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HYSTRIX ZHENGI N. SP., A BRACHYODONT PORCUPINE (RODENTIA) FROM EARLY NIHEWANIAN STAGE, EARLY PLEISTOCENE OF CHINA

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ABSTRACT

A lower premolar from the Longgupo Cave, Sichuan, China and three lower premolars from the Liucheng *Gigantopithecus* Cave, Guangxi, are described as *Hystrix zhengi* n. sp. The localities Longgupo and Liucheng are of Early Nihewanian age, which correlates with the Late Pliocene (Villanyian) of Europe. The specimens are considered to represent a late occurrence of a brachyodont species, agreeing with the replacement of brachyodont *Hystrix* species by hypsodont ones in Europe during the Late Pliocene.

CHINESE ABSTRACT

摘要 根据四川龙骨坡的一枚及广西柳城巨猿洞的三枚大型低冠前臼齿建立一新种*Hystrix zhengi*。龙骨坡与巨猿洞的时代为泥河湾期早期，相当于欧洲的上新世晚期（维兰尼期）。这些标本为低冠种类最晚出现的代表，与欧洲上新世晚期低冠种类被高冠种类替代的时间一致。

INTRODUCTION

The Longgupo Cave, also known as the "Wushan Hominid Site", in Sichuan Province, China, yielded one brachyodont lower premolar of *Hystrix*. It was found during the excavations of 1985-1988 and was described by Zheng (1993) under the name *Hystrix magna* Pei, 1987. The type material of *H. magna* was revised by van Weers & Zheng (1998) who designated the only syntype that was left as the lectotype for *H. magna*. This tooth, however, is hypsodont. The clearly lower crowned p4 from Longgupo is outside the range of variation of the tooth height of *H. magna*. Therefore the specific designation of that tooth will be reconsidered.

While searching in vain for syntypes of *H. magna* in the collections of the IVPP, three brachyodont lower premolars of a porcupine species from the Liucheng *Gigantopithecus* Cave were found. In this paper the four molars mentioned above will be compared with the molars of the species *H. magna* and *H. kiangsenensis* Wang, 1931 from the *Gigantopithecus* Cave.

MATERIALS AND METHODS

MEASUREMENTS

The largest breadth (Br) and length (Lth), as well as three different measurements of the height of the teeth have been taken with vernier callipers. The total height (Ht) is the height with the roots. Another measurement taken is the smallest height of the tooth without the roots ("crown height" = C.Ht). This measurement has the advantage that it can always be taken even if the enamel/dentine border is not marked. The enamel height (E.Ht) is the largest heigt of the enamel crown, in lower teeth at the buccal, in upper teeth at the lingual side. The relative height of the teeth is expressed as the ratio of E.Ht/Lth. The recognition of the wear classes is after van Weers (1990). Upper cheek teeth are indicated in upper case, lower ones in lower case. First and second lower molars are together treated as m1/2.

SPECIMENS STUDIED

IVPP V9669, left p4, Longgupo, fissure zone 6.
IVPP V11549.1, left p4, Liucheng *Gigantopithecus* Cave.
IVPP V11549.2, left p4, Liucheng *Gigantopithecus* Cave.
IVPP V11549.3, right p4, Liucheng *Gigantopithecus* Cave.
IVPP V11550.1, *H. magna*, left p4, Liucheng *Gigantopithecus* Cave.
IVPP V11550.2, *H. magna*, right P4, Liucheng *Gigantopithecus* Cave.
IVPP V11550.3, *H. magna*, left p4, Liucheng *Gigantopithecus* Cave.
IVPP V11551.1, *H. kiangsenensis*, right p4, Liucheng *Gigantopithecus* Cave.
IVPP V11551.2, *H. kiangsenensis*, left p4, Liucheng *Gigantopithecus* Cave.

TAXONOMY

Order Rodentia Bowdich, 1821
Family Hystricidae Burnett, 1830
Genus *Hystrix* Linnaeus, 1758
Subgenus *Hystrix* Linnaeus, 1758
This subgenus encloses the larger sized *Hystrix* species, hypsodont as well as brachyodont ones, which are more specialised as for their larger length of the nasals and the larger height of the skull.

