

Original article

A new nanhsiungchelyid turtle from the Late Cretaceous of Neixiang, Henan Province, China

Un nouveau chélonien nanhsiungchelyidé du Crétacé supérieur de Neixiang, Province du Henan, Chine

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Abstract

A new genus and species of Nanhsiungchelyidae (Testudines: Cryptodira), *Yuchelys nanyangensis* n. g. n. sp., are described on the basis of a partial skeleton from the Late Cretaceous Gaogou Formation of Neixiang, Nanyang Basin, Henan Province. It is the first nanhsiungchelyid record in the east-central part of China and fills the geographical gap between the western (Uzbekistan, Mongolia, Northern and Southern China) and eastern (Japan) distribution areas of the family Nanhsiungchelyidae.

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Keywords: Testudines; Nanhsiungchelyidae; Late Cretaceous; Henan Province; China; Systematics

Résumé

Un nouveau genre et une nouvelle espèce de Nanhsiungchelyidae (Testudines: Cryptodira), *Yuchelys nanyangensis* n. g. n. sp., sont décrits à partir d'un squelette partiel provenant de la formation Gaogou (Crétacé supérieur) à Neixiang, Bassin de Nanyang, Province du Henan, Chine. C'est le premier nanhsiungchelyidé découvert dans le centre-est de la Chine, comblant la lacune géographique entre l'Ouest (Ouzbékistan, Mongolie, Chine du Nord et du Sud) et l'Est (Japon) de la zone de répartition de la famille.

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Mots clés : Testudines ; Nanhsiungchelyidae ; Crétacé supérieur ; Province du Henan ; Chine ; Systématique

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1. Introduction

Nanhsiungchelyidae is a monophyletic group of cryptodiran turtles from the Cretaceous of Asia and North America. The family includes a dozen taxa with the best records from the Late Cretaceous of Mongolia (Danilov and Syromyatnikova, 2008). In China, remains of nanhsiungchelyids have been recorded from northern (Inner Mongolia) and southern China (Guangdong and Jiangxi Provinces) (Ye, 1966; Brinkman and Peng, 1996; Tong and Mo, 2010). Here we report on a skeleton of a large turtle from the Late Cretaceous of Henan Province. The specimen consists of a partial carapace and almost complete plastron, most cervicals, and girdle and limb bones, belonging to a new genus and new species of Nanhsiungchelyidae. The specimen is housed in the Henan Geological Museum (HGM), Zhengzhou, China.

2. Geographical and geological setting

The turtle specimen was collected at Xiaguan Commune, Neixiang District, Nanyang Municipality, Henan Province, in the central-eastern part of China (Fig. 1). Xiaguan is in the Nanyang Basin which is located in the southwestern part of Henan Province. The Cretaceous deposits in the Nanyang Basin are divided into four formations, which are, from the bottom to the top, the Early Cretaceous Baiwan Formation and the Late Cretaceous Gaogou, Majiacun and Sigou Formations. The early Late Cretaceous Gaogou Formation which yielded the turtle remains described herein consists of floodplain and lacustrine conglomerates, sandstones and mudstones, deposited under a subtropical-tropical climate and dry conditions. It overlies unconformably the Early Cretaceous



Fig. 1. Map showing the location of Xiaguan, Nanyang, Henan Province, China.
Carte montrant la localisation de Xiaguan, Nanyang, Province du Henan, Chine.

Baiwan Formation, and underlies conformably the Late Cretaceous Majiacun Formation. Abundant dinosaur eggs and a few dinosaur and turtles bones, as well as dinosaur footprints have been discovered in that formation, including titanosauriform sauropod *Baotianmansaurus henanensis* and iguanodontid *Nanyangosaurus zhugeii* (Xu et al., 2000; Zhou et al., 2005; Zhang et al., 2009).

3. Systematic palaeontology

Testudines Linnaeus, 1758

Cryptodira Cope, 1868

Nanhsiungchelyidae Ye, 1966

Yuchelys nanyangensis n. g. n sp.

