A NEW BUNOSELENODONT ARTIODACTYL FROM THE MIDDLE EOCENE OF CHINA AND THE EARLY RECORD OF SELENODONT ARTIODACTYLS IN ASIA

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The vast continent of Asia is thought to have played a major role in the origin and early differentiation of several extant groups of ungulate mammals, including artiodactyls (e.g., Beard, 1998). According to Gentry and Hooker (1988), Selenodontia is a major division within Artiodactyla encompassing many extinct forms that are more closely related to extant ruminants and camels than to pigs and hippos (Bunodontia). Living ruminants are characterized by their highly derived digestive system, which is not preserved in fossils. Bony features that are closely correlated with this critical physiological innovation have yet to be identified. The incisiform lower canine and the loss of upper incisors are dental features that help to define extant ruminants, but these characters are rarely preserved in the fossil record. Moreover, Archaeomeryx from the middle Eocene of Mongolia, which is classically regarded as the earliest known ruminant, still retains its upper incisors (Matthew and Granger, 1925). In terms of osteology, the main apomorphic feature unifying all Ruminantia, is the fusion of two tarsal bones (cuboid and navicular), although this feature may have evolved at least twice during in the evolutionary history of selenodont artiodactyls (Sadile and Blundel, 1995). Accordingly, it can be problematic to distinguish a “true ruminant” from the multitude of extinct proto-selenodont forms that radiated during the middle Eocene in the Northern Hemisphere. Moreover, the poor record of early Selenodontia in Asia greatly hampers our understanding of their origin and early evolution. Except for Archaeomeryx, which is known from several fairly complete skeletons from Mongolia (Matthew and Granger, 1925; Colbert, 1941; Webb and Taylor, 1980; Vislobokova, 1998, 2001), the early selenodonts of Asia are limited to fragmentary jaws and isolated teeth from the middle and late Eocene (Guo et al., 2000; Métais et al., 2001; Tsukamoto et al., 2003).

Here, we describe a new genus and species that is characterized by a combination of primitive ‘dichobunoid’ dental features together with derived dental characters that are reminiscent of early ruminants. The fossils were collected by screen-washing the fossiliferous clays from the middle Eocene fissure-filling complex near the village of Shanghuang in southern Jiangsu Province, People’s Republic of China (Fig. 1). Five distinct fissure fillings (designated A through E) have been sampled from the Triassic Shangqinglong limestone at Shanghuang. Artiodactyl remains have been retrieved from all the fissures, but the taxon described here is known so far only from fissure-filling D, which has also yielded a lantianine dichobunid (Métais et al., 2004), brontotheriid perissodactyl (Qi and Beard, 1996, 1998), rodents (Wang and Dawson, 1994; Dawson and Wang, 2001), and other mammals that are currently under study. According to Dawson & Wang (2001), fissure D is middle Eocene in age and probably correlates with the Irdinmanhan Asian Land Mammal Age (see Russell and Zhai, 1987).

SYSTEMATIC PALEONTOLOGY

Order ARTIODACTyla Owen, 1848
Suborder SELENOdontia Scopoli, 1777
Family HOMACodontidae Marsh, 1849
LIMERYX CHIMAERA, gen. et sp. nov. (Fig. 2)

Diagnosis—Medium-sized bunoselonodont artiodactyl slightly smaller than extant African tragulid Hyemoschus. Upper and lower molars with weakly crescentic cusps and cuspids. Upper molars with buccal cingular thick, paraestyle and mesostyle well developed, buccally deflected centro-crista, paracone and metacone distinct, metacone subcrescentic and not fully lingual in position, and protocone relatively central in position. Lower molars retaining straight hypolophid and minute paraconid. Differing from Asiohomacodon in having less crescentic and more inflated cusps (especially on lower molars), less developed cingula and lack of wrinkled enamel on upper molars, shorter posthypocristid and presence of both distinct hypolophid and Zhailimeryx fold on lower molars (Fig. 2). Differing from all North American ‘homacodonts’ in having Zhailimeryx fold and short posthypocristid (Fig. 2) not connected to postcingulid on lower molars, and in labially deflected centro-crista, distinct mesostyle, and stronger metacone and parastyle on upper molars. Further differing from Homacodon and Microsor in more nearly selenodont structure of upper molars, extreme reduction of lower molar paracodons, and greater mesiodistal length of lower molar trigonids. Further differing from Mesomeryx, Pentacemylus and Bunomeryx in lacking lingual cingulum, showing stronger development of parastyle and mesostyle on upper molars, and weaker ribbing on buccal side of both paracone and metacone. Differing from European Hyperdichobune and Moulaliatherium in lacking hypcone, showing less development of styles and cingula on upper molars, and in having relatively longer lower molars with Zhailimeryx fold and straight transverse hypolophid joining entoconid to hypoconid.

Holotype—IVPP Y12760.1, an isolated upper molar (probably M2; Fig. 2A-B). Collection of the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), Chinese Academy of Sciences, Beijing.