Hystrix zhengi n. sp.
(Fig. 1A-I)

Hystrix magna Pei, 1987: 115 (specimens now registered as V11549.1-3); Zheng, 1993: 24, Fig. 57a.
Hystrix sp.; van Weers & Zheng, 1998: 55.

Holotype: left lower premolar kept in the IVPP in Beijing under nr. V9669, Figs. 1A-C.
Derivatio nominis: named after Dr. Zheng Shaohua, acknowledging his contribution to the Quaternary mammology.
Type locality: Site of Longgupo, fissure zone 6, Wushan County, Sichuan Province, China.
Hypodigm: V9669, holotype, left p4 (Fig. 1A-C); V11549.1 (Fig. 1D-E) and V11549.2 (Fig. 1F-G), left p4's, and V11549.3, right p4 (Fig. 1H-I).

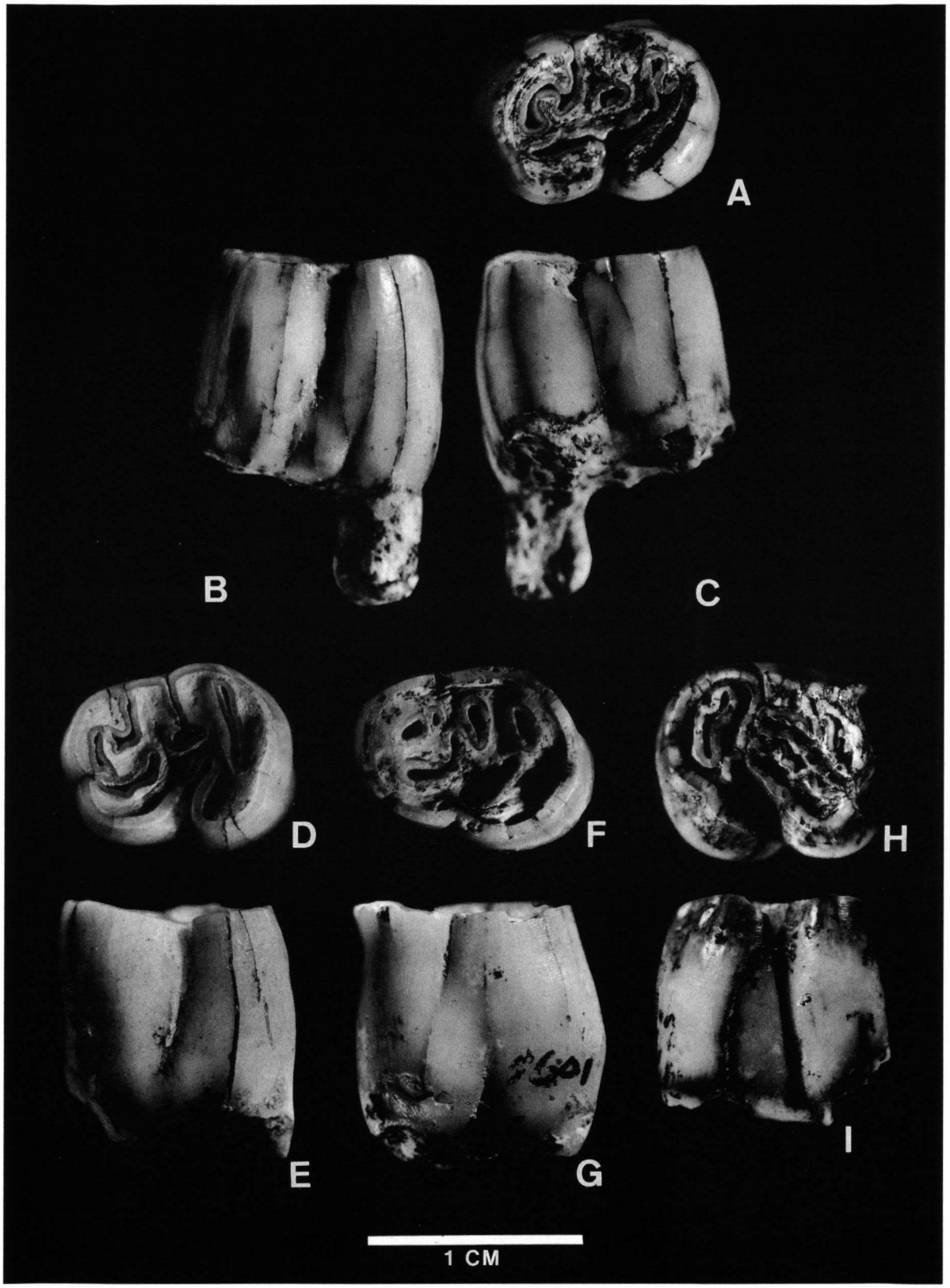

Fig. 1. A, occlusal, B, buccal and C, lingual view of the left p4, holotype of *H. zhengi* n. sp. nr. IVPP V9669 from Longgupo. D, occlusal and E, buccal view of left p4 nr. IVPP V11549.1; F, occlusal and G, buccal view of left p4 nr. IVPP V11549.2; H, occlusal and I, buccal view of right p4 IVPP V11549.3 of *H. zhengi* n. sp. from the Liucheng *Gigantopithecus* Cave.

Table 1. Measurements of the type (V9669) and three p4 of *H. zhengi*, two p4 and one P4 of *H. magna* and two p4 of *H. kiangsenensis* in mm. Height measurements of teeth with damaged or lacking roots are indicated with *.

IVPP nr.	Locality	Species	Th	Br	Lth	Ht	C.Ht	E.Ht	Cl	Ht/Lth
V9669	Longgupo	*H. zhengi*	p4	9.0	12.2	17.1	10.7	11.0	P1	0.90
V11549.1	Liucheng	*H. zhengi*	p4	8.8	11.0	12.5*	9.9	11.0	Q	1.00
V11549.2	Liucheng	*H. zhengi*	p4	8.4	12.0	13.2*	11.8	11.8	T1	0.98
V11549.3	Liucheng	*H. zhengi*	p4	9.8	11.5	11.0*	8.6	10.9	Q	0.95
V11550.1	Liucheng	*H. magna*	p4	7.7	10.6	15.3	13.6	13.0	S4	1.23