(Figs. 2 and 3)

Etymology: Genus name from ‘Yu’, Chinese abbreviated name of Henan Province; species name from Nanyang municipality, where the specimen comes from.

Holotype: HGM NR09-11-14, a partial skeleton with an incomplete carapace articulated with an almost complete plastron, second to eighth cervical vertebrae, dorsal vertebrae, pectoral and pelvic girdles and limb bones.

Type locality and horizon: Xiaguan commune, Neixiang district, Nanyang municipality, Henan Province, China; Gaogou Formation, Late Cretaceous.

Diagnosis: Nanhsiungchelyid of moderate size, with carapace length about 55 cm. Differs from all other nanhsiungchelyids in the anteriorly placed entoplastron, with its posterior border clearly anterior to the axillary notch. Additionally differs from *Nanhsiungchelys* and *Anomalochelys* in having narrower neurals and narrower vertebrae; differs from *Basilemys* in having mesiolaterally expanded posterolateral marginals which are almost as long as the corresponding peripherals, and wider posterior lobe; differs from *Jiangxichelys* in having posterolateral peripherals and marginals which are roughly square in shape, and a wider plastron; differs from *Hanbogdemys* in having a trapezoidal fifth vertebral and a wider posterior lobe of the plastron; differs from *Zangerlia* in having the hypoplastron/xiphiplastron suture lying far posterior to the base of the posterior lobe; differs from *Kharakhutulia* in the full neural series reaching the suprapygal and the humeropectoral sulcus extending to the level of epihyoplastral suture.

Measurements: Table 1.

Description and comparisons:

Preservation: The carapace is badly crushed and preserved in two parts (Fig. 2). The plastron is almost complete, with the anterior margin damaged and lacking the left bridge. Most cervicals, the pectoral and pelvic girdle bones, both humeri and femora, and other limb elements are preserved but disarticulated.

Shell

The carapace is incomplete. The carapace outline, when reconstructed, would be oval. The anterior margin of the carapace is damaged, the cervical notch is not preserved. The height of the carapace cannot be determined because of crushing. Although the surface is worn and over-prepared, the whole carapace and plastron surface is covered by a strong ornamentation composed of large cells separated by ridges. This ornamentation also covers the inner surface of the peripherals except in the bridge region. The anterolateral margin of the carapace is thickened. The posterior margin of the carapace is flared.

