

Wild Goats of India: Origin and Domestication of Indian Goat

Roy U¹, Rout P K¹, Roy B G^{2*}, Gogoi D³ and Roy R¹

¹Central Institute for Research on Goats (CIRG), Makhdoom, Farah, Mathura, U.P-2281122

² Institute of Nuclear Medicine & Allied Sciences (INMAS), Timarpur, Delhi-110054, India

³ Defence Institute of High Altitude Research (DIHAR), Leh, C/O 56 APO

*Corresponding Author: Dr. Bal Gangadhar Roy

Institute of Nuclear Medicine & Allied Sciences (INMAS), Experimental Animal Facility

Brig. SK Mazumdar Road, Delhi-110054

Abstract: India possess a rich depository of domestic goats for varied agro-climatic conditions and regions of India. The ancestry of Indian goats breeds have been studied and found to be linked with the wild goats of Indian Subcontinent. This review presents the available information on wild goats of India and their role in origin and domestication of Indian goats. The wild goats are invaluable in deciphering the origin and genetic diversity of our present day domesticated goat breeds of India.

Key words: Wild goats of India, Domestication, Indian goat, Genetic Diversity

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I. Wild Goats Of India: Origin And Domestication Of Indian Goat

Goats are the most adaptable and geographically wide spread livestock species, ranging from the mountains of Siberia to the deserts and tropics of Africa. Goats are spread over a wide range of habitats with a substantial concentration in the tropics and dry zones in developing countries (Galal 2005; FAOSTAT 2006). Therefore, they are expected to show a large amount of genetic diversity in adapting to the varying ecosystems. Wild Goats are distributed over different regions of this country.

(a) Himalayan ibex (*Capra sibirica hemalayanus*)

The ibex are somewhat heavy bodied, thick set and have short sturdy legs. The under wool of the ibex has long been prized for producing the softest and most luxurious quality of wool called "Pashm". In both sexes there is a thick woolly beard. The Himalayan ibex can be separated from the Alpine population by the horn shape. They are found in Pakistan and India. They are associated in small herds varying from seven to thirty individuals.



(b) Markhor (*Capra falconeri*)

Markhor is known as one of the progenitor of present day goat breeds. Markhor have limited geographical distribution in the moist to semi-arid mountain tracts of Pakistan, India, Afghanistan and Russia (Schaller, 1977 and Shackleton, 1997). Within India, markhor is restricted to part of the Pir Panjal range in southwestern part of Jammu and Kashmir. Populations are scattered throughout this range starting from just east of the Banihal pass (50 km from the chenab river) on the Jammu- Srinagar highway westward to the disputed border with Pakistan. Recent survey reports indicate its presence in catchments of the Limber and Lachipora rivers and around Shupiyuan to the south of Srinagar. The markhor mainly inhabits the sparsely wooded

mountainous region in Northern and Western Pakistan at an elevation of 600-3600m. Today, Markhor are present in around 20 of Pakistan's protected areas.



(c) Himalayan thar (*Hemitragus jemlahicus*)-

Himalayan thar is a large ungulate and a close relative to the wild goat. Its native habitat is in the rugged wooded hills and mountain slopes of the Himalaya from northern India to Tibet. They spend the summers grazing in high pastures, and then come down the mountains and from mixed- sex herds in the winter. The Himalayan thar occurs in timberline regions across the southern-forested slopes of the Himalaya from Jammu and Kashmir to Sikkim. It is patchily distributed from south-central Kashmir, eastward through the southern part of Kulu District (Himachal Pradesh) between 2,000 and 3,270 m (Gaston et al. 1981,1983) and more widely present at similar elevations through northern Uttar Pradesh to the Nepalese border. Small numbers are also found in east and west Sikkim near the borders with Nepal and Bhutan. The Himalayan thar is one of three species of thar. The others are the Arabian thar of Oman and the Nilgiri thar of southern India.



(d) Nilgiri thar (*Nilgiritragus hylocrius*)

The Nilgiri thar is native to the Nilgiri Hills and the southern portion of the Western Ghats range in Tamil Nadu and Kerala. It is known locally as the Nilgiri ibex or simply ibex. Its closest relative is sheep (genus *Ovis*). Until 2005, it was placed with the Himalayan thar (*Hemitragus jemlahicus*) and the Arabian thar (*Arabitragus jayakari*) in the genus *Hemitragus*. However, Ropiquet and Hassanin (2005) placed it in a new genus *Nilgiritragus*, because it is genetically more similar to members of the genus *Ovis* (sheep) than to other thars.



II. Goat Antelope

Goat Antelopes are distributed over different regions of this country

(a) Serow (*Capricornis sumatraensis*)

The serow is widespread but sparsely distributed throughout the forested southern slopes of the Himalaya in northern India, from Jammu and Kashmir to the Mishmi Hills in Arunachal Pradesh and in the hill states of northeastern India (Prater 1971). Himalayan serow (*C.s.thar*) is known to be locally present between 300 and 3,000m asl in all Himalayan states (Green 1987b) and is found extensively in the Sutlej and Beas River catchments (Himachal Pradesh). In northeastern India, the red serow (*C.s.rubidus*) apparently occurs south of the Brahmaputra river in hilly tracts in Assam, Meghalaya and Tripura (Green 1987b; Groves and Grubb 1985).



(b) Goral (*Naemorhedus* spp.)

