«MICROSTONYX» MAJOR (SUIDAE, ARTIODACTYLA)  
FROM THE TYPE AREA OF THE NAGRI FORMATION,  
SIWALIK GROUP, PAKISTAN  

J. van der Made* and S. Taseer Hussain**

ABSTRACT

Microstonyx major is described for the first time from the Nagri Formation type section. The species is compared to Hippopotamodon sivalense and Dicoryphochoerus titanoides. The latter species is found to be a junior synonym of M. major. Microstonyx and Hippopotamodon might also be synonymous but further research is needed to substantiate this hypothesis. The Indian and Eurasian suid faunas had many species and genera in common.

Key words: Microstonyx, Hippopotamodon, Suidae, Nagri, Dhok Pathan, Vallesian, Turolian.

RESUMEN

Se describe Microstonyx major por primera vez en la sección típica de la Formación de Nagri. Se compara esta especie con Hippopotamodon sivalense y con Dicoryphochoerus titanoides. Esta última especie es un sinónimo reciente de M. major. Microstonyx y Hippopotamodon pueden ser sinónimos entre sí, pero para asegurar su/status se necesita una investigación más profunda. Las faunas de suidos de la India y de Eurasia tenían muchas especies y géneros en común.

Palabras clave: Microstonyx, Hippopotamodon, Suidae, Nagri, Dhok Pathan, Vallesien, Turolien.

Introduction

Hippopotamodon sivalense Lydekker, 1877 from the Indian subcontinent is a large suid. In the morphology of the cheek teeth and the skull it resembles Microstonyx, which is known from Europe and Asia. The two taxa are closely related and several workers have speculated on the possibility of synonymy; the main difference seems to be the reduced canines in Microstonyx.

Besides Hippopotamodon sivalense, Lydekker, 1877, Hippopotamodon/Microstonyx-like suids from Pakistan and India were described as Sus titan Lydekker, 1884 (which is type species of Dicoryphochoerus Pilgrim); Dicoryphochoerus robustus Pilgrim, 1926; Dicoryphochoerus titanoides Pilgrim, 1926 and Sus praecox Pilgrim, 1926. Recently Pickford (1988) revised the Indian Suidae and considered all species synonymous to Hippopotamodon sivalense.

One of us studied material of Hippopotamodon in the collection of the Geological Survey of Pakistan (GSP) in Islamabad and in the Indian Museum in Calcutta. Most of the material studied forms a homogeneous group on the basis of morphology and size.

A mandible from the Nagri Formation in the collection of the faculty of geology and geophysics of the university of Utrecht (Ng 103) is smaller than the Hippopotamodon material in the Pakistani and Indian collections. The morphology of the teeth in the mandible is the same as Hippopotamodon. The mandible forms part of a collection made in 1964 and 1966 by G. H. R. Von Koenigswald, P. Y. Sondaar, A. J. van der Meulen and the second author. The material was collected from the type section of the Nagri Formation. There is also a P3 and a part of a last lower molar of the same species. A part of a last lower molar bears the number «Ng 516» at one side and the indication «Ng» at the
Plate 1.—Fig. 1: Ng 103 Microstonyx major, a left mandible with P to M, from the Nagri Formation. Fig. 2: Ng 516 cf. Hippopotamodon sivalensis, the last lobe of a left M3 from the Nagri Formation. Fig. 3: Ng 184 Microstonyx major, the last lobe of a left M, from the Nagri Formation. Fig. 4: Ng 183 Microstonyx major, a left P, from the Nagri Formation.
Plate 2.—Fig. 1: B 354 Microstonyx major, a right maxilla with P\textsubscript{4} to M\textsubscript{3} and an abnormal tooth («P»), Punjab.
other: it seems that there were doubts about its provenance. This molar fragment probably belongs to *H. sivalense*. The only other suid in this collection is *Propotamochoerus hysudricus*.

**Description of the material and comparison**

The mandible contains the last premolar, the last two molars and the posterior half of the first molar, besides there are the roots of the second and third premolars. The morphology of the P₄ is typical of *Dicoryphochoerini* (Schmidt-Kittler, 1971). The second largest cusp of the tooth is placed postero-lingually to the largest cusp. Another morphotype occurring in *Dicoryphochoerini* has the second largest cusp placed lingually of the largest cusp; the two cusps are separated by a deep valley. In a third type the second largest cusp may be smaller and placed more backwards and near to the axis of the tooth. It is

![Graphs showing length versus greatest width of P₄, M₂, and M₃ for different species.](image-url)

**Fig. 1.**—Length (vertical) versus greatest width (horizontal) of P₄, M₂, and M₃ of *Hippopotamodon*-like Suinae in the collections of the GSP and Indian Museum (1), *Microstonyx antiquus* from Eppelsheim (2; measurements from Hünermann, 1968), *Microstonyx major* from western Europe (3) and mandible Ng 103 (4).
Fig. 2.—Length and width of upper dentition. Legend as in figure 1, save for symbol 4 which represents the holotype of *Dicoryphochoerus titanoides*. Length and width of P₂. Legend as in figure 1, symbol 4 represents Ng 183.
common to find two of these types in one population. The molars are of a common suid morphology. The last molar has a third lobe with two large cusps of which the labial one is the largest and posterior to them is a very small cusp near the axis of the tooth. This is a common morphotype in *Hippopotamodon* and *Microstonyx*.