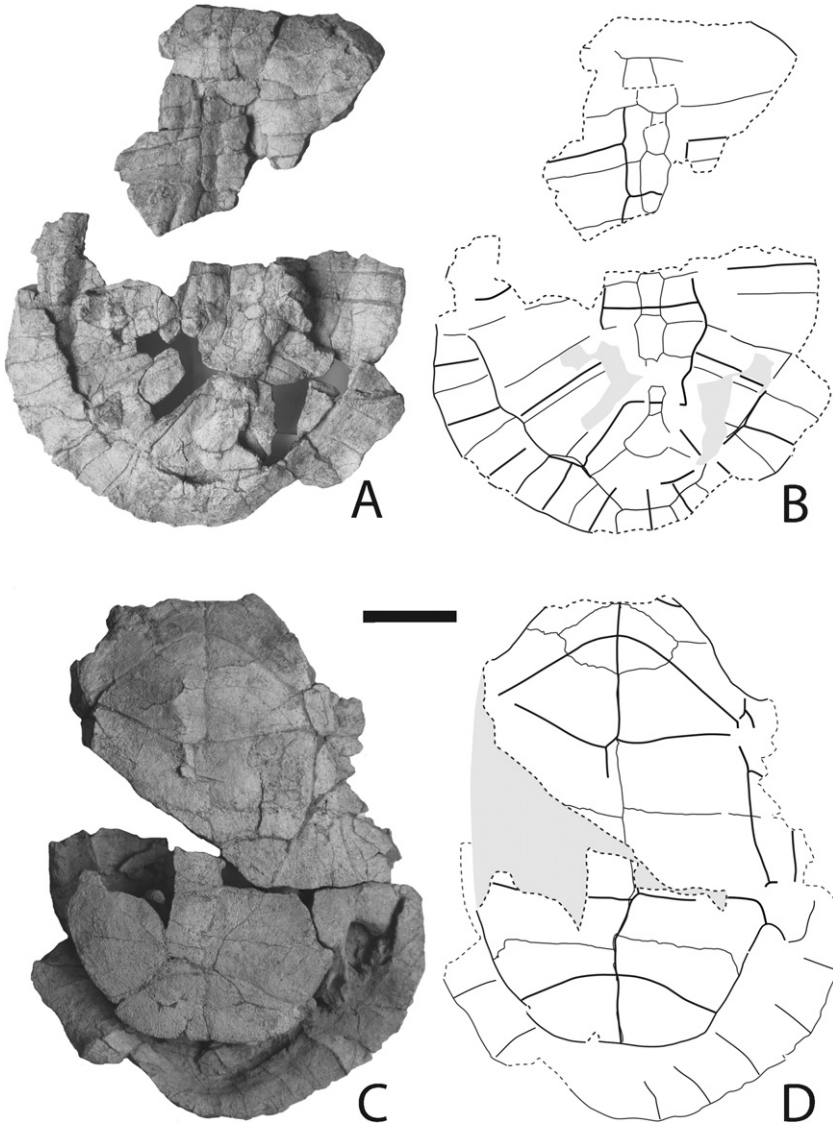


Fig. 2. *Yuchelys nanyangensis* n. g. n. sp. from the Late Cretaceous of Xiaguan, Nanyang, Henan Province, China. Shell: A-B, carapace in dorsal view; C-D, plastron in ventral view; Scale bar = 10 cm.

Yuchelys nanyangensis n. g. n. sp. du Crétacé supérieur de Xiaguan, Nanyang, Province du Henan, Chine. A-B, carapace en vue dorsale ; C-D, plastron en vue ventrale ; barre d'échelle = 10 cm.

The nuchal is damaged, lacking the anterior portion; and the contact with the first peripheral is unclear. The neural series is almost complete. The first neural is cut into two by a crack and the anterior portion is shifted leftward. It is hexagonal with short posterolateral sides as in other nanhsiungchelyids. The second neural is also damaged, it appears to be rectangular. The third, fifth, sixth and eighth neurals are complete, the fourth neural is missing and the seventh is damaged. The third and fifth neurals are hexagonal with short anterolateral sides. The sixth neural is octogonal,

