

Lesser known ovine germplasm—An underevaluated asset of India

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ABSTRACT

India has a diverse sheep population numbering 63.0 million in parallel with its diverse ecology, production system and communities. National Bureau of Animal Genetic Resources (NBAGR), Karnal, established by the Indian Council of Agricultural Research (ICAR) India, initiated activities aimed at determining the comprehensive phenotypic and genotypic characteristics to provide a nation wide frame work for the management of sheep genetic resources of the country. Only around 25% of the country's estimated sheep population which comprises 40 traditionally recognized breeds has been exploited so far through surveys on native tracts and molecular characterization of their blood samples. Rich ovine genetic diversity of India, however, remains meagerly explored. This report based on the review of published/unpublished information discerns for the first time a total of 47 lesser-known sheep groups categorized into breeds/populations (19), strains (11), varieties (5) and recent derivatives (12). Wherever possible the lesser known sheep are described in terms of physical characteristics, eco-regional distribution, community/tribal affinity, utility, special qualities and socio-cultural significance. Recommendations made for effective characterization, documentation, management and conservation of lesser known sheep are further highlighted.

Key words: Biodiversity, India, Lesser known sheep

The Indian subcontinent sheep estimated to be about 63.0 million and ranking third in the world (BAHS 2006) play an important role in the livelihood of large population of small, marginal farmers and landless laborers. At the National level indigenous sheep accounts for 230 million kg of mutton, 45.2 million kg of wool (7th largest producer of raw wool) (BAHS 2006) and 52.3 million kg of skins (FAO 2002) are produced annually in the country. The diversified germplasm of sheep represented by 40 breeds known at national level is distributed across four agro-ecological regions of the country (Acharya 1982). These breeds thriving under zero/low input system have adapted to the local adverse conditions over the years. Nevertheless, around 75% of the country's sheep population is of local nondescript type and do not belong to any of the defined breeds.

FAO (DAD-IS)—a global databank on Farm Animal Genetic Resources implemented by the Food and Agriculture Organisation (<http://dad.fao.org/>), USA has however listed a few lesser known breeds in addition to descript breeds, their synonyms and wild species of the ovine in their Domestic Animal Diversity Information System of sheep breeds from India. Many more new populations/breeds, strains, varieties in addition to recent derivatives of the

already described breeds appear to be distinct and are generally named after their place of origin/communities rearing them are still being discovered from different regions of India. Though, the names of some of them are either mentioned in literature or are known locally yet they play an important role in their regional economy. Such populations reported only to some extent are passing through a period of identity crisis. It is, therefore, emphasized at several fora to characterize the non-descript populations both at phenotypic and genotypic levels so that they can be marked as descript breeds before they are lost forever. The present compilation, therefore, attempts to describe the available lesser-known sheep categories/types groups wherever possible, in terms of physical characteristics, eco-regional distribution, people responsible for the development, their cultural significance and future research scenario .

INFORMATION ACTIVITIES/RESOURCES

Compilation of information on characteristics of lesser-known sheep breeds/populations of India—a first attempt is based on several activities carried out at various quarters. These are comprised of rapid surveys of selected breeds/populations within the country by various agencies at National and State level (Gokhale 2003, Köhler-Rollefson and Wanyama 2003, PAMMSVM 2003, Kornel *et al.* 2006, Singh and Jain 2009) and field visits included interviews

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with government officials, national scientists, sheep rearers etc. Review of literature from books and especially the non-conventional (grey) publications such as, annual reports, news letters, research thesis, proceedings of national meetings (conferences, seminars), research project reports and brochures/monographs etc. comprised the additional extensive information sources (Basuthakur 1988, Geerlings 2001, Singh and Köhler-Rollefson 2005, Singh and Panchasara 2007, Yadav *et al.* 2009a, Yadav *et al.* 2009b, Mishra *et al.* 2007).

