

**A NEW SPECIES OF BUFFALO FROM THE UPPER SIWALIKS OF JARIKAS,
DISTRICT MIRPUR, AZAD JAMMU AND KASHMIR, PAKISTAN**

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Abstract: A well-preserved left mandibular fragment containing M₁, roots of M₁ and root alveoli of P₁ has been described from the Upper Siwaliks of Jari Kas, district Mirpur, Azad Jammu and Kashmir, Pakistan. Its comparison with the known species of the genus *Bubalus* has proved it to be a new species. The name *Bubalus jarikasensis* has been proposed for this new species.

Key words: Upper Siwaliks, *Bubalus*, Pakistan.

Abbreviations

- H.** Maximum preserved height of the crown.
L. Maximum preserved anteroposterior length of the crown.
M.P.U.Z. Museum collection stored in the Department of Zoology, University of the Punjab, Lahore, Pakistan.
P.U.P.C. Palaeontological Collection stored in the Department of Zoology, University of the Punjab, Lahore.
W. Maximum preserved width of the crown.

INTRODUCTION

B*ubalus* is a purely Asiatic genus and its record from outside Asia is erroneous. Chronologically the earliest record of the genus is either from Pinjor stage or Boulder Conglomerate stage of the Upper Siwaliks (Lydekker, 1878; Pilgrim, 1939) and Change-Te-ho, China (Hopwood, 1925). Both of these localities are Pleistocene in age. The genus declined towards the Late Pleistocene and at present only one domestic species *Bubalus bubalis* is surviving as domestic animal. The water buffalo, *Bubalus arnee*, which was widespread in southern Asia is now confirmed to Nepal and Southeastern Asia (Lever, 1985).

The genus *Bubalus* was created by Smith (1827) for the Indian domestic buffalo. Pilgrim (1939) reviewed the genus and designated *Bos bubalis* Linnaeus as its genotype. The inclusion of the genotype *Bos bubalis* Linnaeus in the genus *Bubalus* should be considered as invalid. This is because the name was not erected at the time of Linnaeus. The present author is of view that *Bubalus bubalis* (Linn.) Smith, 1827 may be regarded as the genotype of the genus.

Lydekker (1878) erected a new species *platyceros* from the Siwalik Hills. This species seems to be an intermediate stage between *Hemibos acticornis* and *Bubalus bubalis*. Lydekker (1913) also recognized four sub-species of *Bubalus bubalis*. These are *B.b. macrocerus*, *B.b. hosei* and *B.b. pallasii*. He is of the opinion that *B.b. palaeindicus* might be identical with *B.b. macrocerus*. The views held by different authors from time to time on the sub-species were summarized by Maarel and van Der (1932). The latter author admitted as definite sub-species of *Bubalus bubalis* not only *B.b. palaeindicus* but also *B.b. sondaicus* Schlegel and Muller (1839-44), the wild buffalo or kerabau of Java.

Pilgrim (1939) added a new sub-species *Bubalus bubalis* (Linn.) *palaeindicus* (Falconer), to the genus. It is very close to the *Bubalus bubalis*, but is of larger size. Hopwood (1925) erected a new species of the genus from the Pleistocene of China. This species *Bubalus Mephistopheles* has the three keels of the horn-core quite as strongly marked as in *Bubalus platyceros* but the cross-section is almost isosceles, more compressed, the inner keel is relatively more distant from the two primary keels and the horn-cores are much shorter, less divergent, crescentic, curve outwards and upwards.

Bubalus mindorensis Heude (Sumulong, 1931) is even closer to *Hemibos* in regard to the narrowness of the frontal and the occipital, the parietal is longer and more inclined to the occipital plane. The horns are shorter and much less divergent than in *B. platyceros* Lydekker (Pilgrim, 1939).

Many Pleistocene long-horned buffaloes both in northern and eastern as well as in southern Africa have been considered to belong to the type of the Indian buffalo. These are *Bubalus nilssoni* Lonnberg (1933). The horn-cores of these species are identical in their morphology, i.e., they are much longer, more divergent and none of them has sharp keel. Besides the longer horn-cores, they also differ from *Syncerus caffer* by their horn-cores being less dorso-ventrally compressed and without basal bosses and by longer metapodials (Gentry, 1978). According to him, all the three species may be grouped under the genus *Pelorovis* as *Pelorovis antiquus* (Duvernoy, 1851), which includes *Bubalus baini* Seeley and *Bubalus nilssoni* Lonnberg.

SYSTEMATIC ACCOUNT

Order	Artiodactyla Owen
Suborder	Ruminantia Scopoli
Family	Bovidae Gray
Genus	<i>Bubalus</i> Smith

Bubalus jarikasensis n.sp.
(Fig.I)

Type

A left mandibular ramus bearing $M_{2,3}$, roots of M_1 and root alveoli of $P_{3,4}$ (P.U.P.C. No. 91/10).

Locality

Jari Kas, district Mirpur, Azad Jammu and Kashmir, Pakistan.

Horizon

Pinjor stage of the Upper Siwaliks.

Hypodigm

Type only.