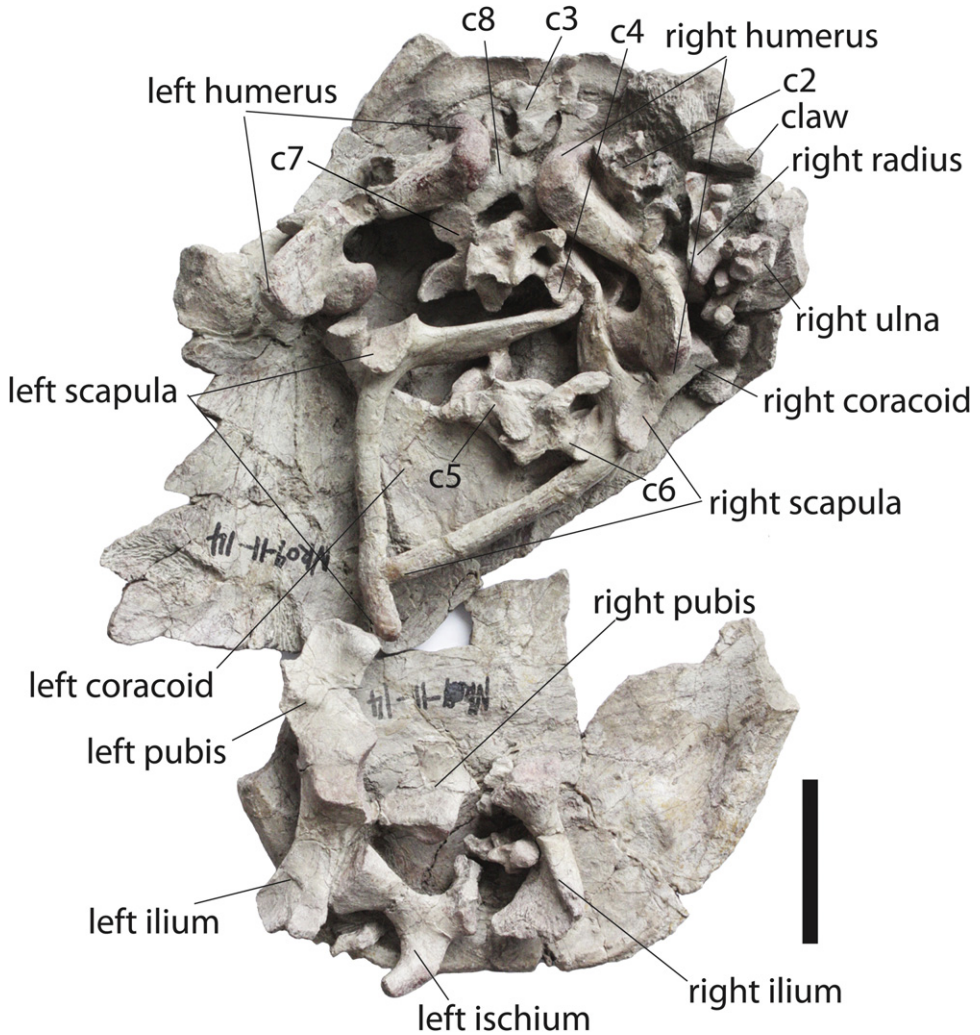


Fig. 3. *Yuchelys nanyangensis* n. g. n. sp. from the Late Cretaceous of Xiaguan, Nanyang, Henan Province, China. Other postcranial elements. Scale bar = 10 cm.

Yuchelys nanyangensis n. g. n. sp. du Crétacé supérieur de Xiaguan, Nanyang, Province du Henan, Chine. Autres éléments post-crâniens. Barre d'échelle = 10 cm.

contacting the fifth through seventh costals. The seventh neural appears to be rectangular and narrow. The eighth neural is hexagonal and narrow, it is twice as long as wide and contacts the first suprapygal. The neural formula is thus likely $6<4>6>?>6>8<4>6$. Two suprapygals are present. The first one is roughly triangular and the second one is much larger than the first. The pygal is incomplete, it is rectangular and wider than long. There are eight costal plates. The right eighth to eleventh peripherals, and the left seventh to eleventh peripherals are preserved. The seventh to eleventh peripherals are roughly square, unlike the narrower posterior peripherals of *Zangerlia* and *Jiangxichelys* (Mlynarsky, 1972; Tong and Mo, 2010). An anteromedially directed

Table 1

Measurements of *Yuchelys nanyangensis* n. g. n. sp. from the Late Cretaceous of Xiaguan, Nanyang, Henan Province, China (in centimetres).

Mesures (en centimètres) de Yuchelys nanyangensis n. g. n. sp. du Crétacé supérieur de Xiaguan, Nanyang, Province du Henan, Chine.

Carapace length (estimated)	55
Plastron (length × width, preserved)	44.5 × 33.5
Entoplastron (length × width)	7.1 × 11.6
Hyoplastron length	14
Hypoplastron length	12
Xiphiplastron (length × width)	10 × 12
Pectoral length	10.5
Abdominal length	14.2
Femoral length	8
Anal length	7
Length of scapular process of left scapular	14
Length of acromion process of left scapular	9.5
Left coracoid length	12
Right humerus length	12.8
Right radius length	5.3
Right ulna length	4.8
Left femur length	11.2

process, the axillary buttress, is preserved on the inner side of the carapace, close to the right lateral border, which is similar to *Kharakhutulia kalandadzei* (Sukhanov et al., 2008, Fig. 3A₂).

