

New Bovid fossils from the Late Miocene Hasnot (Siwaliks, Pakistan)

Arifa Batool^a, Muhammad Akbar Khan^b, Muhammad Adeeb Babar^b, Khalid Mahmood^{b,*},
Muhammad Akhtar^b

^a Department of Zoology, Wildlife & Fisheries, GC University, Faisalabad, Punjab, Pakistan

^b Dr. Abu Bakr Fossil Display and Research Centre, Zoology Department, Quid-e-Azam Campus, University of the Punjab, Lahore, Punjab, Pakistan

Received 24 January 2015; received in revised form 29 August 2015; accepted 23 October 2015

Available online 2 November 2015

Abstract

The Siwalik Late Miocene bovids from the Hasnot deposits of Northern Pakistan are described here. The bovids are represented predominantly by boselaphines. The Hasnot outcrops range 7–5 Ma and correspond to the fauna of the Late Miocene–Early Pliocene of Eurasia and Africa. The associated fauna of Hasnot is suggestive a vast open land environment depicting sporadic dry and flood seasons, forcing a mosaic of ecotonal habitats with countless number of niches.

© 2015 Elsevier B.V. and Nanjing Institute of Geology and Palaeontology, CAS. All rights reserved.

Keywords: Siwaliks; *Selenoportax*; *Pachyportax*; *Tragoportax*; *Sivaceros*; *Caprotragoides*

1. Introduction

The Siwalik Group is divided into Lower, Middle, and Upper Siwalik subgroups. These subgroups are further divided into formations. The Middle Siwalik subgroup comprises Nagri and Dhok Pathan formations. The Dhok Pathan Formation comprises sandstone with alternate clay and minor layers of conglomerate in lower part and more conglomerates with sandstone and clay in the upper part. The clays are orange brown in colour (Barry et al., 2002). The magnetic polarity and stratigraphic dating has constrained the age of the Dhok Pathan Formation to be between 10.1 Ma and ca. 3.5 Ma (Khan et al., 2010). Overall, the Dhok Pathan Formation faunas resemble those from the Turolian Land Mammal ‘Age’ as defined in Europe, North Africa, and West Asia (Khan et al., 2009).

The bovids are considered more common components in the assemblages than any other taxa in the Dhok Pathan Formation and demonstrated only a small change in the structure and higher-level taxonomy (Khan et al., 2009, 2010, 2013; Gentry et al., 2014). Diversification of bovids is suggestive of the fact that Late Miocene bovids became more diversified and

geographically widely distributed and as a result their territorial range increased from their evolutionary origin (Fortelius et al., 1996). Nevertheless, Bovidae evolution is influenced by natural factors such as climatic fluctuations, vegetation physiognomy and rifting (Kingdon, 1989). The Siwalik bovids thus could offer considerable taxonomic, biostratigraphic and palaeoenvironmental information.

Geographically, the Hasnot village (Lat. 32°49'N, Long. 73°18'E) is situated west of the Jhelum city in the Potwar Plateau of the northern Pakistan (Fig. 1), and it produces a diversified assemblage (Table 1) of the Dhok Pathan Formation (Farooq et al., 2007a, b, 2008; Khan, 2007; Khan et al., 2006, 2007, 2008, 2009, 2010, 2013), including Artiodactyla (Cervidae, Tragulidae, Giraffidae, Suidae), Perissodactyla (Equidae, Rhinocerotidae), Proboscidea, and Primates (Cercopithecoidea) (Matthew, 1929; Colbert, 1935; Pilgrim, 1937, 1939; Sarwar, 1977; Khan et al., 2009, 2012a, b, 2013, 2014; Batool et al., 2014). The deposits at the Hasnot include a succession of rocks of similar lithology with those at the Dhok Pathan type locality. They have the same age (or younger) as those of the type Dhok Pathan Formation but the deposits towards the Bhandar side, which is found northeast of the Hasnot, are younger than the Dhok Pathan Formation (Khan et al., 2009, 2012b).

Recently, the Hasnot outcrops have been thoroughly surveyed for bovid remains and many new specimens were recovered.

* Corresponding author. Tel.: +92 3364863390.

E-mail address: khalidkasuri@hotmail.com (K. Mahmood).