V11550.2	Liucheng	*H. magna*	P4	9.1	10.5	18.8		19.1	G1	1.82
V11550.3	Liucheng	*H. magna*	p4	8.1	10.2	18.0	16.2	16.9	R/S	1.66
V11551.1	Liucheng	*H. kiangsenensis*	p4	6.6	8.4	14.8*		14.8	P1	1.76
V11551.2	Liucheng	*H. kiangsenensis*	p4	6.7	8.8	16.1	11.4	15.0	P1	1.70

Age: Early Nihewanian, Chinese Early Pleistocene, which agrees with the European Late Pliocene.

Diagnosis: H. zhengi is a very large porcupine with brachyodont cheek teeth.

Differential diagnosis: H. zhengi differs from *H. kiangsenensis* by its larger size and brachyodont molars. *H. zhengi* has about the same size as *H. magna,* but the latter species is clearly hypsodont with a relative average crown height (E.Ht/Lth) of the p4 of 1.9. *H. zhengi* differs from the Middle Pleistocene *H. gigantea* van Weers, 1985 of Java by its brachyodonty. The size of the p4 of *H. zhengi* is about the same as in *H. primigenia* Wagner, 1848 but it is less brachyodont. It has a relative crown height of an average of 0.96 against about 0.7 in *H. primigenia.*

DESCRIPTION

Table 1 gives the measurements of the holotype of *H. zhengi* from Longgupo and of the three p4 from the Liucheng *Gigantopithecus* Cave assigned to that species. The measurements of two p4 and one P4 of *H. magna* and of two p4 of *H. kiangsenensis* from the Liucheng *Gigantopithecus* Cave are given for comparison. The height of the enamel crown of the holotype is dependent on the place where it is measured. That height is buccally at midlength 10.2 mm, buccal-posteriorly 11.0 mm and anteriorly 11.4 mm. At the occlusal surface the breadth of the tooth is 7.8 mm and the length 10.6 mm.