It can be seen that Ng 103 is much smaller than the material in the GSP collection and the Indian Museum and that it has the same dimensions as *Microstonyx major* from Europe (figure 1). The dimensions of *M. antiquus* from Eppelsheim are also shown, which are closer to the material in the GSP and Indian Museum collections.

Ng 184 and Ng 516 are the last lobes of two last lower molars. Ng 184 is smaller in size as compared to third lobes of the molars of *H. sivalense*, and is of similar size to those of *M. major* from Europe. Ng 516 has a size and morphology similar to the molars of *H. sivalense*.

The P3 (Ng 183) has the typical morphology of this group. No clear separation in two groups can be seen on the basis of size.

**Discussion**

Most of the material in the collections of the GSP and the Indian Museum forms a homogenous group.

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<th>Table 1.—Dimensions of the material from Nagri and B 354, the holotype of <em>Dicoryphochoerus titanoides</em></th>
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with greater dimensions than *Microstonyx major*. Some teeth are however closer to *M. major*. The dimensions and morphology of the holotypes or lectotypes of *Sus titan*, *Sus praecox* and *Dicoryphochoerus robustus* fall within the range of the group of larger teeth.

In figure 2 dimensions of upper cheek teeth of *Hippopotamodon*-like suids are shown. Again, *Microstonyx major* and the bulk of the Pakistani and Indian material form two groups. The holotypes of *Hippopotamodon sivalense* is a maxilla with the size similar to the large group. The holotype of *Dicoryphochoerus titanoides* falls in the range of *Microstonyx major*.

It seems that there are two large species in the Indian subcontinent: a very large *Hippopotamodon sivalense* and a smaller species of the size of *Microstonyx major*. Both species have approximately the same morphology.

*D. titanoides* is reported from the Dhok Pathan Formation and possibly Tatrot Formation as stated by Pilgrim (1926). Ng 103 is from the Nagri Formation. The fauna of the Nagri Formation has been correlated with late Vallesian or early Turonian faunas of Europe. It is also correlated with faunas from Samos of about 9 Myr and from Turkey between 9 and 10 Myr (Pilbeam et al., 1977).

*Microstonyx major* is well known from Europe (V. d. Made & Moya Solà, in press), Russia (Trofimov, 1951), Turkey (Ozansoy, 1965), Marageh in Iran (Campbell et al., 1980), but also from China (Erdbrink, 1969; Pearson, 1928; *M. erymanthius*-should be considered a subspecies of *M. major*). It ranges in Europe from the late Vallesian to the middle Turonian (MN 10 to MN 12).

Both *Microstonyx major* and the small Indian form have the same morphology and size, as far as the dentition is known. Both enter in the Vallesian and range nearly to the beginning of the Pliocene. There seems to be no reason for not considering *D. titanoides* a junior synonym of *Microstonyx major*. The only alternative is that *D. titanoides* evolved locally and reached a similar morphology and size at approximately the same time as *M. major*, which seems less likely. It is concluded that *Dicoryphochoerus titanoides* is a junior synonym of *Microstonyx major*.

Erdbrink (1969) while studying Chinese material reached more or less a similar conclusion: *Dicoryphochoerus titanoides* a junior synonym of *Sus erymanthius* (=*Microstonyx major*). However in this opinion the species was less related to *Dicoryphochoerus* (=*Hippopotamodon*) than to *Sus*. We certainly do not agree with this assumption. Erdbrink is not followed by later students of Indian Suidae.

An other problem is the right generic name. The main difference between *Microstonyx* and *Hippopotamodon* is the reduced canine in *Microstonyx*, it was the reason that Pilgrim (1926) erected a new genus. *Microstonyx antiquus* differs from *M. major* in lesser
reduced canines and retention of a P1. It resembles *Hippopotamodon sivalense* in the retention of the P1 and in size (see figure 1). *Hippopotamodon sivalense* is only slightly larger. It seems likely that *Microstonyx* and *Hippopotamodon* are synonymous because only a reduced canine is not sufficient for generic distinction. However a comparative study of the skull of *H. sivalense* (B 26) in the Indian Museum should be made for obtaining further information.

For a long time, India was thought to be rich in endemic Suidae (Pilgrim, 1926). Pickford (1988) revisited the Indian Suidae and found that species diversity was not so high. He also found that the European and Indian suid fauna resembled each other. The occurrence of *M. major* in the Indian subcontinent and the probability of very close ties between *M. antiquus* and *M. sivalense* corroborate the findings of Pickford (op. cit.).

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**References**


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