The scute sulci are barely visible on the anterior part of the carapace, probably due to the over-preparation, but quite well imprinted on the remaining parts of the carapace. The cervical scute is not preserved. The vertebrae are apparently narrow as in *Hanbogdemys*, *Basilemys* (Langston, 1956; Sukhanov, 2000) and *Jiangxichelys*, unlike the square-shaped vertebrae of *Nanhsiungchelys* and *Anomalochelys*. The fifth vertebral extends slightly onto the tenth peripheral. The intervertebral sulcus passes through the first, third, fifth and eighth neurals respectively. The right ninth to twelfth and left seventh to twelfth marginal scutes are preserved; all are roughly square in shape, unlike those of *Basilemys* and *Jiangxichelys* in which the posterolateral marginals are clearly narrower than the corresponding peripherals. The pleuromarginal sulci are apparently close to the costal/peripheral suture on the posterolateral portion of the carapace, as in *Hanbogdemys*. The eleventh and twelfth marginals cover the posterior part of the second suprapygals as in other nanhsiungchelyids.

The plastron is sutured to the carapace, as preserved on the left side. Although the anterior lobe is damaged at its tip, it seems that the plastron extended anteriorly beyond the anterior margin of the carapace. The lateral margins of the anterior and posterior lobes are greatly thickened, but the posterior margin of the posterior lobe remains thin. The shape of the anterior lobe is apparently different from the triangular anterior lobe of *Hanbogdemys*, *Basilemys* and *Jiangxichelys*, but wider. The bridge is long and narrow as in other nanhsiungchelyids. The posterior lobe is complete, it is wide and short. Both epiplastra are incomplete. The epiplastron has a straight and transversal suture with the hyoplastron. The entoplastron is complete, it is diamond-shaped and much wider than long. The position of the entoplastron is clearly more anterior than in other nanhsiungchelyids, with its posterior end clearly anterior to the level of the axillary notch. The hyoplastron and hypoplastron have similar midline lengths. The hypoplastron forms a large portion of the posterior lobe, in contrast to *Zangerlia testudinomorpha*. The xiphiplastron is slightly wider than long.

The scute sulci are well impressed on the plastron. The intergulars are not preserved, but the lateral end of the left gular is visible. Both gular and intergular scutes are absent from the entoplastron. This is different from *Basilemys* spp. and *Zangerlia neimongolensis* in which the intergulars or both gulars and intergulars extend onto the entoplastron. The pectoral is a diamond-shaped scute with strongly forward convex anterior sulcus which reaches the level of the epihyoplastral suture, resulting in a short humeral midline sulcus. Laterally, this scute is excluded from the axillary notch as in other nanhsiungchelyids. In comparison, the humeropectoral sulcus of *Kharakhutulia* and *Hanbogdemys* does not reach the level of the epihyoplastral suture (Sukhanov et al., 2008). The abdominal scute is clearly longer than the femoral scute. The abdominofemoral sulcus is transversal and the anal scute is short. Three narrow inframarginal scutes are visible on the left side, the second one is elongate and the largest.

Vertebrate column

Cervical vertebrae: Seven disarticulated cervical vertebrae are preserved inside the shell. Only cervicals 5 and 6 remain articulated with each other. Cervical 2 is visible in left lateral view. It is slender; the centrum bears a sharp keel on the ventral surface and has a single concave posterior articular surface, which is higher than wide. Cervical 3 is visible in dorsal view, the centrum has a convex triangular anterior articular surface. Cervical 4 is visible in posterior view, the centrum has a single square-shaped and concave posterior articular surface. Cervical 5 is visible in dorsal and anterior views, the centrum has a single convex and wider than high anterior articular surface. Cervical 6 is also visible in dorsal and posterior views, the centrum has a double separated concave posterior articular surface which is wide and low. Cervical 7 is visible in ventral and posterior views. The centrum bears a well defined ventral keel, and has a double but continuous, concave posterior articular surface, which is much wider than long and smaller than that of cervical 6. Cervical 8 is visible in dorsal view and has its centrum embedded in matrix so that the articular surfaces are not visible. Thus the cervicals are likely all opisthocelous and the articular surfaces between the centra of the cervicals 6 to 8 are doubled. The length of the centrum increases from cervical 2 to cervical 5, then decreases posteriorly. The zygapophyses are divergent, forming an X in dorsal view as in *Z. neimongolensis*. The neural spine is not present on any of the cervicals as in *Basilemys* sp. and *Z. neimongolensis* (Brinkman and Peng, 1996; Brinkman, 1998). The transverse process is visible on cervicals 3 and 5. It is situated below the prezygapophysis in both cervicals. It is distinct from the prezygapophysis and directed ventrolaterally on cervical 3 while on cervical 5 it is a large structure that extends from the prezygapophysis ventrally as in *Z. neimongolensis*.