Table 1 shows the differences in the absolute and relative tooth height between the three species. That table also shows that *H. zhengi* and *H. magna* are larger than *H. kiangsenensis.* The buccal views of *H. zhengi* (Fig.1) and of *H. magna* and *H. kiangsenensis* (Fig. 2) illustrate the difference in height between *H. zhengi* and the latter two species. The occlusal views in the figures 1 and 2 show the stage of wear, the class of wear is given in Table 1.

DISCUSSION

Pei (1987) mentioned more than 200 isolated porcupine cheek teeth from the Liucheng *Gigantopithecus* Cave. Most of these are allocated to the hypsodont species *H. magna* and *H. kiangsenensis* (van Weers & Zheng, 1998). Pei (1987) allocated only 14 specimens from that large collection to *H. magna* and considered them as relatively low-crowned and intermediate in height between the brachyodont *Atherurus* and hypsodont *Hystrix* teeth. The only left one of these syntypes of *H. magna* is a hypsodont M1 or M2, original number V5036.12, now kept in the IVPP as lectotype under number V11549.4. Van Weers & Zheng (1998) considered that Pei's type series of *H. magna* could have been the lowest specimens in the range of variation of the specimens allocated by them to *H. magna.* It must be tested if this supposition is valid for the low-crowned teeth of *H. zhengi.* The only sample available for comparison consists of the mixture of p4 of *H. magna* and *H. kiangsenensis* (van Weers & Zheng, Table 2). These show a relative height (Ht/Lth) for the p4 of 1.6-2.4, mean 1.9 (n = 15), so these are all clearly hypsodont and significantly different from *H.*