SHEEP CATEGORIES AND THEIR CLASSIFICATION

The Indian Government uses a geographical breakdown as regards the distribution of sheep as per their productive traits. Accordingly 47 lesser-known sheep discerned so far were categorized into sheep breeds/populations, strains, varieties, recent derivatives, and were classified on the basis of agroecological regions—Northern temperate (NT), Northwestern arid and semiarid (NWSA), Southern peninsular (SP) and Eastern region (ER), and on the basis of production potentials (wool, meat and wool and meat types). The NT region which falls under the influence of Himalayas comprises Jammu and Kashmir, Himachal Pradesh and hilly regions of Uttaranchal states; NWSA region with drought prone areas having semi arid eco system includes states of Punjab, Haryana, Rajasthan and Gujarat and the plains of Uttar Pradesh, Madhya Pradesh and Chhattisgarh; SP region with tropical climate (semi-arid or hot and humid) comprises Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and other territories in the central area; and ER region is mostly hot and humid which includes Bihar, Jharkhand, West Bengal, Orissa, Assam, Meghalaya, Arunachal Pradesh, Mizoram, Manipur, Tripura, Nagaland and Sikkim states (Bhatia and Arora 2005). There is high morphological and ecological diversity among the various sheep types. Geerlings (2001), however, made a classification of Rajasthani sheep on the basis of local names, descriptions and qualities of the breed. Raika sheep pastoralists of Rajasthan use a classification based on phenotype and production qualities of a breed. Fig.1 elucidates geographical distribution of various listed categories of lesser known sheep.

Sheep breeds/populations

In the NT region only one such sheep population namely Biangi with wooly coat has been reported so far from Himachal Pradesh. Two coarse wooled mutton type sheep breeds/populations namely Lohi and Tepli with large sized animals inhabit the NWSA region. Characterisation status of Baradi and Danapuri sheep of the region, however, remains unexplored. Out of 5 lesser-known sheep breeds/populations of SP region (Marathwada, Godavari, Kachakatty, Berari and Chevaad) all except Berari have been reported to exhibit medium-tall sized short hairy fleeced body superior/good for mutton production. Nevertheless, information about

Berari is still wanting. Sheep breeders from major market place “Madgyal” and its adjacent villages of Jath Taluka, District Sangli, have evolved a fast growing and most beneficial sheep breed for mutton production called ‘Madgyal’ by applying selection pressure. Madgyal sheep of SP has promising quality of rapid weight gain. Majority of 8 lesser-known sheep breeds/populations of ER region (Dakshini, Monpa, Kuzi, Edka, Dalua, Koraput, Kendrapada and Dharamagarh) have been reported to be short/medium statured, hairy and generally with high fecundity (Kuzi, Edka, Koraput, Kendrapada), however, information on Monpa is scanty (Table1).

Strains, varieties

Several strains (Sangola, Kolhapuri, Lonand, Sangamneri, Palla, Jodipi, Dora, Kattupakkam, Mooli Kadhu, Nari Kadhu and Elai Kadhu) with differences resulting from genetic changes within a species/breed, arising from natural variation or through animal breeding are given in Table 2, and varieties (Bagri, Telingana, Hill sheep, Dashamantpur and Machhkund) differing from others of the same breed/species in minor but heritable characteristics are given in Table 3.

Recent derivatives

Several lesser known sheep populations have been formed as a result of crossbreeding of two or more breeds, viz. Kendrapada Nari Suvarna, Sardarsamand, Dumba, Wannermi, Kajeli, Gungli, Hodi, Lapri, Kabri, Munjal and Kheri (Table 4). The Nimbkar Agricultural research Institute (NARI), Maharashtra, resulted in the development of NARI-Suvarna sheep known for its twinning (NARI 2006, Mahmood 2009). Sardarsamand sheep of NWSA region produced by crossing of exotic and indigenous sheep is considered to have been originated from 1935 onwards. Wannermi sheep is cross between local and Marwari which is well adapted to poor forage conditions. Kajeli sheep is produced by crossbreeding of a local with an exotic breed. It is not clear which local and which exotic breeds are meant by Geerlings (2001). Kheri originated from crossbred base with unknown levels of inheritance of Marwari, Malpura and Jaisalmeri (Bhatia *et al.* 2005). Gungli, Hodi, Lapri, Kabri are crossbreds (Bhildami) from Rajasthan with unknown inheritance (Singh and Kohler 2005).

