	Site-II
Beetal-black	9.17	24.24	9.72	35.59	10.67	31.08
Beetal-brown	5.50	5.05	6.94	8.47	6.67	6.76
Beetal-white	0.92	7.07	0.00	5.08	0.00	6.76
Beetal-black splashed	22.94	21.21	23.61	15.25	9.33	12.16
Beetal-brown splashed	41.28	1.01	43.06	0.00	56.00	0.00
Beetal-others	0.92	13.13	0.00	6.78	1.33	16.22
Teddy	10.09	13.13	9.72	15.25	9.33	14.86
Beetal × Teddy	9.17	15.15	6.94	13.56	6.67	12.16

Table 8. Percentage of farmers showing preference of breeds for docile nature and ranking at two sites

Breed	Docile nature		Overall ranking	
	Site-I	Site-II	Site-I	Site-II
Beetal-black	11.11	30.51	9.20	29.87
Beetal-brown	4.17	1.69	5.75	6.49
Beetal-white	1.39	3.39	0.00	6.49
Beetal-black splashed	13.89	16.95	21.84	15.58
Beetal-brown splashed	43.06	0.00	48.28	0.00
Beetal-others	1.39	13.56	1.15	15.58
Teddy	11.11	15.25	8.05	14.29
Beetal × Teddy	13.89	18.64	5.75	11.69

Indigenous knowledge has its place and equal effectiveness. Farmers possess well know how about performance of goats and make use of their knowledge to get maximum profit in their local areas. Average number of animals owned by the farmers as found in the present study matched with finding of Jaitner *et al.* (2001). Ayalew *et al.* (2003) reported net benefits from goats showing the interest of farmers in crossbreds. In present study farmers preferred purebreds as well as crossbred. Variable flock size was reported by Masika and Mafu (2004) in South Africa. They reported that goats were kept for slaughter on rituals. Milk yield was also quite variable reaching to a maximum of 2 litres per goat. Only $1/5^{th}$ of farmers kept their own bucks for breeding. According to Bett *et al.* (2009) milk production and sale of breeding goats were the first choice of goat rearing. Farmers were interested in milk production, growth, body size, fertility and disease resistance. All traits were given

equal importance either reproductive, behavior, health or meat production. The farmers ranked these as the most important traits. The findings of Dossa *et al.* (2008) partially matched with present findings and people's choice was affected by gender, ethnicity and perception of risk. Duncan *et al.* (2006) found that live-weight, milk production and reproductive performance were the traits preferred by the farmers. Goat farming not only provided income but also a source of employment to the family (Ayenew *et al.* 2011). Crossbreeding improved profitability of small holders and cannot be compensated by others in some performance traits. The interest of farmers in crossbreds was genuine because of higher productivity (Bett *et al.* 2011). Hence the present findings supported the previous studies. The important traits were growth rate, body size, body shape, drought tolerance, meat quality, fertility, disease and heat tolerance, prolificacy and temperament. Most of famers reared their own males, the findings strengthening the present findings. The major problems as revealed by Sebei *et al.* (2004) were housing and internal parasites and suggested improvement in survival of kids. The study partially supported present findings. The studies of Dossa (1996) and Quisumbing and Maluccio (2000) reported that personal preferences were different in households, supported the present study. Results of Barret *et al.* (2001) were similar to present findings. Finding of Nepali *et al.* (2010) partially contradicted the present findings in using own breeding bucks. Sadoulet and Dejanvary (1995) reported constraints in goat production that also match with the present findings, slightly oppose the findings of Bett *et al.* (2009) regarding the average number of goats kept by the farmers. Results about the average number of goats kept were different from the findings of Duncan *et al.* (2006) who reported higher average values. Present results partially supported the findings of Dossa *et al.* (2008). Reasons for keeping goats were also not matched with present study but traits ranking matched to some extent. Flock size as found in present study was according to the findings of Gwaze *et al.* (2010). Important traits like growth rate, body size, growth tolerance disease, heat tolerance, prolificacy and temperament matched with the findings of Kosgey *et al.* (2008). Ranking of traits slightly matched. Purpose of keeping goats was also in line with the findings of Kosgey *et al.* (2008).

Conclusion: Farmers have their preferences for performance traits of goats because their choice is strongly linked to fetching more monetary benefits in the local markets. The between sites differences for breed preferences and choice of other traits were remarkable showing well know how of farmers. Hence it became more important to provide ample sources in form of cash and kind to improve the local stocks and breed the goats for market oriented choices in order to bring prosperity and upraising the social status of the rural farmers by making use of their indigenous knowledge in scientific manner. Household surveys proved their efficacy in digging out the most relevant features of farmers' preferences. Hence long term policies should be made keeping view all the relevant information to attain improved goat production.

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