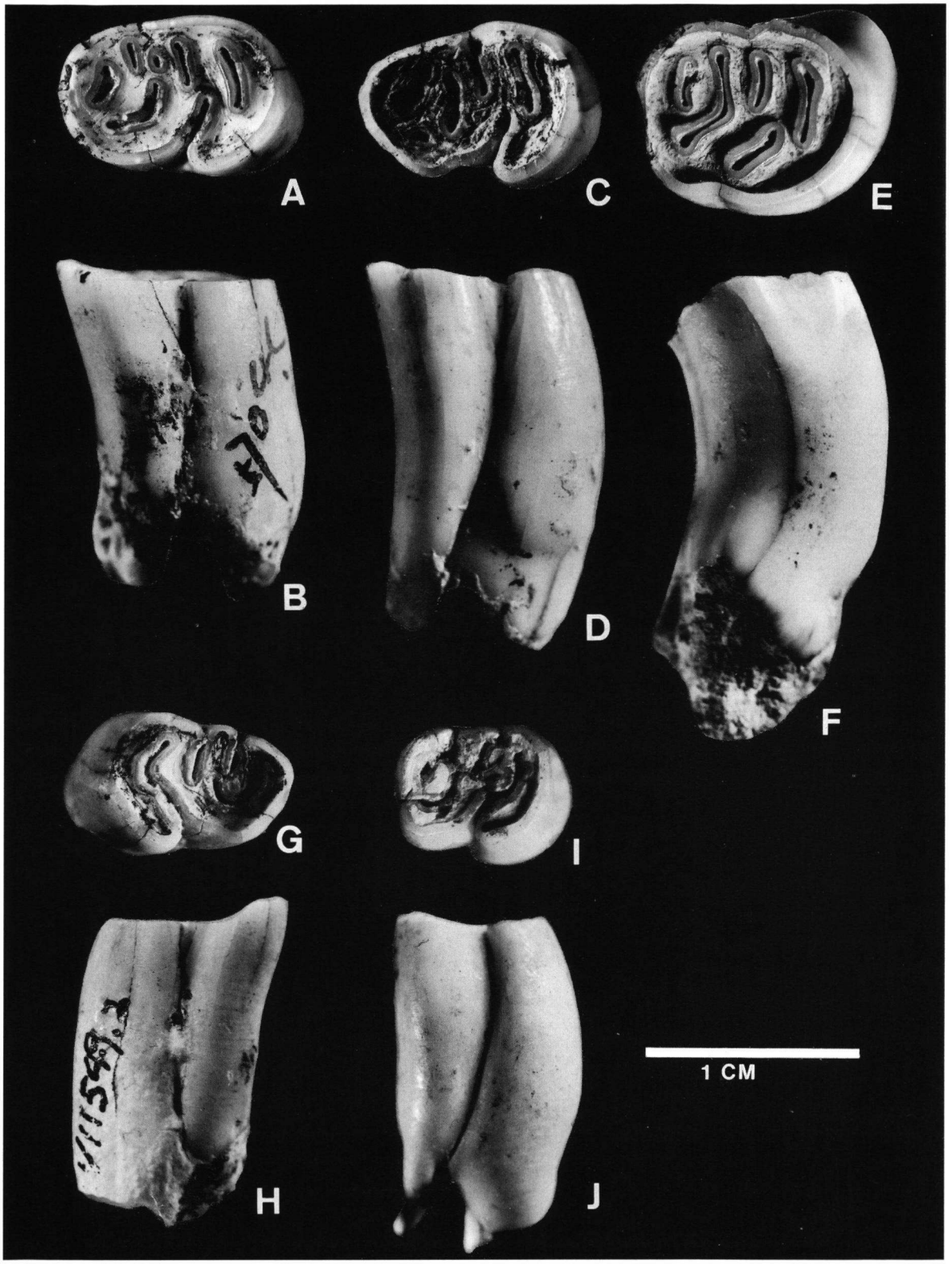

Fig. 2. A and C, occlusal, B and D, buccal views of left p4 nr. IVPP V11550.1 and V11550.3; E, occlusal and F, buccal view of right P4 nr. IVPP V11550.2 of *H. magna* from the Liucheng *Gigantopithecus* Cave. G, occlusal and H, buccal view of the right p4 nr. IVPP V11551.1; I, occlusal and J, buccal view of the left p4 nr. IVPP V11551.2 of *H. kiangsenensis* from the Liucheng *Gigantopithecus* Cave.