PEOPLE RESPONSIBLE FOR DEVELOPMENT OF LESSER KNOWN SHEEP

The majority of India's indigenous livestock breeds are associated with specific tribal and caste communities. Although no definite evidence is available about the origin of different breeds of sheep, scientists have recently begun to pay attention to the social contexts of livestock breeds. The Raikas, Khatiks, Gollas, Goudas or Yadvas, Koya, Poraja, Bhumia, Bhattara, Konar, Moopar, Pallar, Paryan and

Table 3. Varieties of lesser known sheep of India

Varieties (common name)	Location/ States (Districts)	Agro ecological regions	Important physical features	Origin	Main uses	Population size/ status
Bagri	Bagar tract, around Delhi	NWASA	Animals usually with brown or black head. Body covered with wool.	Local variety of Bikaneri group	Meat, carpet wool	
Telingana (Navargade)	Andhra Pradesh (Hyderabad)	SP	Black coloured animals with wooly coat.	Local variety	Wool	
Hill sheep	Orissa (Koraput)	ER	The hill sheep of Koraput are usually dwarf in size, characterized by coarse wool, short tail and annual single lambing.	Koraput variety	Meat, manure, skin	30 000-50 000 animals/Insecure status
Dashamantpur	Orissa (Koraput)	ER	Sheep of Dashamantpur variety are medium in size and highly prolific.	Koraput variety	Meat, manure, skin	30 000-50 000 animals/Insecure status
Machhkund	Orissa (Koraput)	ER	Machhkund variety is characterized by small size coarse wool, short tail, early maturity and also high prolificacy (twice lambing in 14 months).	Koraput variety	Meat, manure, skin	30 000-50 000 animals/Insecure status

Dhangar communities and other ethnic tribal groups seem to have played significant role in development and maintaining the uniqueness of breed nurtured by them for years without any ingress from outside.

Raika or Rebari are the best-known livestock breeders in Rajasthan/Gujarat and possibly the largest migrant groups in India. They are primarily responsible for the development of Wannermi, Tepli, Dhumi, Kajeli, Beradi, Gungli, Hodi, Lapri, Kabri and Kheri sheep (Geerlings 2001). Khatiks are associated with rearing of Munjal sheep.

Golla community of Orissa is primarily responsible for development of Dalua sheep; Goudas community for Kuzi and Edka sheep; Koya, Poraja, Bhumia and Bhattara tribes of Koraput are for Koraput sheep. These sheep are of special interest to them because of their socio-religious vis-à-vis economic use and dietary habits. The Ganjam Gulla community developed three varieties of sheep namely the Bedi (Dalua) Mendha, Mamula Mendha and the Bangiri Mendha. These sheep are classified as Ganjam and Dalua sheep breeds in livestock literature. Koyas tribe live in Northern catchments area of the river Godavari spreading across the boundaries of the neighbouring districts of the State of Andhra Pradesh, Chhattisgarh and Orissa. The Koraput sheep breed known for twinning and early maturity has been developed by Bodo Poraja, Bhattara and Bhumia tribes of Koraput district. The Bhumia is an agrarian

community found in the district of Nabarangpur and in the blocks of Kundra and Boipariguda, which is in the Koraput district (Kornel *et al.* 2006).

Konar, Moopar, Pallar and Paryan communities of Tamil Nadu are responsible for maintaining Katchakatty a well-known sheep for its fighting qualities (Kohler-Rollefson 2007). Different strains of Deccani sheep namely Sangola (Solhapuri), Kolhapuri, Lonand, Sangamneri are maintained by Dhangar community.