Goral is found across most of the southern slopes of the Himalaya of Northern India from Jammu and Kashmir to eastern Arunachal Pradesh and in the northeast states hills near India's border with Myanmar (Prater 1971; Groves and Grubb 1985). The subspecies *N.goral bedfordi* and *N.g.goral* are apparently separated by Nepal, with the former occurring in Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, the latter in Sikkim and Arunachal Pradesh. Long tailed goral (*N. caudatus evansi*) probably occurs in Nagaland and possibly in Assam and red goral (*N. baileyi cranbrookii*) may possibly be present in northeast Arunachal Pradesh.



(c) **Grey Himalayan**

Grey Himalayan is found in Western Himalayas, Punjab, Himanchal Pradesh and Kumaon.



(d) **Takin (*Budorcas taxicolor*)**

Takin is a goat antelope found in heavily forested areas of the Eastern Himalayas. There are four subspecies: *B. taxicolor taxicolor*, the Mishmi Takin; *B. taxicolor bedfordi*, the Shensi or Golden Takin; *B. taxicolor tibetana*, the Tibetan or Sichuan Takin; and *B. taxicolor whitei*, the Bhutan Takin. The takin is the national animal of Bhutan.



III. Origin And Domestication Of Indian Goat: Recent Findings

Goats are the most adaptable and geographically wide spread livestock species, ranging from the mountains of Siberia to the deserts and tropics of Africa. Goats are spread over a wide range of habitats with a substantial concentration in the tropics and dry zones in developing countries (Galal 2005; FAOSTAT 2006). Therefore, they are expected to show a large amount of genetic diversity in adapting to the varying ecosystems. This seems possible in light of the enormous morphological diversity among more than 300 goat breeds (Porter, 1996). They are the main economic resource in numerous developing countries and are growing in economic importance in Western Countries (Porter, 1996).

The origin of domestic goats remain uncertain and controversial, but archaeological evidence suggests that they were probably first domesticated in the Fertile Crescent region of the Near East around 10,000 years ago (Pringle, 1998; Porter, 1996; Vigne and Buitenhuis, 1999; Peters et al., 1999 and Zeder and Hesse, 2000). Some studies hint that a second domestication in Pakistan could have given rise to the cashmere breeds (Porter, 1996 and Meadow, 1996). According to Zeuner (1963), the site of Ganj Dareh (Iran of today) is one of the homelands (Zagros mountains) of one species of wild goats (Bezoars) and the earliest evidence of goat domestication (around 8000 B.C.) have been found here. Archaeological studies have provided the evidence of origin and domestication of goats in the Zagros Mountains and at the Mehrgarh site in Baluchistan (Zeder and Hesse, 2000). According to Uerpmann (1996), evidence of goat domestication might be found within the biogeographical range of bezoars that spreads from western Turkey to Baluchistan and from the Caucasus to Sinai. Naderi et al. (2008) have suggested an early domestication center on the Central Iranian Plateau (Yazd and Kerman Provinces) and in the Southern Zagros (Fars Province). He further reported a second domestication center covering a large area in Eastern Anatolia and possibly in Northern and Central Zagros. Goats originated in the highlands of western Iran (<http://www.khandro.net/animal>).

MacHugh and Bradley (2001) reported that the bezoars (*Capra aegagrus*) were the first wild herbivores to be domesticated. Others suggest that at least two wild species of *Capra* could have contributed to the gene pool of domestic goats (Mannen et al, 2001). Fernandez et al. (2006) reported that the goats were

among the first farm animals to be domesticated $\approx 10,500$ years ago contributing to the rise of the “Neolithic revolution”. According to Mason (1981) goat is among the earliest livestock species to have been domesticated approximately 9000 BP in Southeast Asia along the present Iran-Iraq borders. Domestic goats (*Capra hircus*) might have played a central role in the Neolithic agricultural revolution and the spread of human civilizations around the globe (Pringle, 1998 and Porter, 1996).

IV. Goat Genetic Resources In India

The domestic goat *Capra hircus* is an important livestock species in India and other developing countries. Because it provides a good source of meat, milk, fiber and skin, it is popularly known as the “poor man’s cow” (McHugh and Bradley, 2001). Goats have fulfilled agricultural, economic, cultural and even religious roles from very early times in human civilization. They are the most adaptable and geographically widespread livestock species, ranging from the cold arid high altitude of the Himalayas to the hot deserts of Rajasthan and humid coastal areas of India.

India is a vast subcontinent with about 148.9 million (20th livestock census, India) goats comprising 34 registered breeds (Gazette notification No. 3364) and non-descript (local) goats, which together make up approximately >20% of the world’s goat population. Indian goat breeds exhibit enormous variations in fecundity; production of meat, milk and fiber; draught ability; disease resistance and heat/cold tolerance. Therefore, there is need to do an extensive study of Indian goat breeds to understand their origin, divergence and past migration pattern. The goats of temperate Himalayan region grow fibers of good quality and possess the finest quality undercoat called cashmere or Pashmina. The goat breeds found in Northwestern region are large in size and primarily of milch type. In the Southern and peninsular part of the country, goats with dual production of meat and milk are found. The highly prolific meat breeds are found in the Eastern region of the country. On the basis of agro-climatic and geographical conditions, the country has been divided into four major eco-regions for the purpose of description of goat breeds. The goats are widely distributed all over the country in different agro-climatic regions (2.4% of the total goat population in Temperate Himalayan region, 39.3% in North-Western region, 32.1% in Eastern region and 26.2% in Southern region). In this country, some wild goats are also found in the jungle of Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Northeast region, Jharkhand and Nilgiri hills. Their population is reducing day by day due to poaching, deforestation and disease etc. Extinction of local/wild population will have serious impact on protection of environment. Wild relatives of domesticated species are of conservation interest because they are the components of livestock biodiversity. Wild goats are believed to be the ancestor of our existing caprines in India.

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