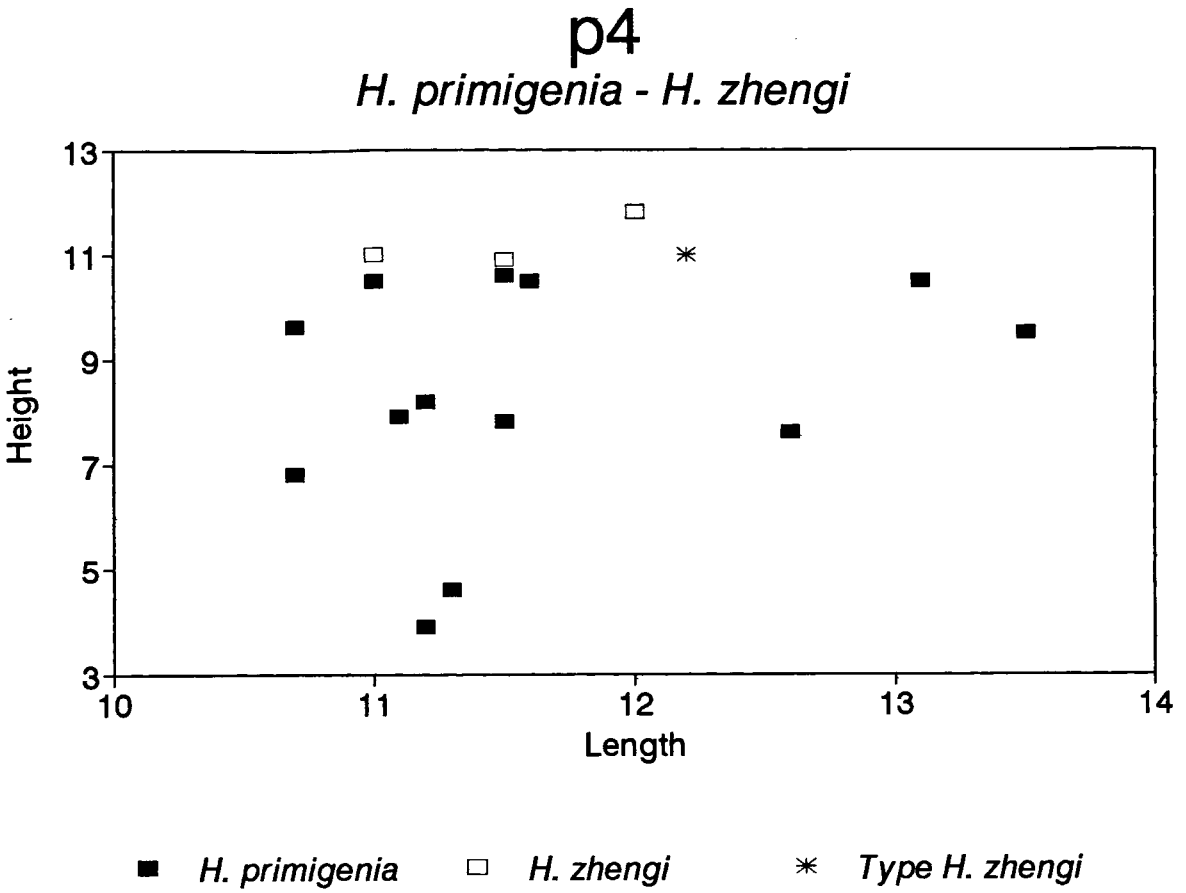

Fig. 3. Diagram of length and height of 13 lower premolars of the Mio-Pliocene *H. primigenia* from Europe, the holotype of *H. zhengi* n. sp. from Longgupo and three specimens of that species from the Liucheng *Gigantopithecus* Cave.

zhengi. In this light Pei's (1987) concept of *H. magna* can be better explained by the supposition that his type series consisted of a mixture of *H. zhengi* and *H. magna*.

The supposition that the small height of the teeth of *H. zhengi* is due to the advanced stage of wear does not apply because three of the four teeth belong to the rather young wear classes P and Q (van Weers, 1990).

H. zhengi resembles the Mio-Pliocene European *H. primigenia* (MN12-MN16) best. Figure 3 shows that the length of the four teeth of *H. zhengi* does not differ from a sample of thirteen specimens of *H. primigenia* (Rook & van Weers, in prep.). The mean height of the new Chinese species however, differs significantly from that of the European one.

H. zhengi is also compared with the brachyodont *H. sivalensis* Lydekker, 1878 from the Late Miocene of the Siwaliks. This is done indirectly via *H. primigenia*. Only from the m1 of the holotype mandible of *H. sivalensis*, the hypodigm of that species, the height and length could be measured. That tooth differs neither in length nor in height from *H. primigenia* (Fig. 4), so there is no basis to suppose a closer relationship of *H. zhengi* with *H. sivalensis* than with *H. primigenia*.

The age of the Longgupo fauna is comparable with the Dachaian fauna of North China, Late Pliocene, MN17, (Zheng, 1993 and Huang Wanpo et al., 1995). The age of the Longgupo and Liucheng faunas are similar as shown by the co-existence of many genera and species (Pei 1987, Han Defen 1987 and Zheng 1993).