MORE THAN JUST WOOL AND MEAT

In pastoral and subsistence farming societies of the country sheep are kept as a source of investment and as an insurance against agricultural disasters especially in erratic and low rainfall regions in the country. Sheep make important contribution to the stability of small farmers providing organic manure and financial resources for purchase of farm inputs. Most communities especially the tribal societies attach deep socio-cultural and religious sentiments to sheep. When a Raika loses a lot of sheep to disease or drought others in his village donate one or more sheep to the sufferer. Sheep are prayed for and play a crucial role in several religious rituals. Black sheep are said to protect a flock against death and sickness, and are used in purifying rituals (Geerlings 2004). Ghee prepared from sheep milk namely Tepli, Dumi, Wannermi and Kheri is rarely sold but mainly offered to the

gods in religious places, to special guests and also used for making candles (Geerlings 2001).

In Orissa state the Edka sheep are of special significance to the Gauda community, Dalua sheep to Golla community and Koraput sheep to tribals who live on small ruminant husbandry as they are used in various socio cultural purposes. The black coloured Koraput sheep are in demand, especially for ceremonial purposes. Sheep milk is utilised as liquid milk and ghee in Ganjam, Gajapati, Nayagarh and some parts of Khurda districts. Kuzi, Dalua, Edka, Koraput and Kendrapada-prolific varieties of sheep are very special utility animals for cyclone and flood affected communities who live in coastal areas of Orissa in mitigation of the disaster consequences (Kornel *et al.* 2006). Black coloured Kuzi animals are also more in demand and are sold at a premium price.

In Tamil Nadu Katchakatty primarily maintained for mutton purpose is well known for its fighting qualities and is preferred to be used for ram fighting sport practised during temple festivals (Kumarasamy *et al.* 2009). Black males are preferred for dedication to folk gods or as 'temple sheep' (*koil kida*). Black sheep with horns are preferred by Muslims for slaughter for the Ramzan feast (Vivekanandan 2003). Milk from Godawri ewes from North-western Andhra Pradesh and Chanda, North-eastern Maharashtra, is used for making dahi (curd) and ghee. Fighting rams are bred in Chanda (<http://www.maharashtra.gov.in/pdf/>).

FUTURE THRUST

1. In depth identification, characterization by carrying out systematic surveys as per questionnaire developed at NBAGR (<http://www.nbagr.ernet.in>) and effective use of molecular markers (FAO 1996, Di Stasio 2001), and documentation of unexplored/lesser known sheep categories/types of the country, similar to recognized breeds.
2. Exploring and promoting information about the situation and advantages of underutilized ovine genetic resources.
3. Registration of lesser known sheep types at National level, to provide identity and protection to such valuable indigenous genetic resources as per registration guidelines developed at NBAGR for new breeds (www.nbagr.ernet.in/GUIDELINES.pdf).
4. Creation and technical/financial support to breed survival trusts, breeding societies, animal welfare bodies and similar other community based organizations for development and maintenance of all especially threatened (population less than 10 000) lesser known sheep populations of the country for conservation, preservation of such sheep, and improvement in the economic status of the people responsible for their development and recognition, protection of intellectual property rights of the local

communities/individuals conserving these breeds/populations.

5. The rearers with whom a lesser known sheep type is linked inextricably whether have the right to crossbreed or not for improving the performance is still a debatable issue and needs to be sorted out by policy planners at national level.
6. Relevant ecological and socio-economic issues affecting the management of lesser known sheep types not yet recognized as breeds should be properly addressed as per Livestock Keepers Rights (Köhler-Rollefson and Wanyama 2003, Köhler-Rollefson 2007) and Convention on biological diversity (CBD 1992).

This compiled information presents an overview of the lesser-known sheep of India which would provide a basis for additional targeted/detailed surveys to assess the status of lesser known/new populations of ovine genetic resources of India. Such sheep appear to represent a vast gene pool with untapped potential for our future commercial purposes as well as maintenance of genetic diversity in this species. Though the information is incomplete but the publication of these results will promote action, particularly at National level that will improve the information base on domestic Indian sheep breeds. Nevertheless comprehensive phenotypic and genotypic characterization of descript breeds of Indian sheep initiated at NBAGR in late nineties is almost complete and several monographs/breed descriptors have been published and remaining are in pipe line. A similar follow up activity on lesser known sheep types would provide a nationwide framework for the management of Ovine genetic resources of India.

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