Diagnosis

P_2 absent. Mandible quite thick transversely, moderately deep vertically. Teeth extremely hypsodont with distinct median basal pillars; enamel thick and moderately rugose; ribs strong; stylids moderately developed. M_3 with large and stout heel with central inflated part.

Description**Mandible (Fig.I)**

The specimen, P.U.P.C. No. 91/10 is a left mandibular ramus. It is well preserved anteriorly but damaged below the molar teeth as well as at the hinder end. P_2 is essentially absent. P_3 probably fell down during biostratonomical stages of fossilization. P_4 and M_1 are indicated by their roots only. Although the first molar is not present in the mandible yet from its roots it can be estimated that it is much smaller than M_2 . The last two molars are present and are in excellent condition. The mental foramina is large and elongated. The mandibular ramus is quite thick transversely but moderately deep vertically. The vertical depth of the ramus below P_3 is about 48.5 mm and width about 30 mm.

 P_2

It is absent in the mandible as there is no evidence of its roots.

 P_3

It probably fell down during biostratonomical stages of fossilization. The antero-posterior diameter of its alveolus is 28 mm and transverse diameter is 10 mm.

 P_4

It is indicated by its roots only. The anterior root is well preserved but posterior one slightly damaged posteriorly. The maximum preserved antero-posterior length is 23 mm and transverse diameter is 23 mm.

 M_1

It is also indicated by its root. The posterior root is better preserved than the anterior one. The antero-posterior diameter is 23 mm and transverse diameter is 13 mm.

M₂

The tooth is well preserved. It is extremely hypsodont and narrow crowned (Table I). It is in the middle stage of wear. The enamel is thick and moderately rugose. The median basal pillar is well developed and has been worn down to where it joined the enamel surrounding the crown. The central cavities are large and moderately wide. They are narrow transversely and moderately wide antero-posteriorly. The anterior limb of the protoconid is slightly damaged and makes a slope towards the inner side. It is large in length than the posterior one. The metaconid is slightly damaged with moderately developed metastylid. The median ribs are very prominent separated by a broad and deep central valley. A small outgrowth of the enamel at the base is present in this valley. The entostylid is more prominent than the metastylid. The posterior limb of the protoconid is higher than the anterior limb of the hypoconid. It has been exposed to weather for some time, resulting in the loss of cement but traces of cement can be seen on the lingual as well as buccal sides.

M₃

The tooth is in a good state of preservation. The apex of the metaconid and entoconid is slightly damaged. It is in the middle stage of wear. It is extremely hypsodont and extremely narrow crowned (Table I). The enamel is thick and moderately rugose. The median basal pillar is very strong and attached to the enamel which surrounds the crown of the tooth. The central cavities are large and deep. They are narrow in the middle and broad at the ends. The anterior limb of the protoconid is larger than the posterior one. The metastylid and entostylid are moderately developed. The median ribs are very well developed and separated by a broad and deep central valley. The tooth has a large and stout heel with central inflated part. The median valley between the hypoconid and the heel is filled by cement.

DISCUSSION

The mandible under study shows the basic features of the genus *Bubalus*. The genus *Bubalus* resembles *Bos* with some differences as stated by early workers and also seen in the specimens of the living species. In *Bos* the diastema behind the canine is short while in *Bubalus* it is much longer. The mandible is thin transversely and shallow vertically in *Bos* while in *Bubalus* it is thick transversely and moderately deep vertically. The characters of the genus *Bubalus* are clearly evident in the specimen under study, e.g., long diastema, thick mandible transversely and moderately deep vertically. The inclusion of the material under study in the genus *Bubalus* is quite certain due to the above stated facts.

It is essentially differs from the recent species and also from any of the previously known extinct forms, in the absence of P₂ which is hitherto never recorded in

any species of the genus. It markedly differs from *Bubalus bubalis* in having a prominent diastema between P_3 and P_4 . It also differs from the mandible of the recent species both in morphology and size of the teeth (Table II). On the basis of these distinct features, the specimen under study is here regarded as a new species of the genus *Bubalus* and name *Bubalus jarikasensis* is being suggested which is after the name of the type locality.

Table I: Comparative measurements (mm) of lower teeth in P.U.P.C. No. 91/10 and M.P.U.Z. No. 597.

	P.U.P.C. No. 91/10		M.P.U.Z. No. 597	
	M_2	M_3	M_2	M_3
L	31	47	28	43.5
W	18	18.5	18	18
W / L index	58	39	64	41
H	29	29	24	28
H / W index	161	157	133	155

Table II: Comparative measurements (mm) of mandibular ramii in P.U.P.C. No. 91/10 and M.P.U.Z. No. 597.

	P.U.P.C. No. 91/10	M.P.U.Z. No. 597
Transverse width under P_3	30	28
Vertical depth under P_3	48.5	43



I: *Bubalus jarikasensis* n.sp. type, a left mandible bearing M_{2-3} , roots of M_1 and the alveoli of P_{3-4} (PUPC No. 91/10) collected from Jari Kas, district Mirpur, Azad Jammu and Kashmir, Pakistan. A. Occlusal view, B. Inner view, C. Outer view.

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