The hypodigm of *H. zhengi* is very small. This material probably represents a relic of a Late

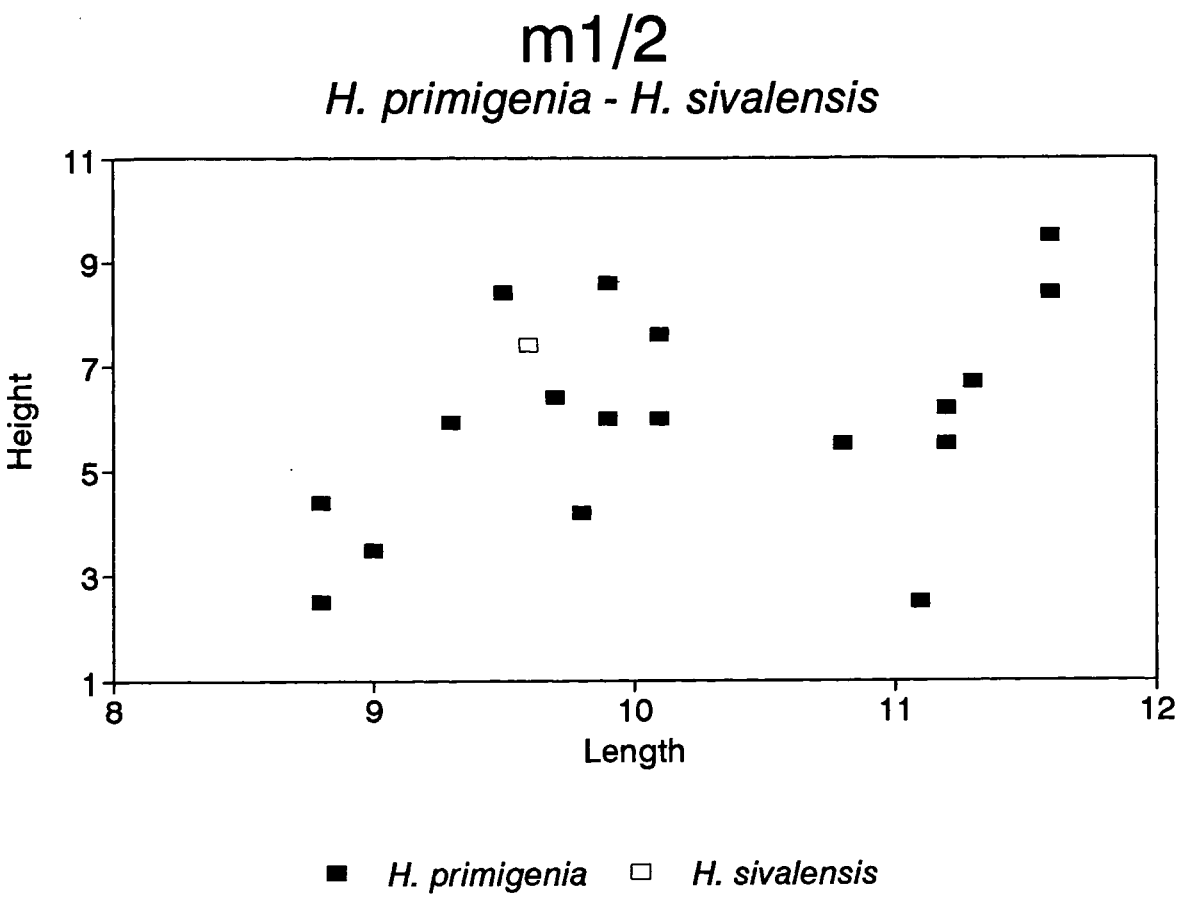

Fig. 4. Diagram of length and height of 18 first and second lower molars of the Mio-Pliocene *H. primigenia* from Europe and the first lower molar of the holotype mandible of *H. sivalensis* from the Siwaliks.

Miocene brachyodont species. The last occurrence of *H. primigenia* in Europe is in the Pliocene of Perpignan, France (Ruscinian, MN15). It seems that the brachyodont *Hystrix* species of Asia and Europe were both replaced by hypsodont species during the Late Pliocene.

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