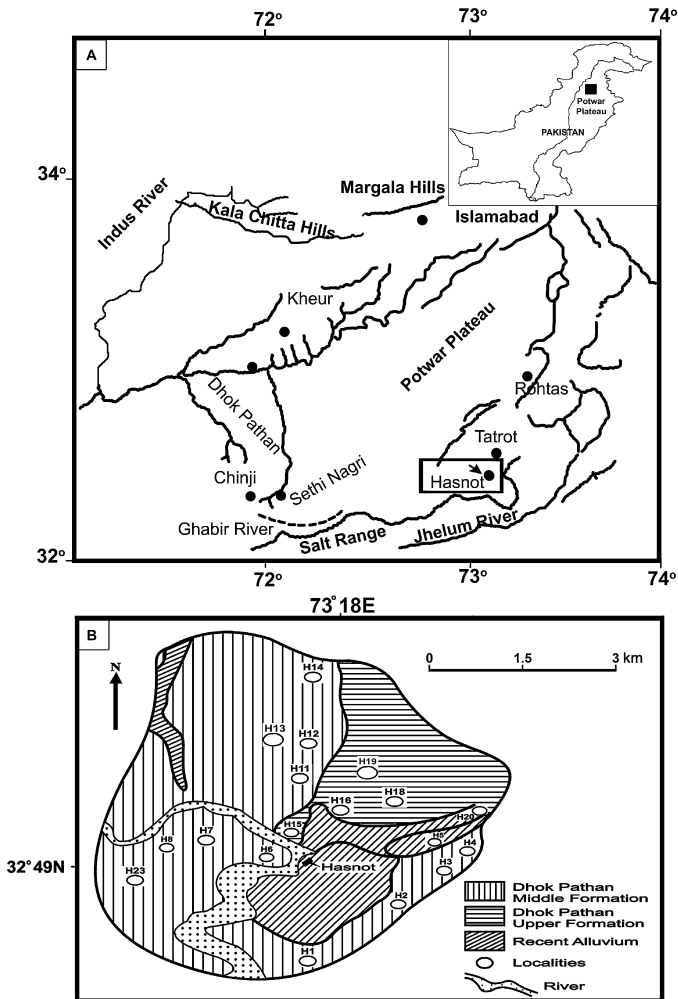


Fig. 1. (A) Map of the Potwar Plateau in northern Pakistan; reference locality of the Siwaliks encircled (Behrensmeier and Barry, 2005; Dennell, 2008; Nanda, 2008). (B) Simplified geologic map of the Hasnot area with indicated localities around the village Hasnot (H = Hasnot) where the studied material is recovered (modified from Colbert, 1935).

The new remains including *Selenoportax*, *Tragoportax*, *Pachyportax*, *Sivaceros*, and *Caprotragoides* are recovered from the Middle Siwaliks of Hasnot (Late Miocene). The contribution of this paper is to document new bovid specimens from Hasnot and discuss their taxonomy, biostratigraphy, and palaeoecology.

1.1. Taphonomy

The Hasnot fossils are mostly scattered vertebrate bones and teeth. Most of the specimens are found in disarticulating conditions and no complete skeleton is recorded yet. Various weathering cracks, abrasion marks, and bite marks are commonly met during specimen observation. The excavated fossils are mainly four types. The first type of fossils occurs in pockets. The second type of fossils is in the form of patches. The third type of the fossils is in general collections, and the fourth type of fossils was partially embedded in crevasses. The collection includes many isolated teeth, mandibles, partial skull and

horn-cores. The bovids constituted the quantitatively dominant group.

2. Material and methods

The embedded material was cautiously excavated with the help of instruments such as chisels, geological hammers, fine needles, pen knives, hand lances and brushes. Most of the material is recovered from the sites H6–8, H23, and H12–13 (Fig. 1B). The respective sites are mentioned in parenthesis within the new material.

The specimen catalogue number consists of series, i.e., yearly catalogue number and serial catalogue number, so figures on the specimen represents the collection year (nominator) and number of that year (denominator) (e.g., PC-GCUF 12/15, the upper figure denotes the collection year and the lower one represents the serial number of the respective year; PC-GCUF — institutional abbreviation).

Comparison. Comparison is made with fossils housed in the British Natural History Museum (BMNH), London, the American Museum of Natural History (AMNH), the Geological Survey of Pakistan (GSP), the Geological Survey of India (GSI), and the Palaeontology Laboratory of the Zoology Department, University of the Punjab, Lahore, Pakistan (PUPC).

Tooth terminology. Terminology follows Gentry and Hooker (1988), Akhtar (1992) and Gentry (1994). An entostyle can be found in the centre of the lingual side of the upper molar and an ectostylid is found in the labial side of the lower molar. Measurements were taken occlusally at maximum level and expressed in millimetres. Uppercase letter with number represents the upper dentition (e.g., M1) and lowercase letter with number indicates the lower dentition (e.g., m1).

Taxonomic description. The species are listed in the systematic order with the information on description, comparison, and discussion.

3. Systematic palaeontology

Family Bovidae Gray, 1821
Subfamily Bovinae Gray, 1821
Tribe Boselaphini Knottnerus-Meyer, 1907

Genus *Tragoportax* Pilgrim, 1937
Tragoportax cf. *punjabicus* (Pilgrim, 1910)
(Fig. 2A–J)

New material. PC-GCUF 11/170, rM2 (H8); PC-GCUF 11/183, lp2 (H8); PC-GCUF 10/89, rp3 (H8); PC-GCUF 12/05, rp4 (H6); PC-GCUF 11/169, lm1 (H6); PC-GCUF 10/72; partial right m3 (H7).

Description. The second upper molar is quadrate PC-GCUF 11/170 and partially damaged (Fig. 2A). The main cusps are well differentiated and the hypocone is wider than the protocone. The second premolar is rugose (Fig. 2B and C). The paraconid of p2 is weaker than p3 (Fig. 2B and C). The metaconid of p3 is posteriorly directed (Fig. 2D–F). The entoconid is stronger than the metaconid. The paraconid of p3 is stronger than parastylid

Download English Version:

<https://daneshyari.com/en/article/4749602>

Download Persian Version:

<https://daneshyari.com/article/4749602>

[Daneshyari.com](https://daneshyari.com)