Thoracic vertebrae: The thoracic vertebrae 5 to 7 are preserved, but not all prepared. The only prepared thoracic, the seventh, has a sharp ventral surface.

Appendicular skeleton

Pectoral girdle: Both scapulae and both coracoids are preserved; the left scapula and coracoid are complete, while the right scapula has the acromion process deformed and the right coracoid is damaged. The rod-like scapular process is clearly longer than the flattened acromion process. The two processes form a wide angle of about 100 °C, wider than in *Z. neimongolensis* (Brinkman and Peng, 1996). The glenoid fossa is oval. The coracoid is a wide paddle-like element, which is much wider than that of *Z. neimongolensis*.

Humerus: Both humeri are preserved, the right one has the middle portion damaged. The humerus is robust, with a slightly curved shaft. The head is oval and turns at right angle to the shaft. The medial process is higher than the head and much more developed than the lateral process; the two processes are separated from each another by the wide intertubercular fossa. The distal end of the humerus is expanded, with distinct radial and ulnar articular surfaces, which face distally

and slightly ventrally. The ectepicondylar foramen is not visible on either humerus because of the position. In comparison, the medial process of *Z. neimongolensis* is longer, extending much farther beyond the head, while the lateral process is smaller; the shaft is more curved and the distal end is less expanded, with less distinct radial and ulnar articular surfaces which are facing more ventrally (Brinkman and Peng, 1996).

Radius and ulna: The disarticulated radius and ulna are short; less than half the length of the humerus. As in *Z. neimongolensis*, both elements are nearly straight. The 53 mm long radius has an expanded, flattened distal end. The ulna is a massive bone and shorter than the radius, with a length of 48 mm.

Carpus and manus: Disarticulated carpals and two claws are preserved. The claws are similar to those of *Basilemys*, which are slightly dorsoventrally flattened, with a roughly circular articular surface.

Pelvic girdle: The almost complete pelvis is mostly disarticulated. The ilium, pubis and ischium are massive elements with a strong acetabular portion. Both ilia are nearly complete. The ilium has a tall dorsal blade which is greatly expanded distally. Both pubes are damaged but the left one is more complete. The pubis has a large pectineal process which is roughly square in ventral view and directed anterolaterally. The ischium has a large and strong metischial process, which is directed posterolaterally. The medial branch of the ischium has a thickened contact surface with its mate and divides the posterior part of the thyroid fenestra.

Femur: The femur is slender, with a slightly curved shaft, its curvature is similar to that of the humerus. The trochanter major and trochanter minor are similar in size, height and shape, and separated from one another by a wide and deep intertrochanteric fossa. There is no low ridge connecting the bases of the two trochanters, as seen in *Z. neimongolensis*. The head is roughly oval in distal view with its long axis perpendicular to the axis of the shaft. The distal end of the femur is flattened, and divided into well distinct tibial and fibular condyles, which are facing distally, different from the ventrally facing condyles of *Z. neimongolensis*.

4. Discussion

4.1. Systematic assignment

HGM NR09-11-14 is assigned to Nanhsiungchelyidae on the basis of the following characters: shell surface covered with a strong ornamentation consisting of large cells separated by ridges; marginal region of the carapace and plastron thickened; complete neural series reaching the suprapygal, with the neural formula of the first two neurals of 6<4; humeropectoral sulcus strongly convex anteriorly and deeply extending onto the entoplastron and pectoral excluded from the axillary notch.

Among nanhsiungchelyids, HGM NR09-11-14 is peculiar in the anterior position of the entoplastron, with the posterior end of that plate clearly anterior to the axillary notch. In other nanhsiungchelyids the entoplastron is more posteriorly placed, with its posterior end reaching the level of the axillary notch in *Nanhsiungchelys wuchingensis*, *Basilemys variolosa* and *Hanbogdemys orientalis*, or even beyond this level in *Z. neimongolensis*, *Z. ukhaachelys*, *Basilemys sinuosa*, *Basilemys nobilis* and *Kharakhutulia kalandadzei* (Langston, 1956; Ye, 1966; Brinkman and Peng, 1996; Sukhanov, 2000; Joyce and Norell, 2005; Sukhanov and Narmandakh, 2006; Sukhanov et al., 2008). *Zangerlia testudinimorpha* has the anterior part of the plastron damaged. Both epiplastra and entoplastron are missing, but the epiplastron/hyoplastron suture is preserved on the right side. The entoplastron is supposed to be very small, and would be located before the

broken margin, since there is no trace of entoplastron/hyoplastron suture on the preserved part (Mlynarsky, 1972). If this interpretation is correct, the entoplastron of this species would have an anterior position and be located anterior to the pectoral scute, which is the unique case among Nanhsiungchelyidae. The posteriorly placed entoplastron is considered as a synapomorphic feature uniting Nanhsiungchelyidae and Adocidae (Tong et al., 2006), the anterior position of that plate in HGM NR09-11-14 is likely a reversal.

HGM NR09-11-14 has a complete neural series, with the neural formula $6<4>6?>6>8<4>6$, and shows a rectangular second neural, a nanhsiungchelyid synapomorphy (Sukhanov, 2000; Hirayama et al., 2001; Sukhanov et al., 2008). However, HGM NR09-11-14 is peculiar in having an octagonal sixth neural. The sixth neural is hexagonal with short anterolateral sides in other nanhsiungchelyids in which this plate is preserved (*Anomalochelys angulata*, *B. sinuosa*, *H. orientalis*, *K. kalandadzei* and *Z. testudinimorpha*). Although most nanhsiungchelyids have a complete neural series of eight neurals which reaches the suprapygals as in HGM NR09-11-14, *Kharakhutulia* and *B. nobilis* have reduced posterior neurals, with the posterior costals meeting on the midline. The reduced neural series is considered as derived.

In addition, *Zangerlia* spp. differs from HGM NR09-11-14 in the reduced posterior lobe of the plastron. This reduction implies a relatively short posterior lobe with a narrow posterior end and the reduction of the contribution of the hypoplastron to the posterior lobe, resulting in a hypoplastron/xiphiplastron suture that is located close to the base of the posterior lobe. Consequently, the hypoplastron does not take part in the posterior lobe of the plastron in *Z. testudinimorpha*, or very little in *Z. neimongolensis* and *Z. ukhaachelys*. Given the general condition in turtles and Adocidae in which the hypoplastron/xiphiplastron suture is located far posterior to the inguinal notch, this character is considered as an autapomorphic feature of *Zangerlia*. The shortening of the posterior lobe is also indicated by the posterior end of the plastron that is far anterior to the posterior margin of the carapace. The distance between the posterior end of the plastron and that of the carapace is greater than the length of the posterior lobe in *Zangerlia*, in contrast to the condition in HGM NR09-11-14, as well as in *Hanbogdemys* and *Basilemys*.

Nanhsiungchelys and *Anomalochelys* differ from HGM NR09-11-14 in their wider neural plates and wider vertebral scutes. In both genera, the preserved neurals are as wide as long or wider than long and the second and third vertebrals are almost square in shape. In HGM NR09-11-14, the neurals are all clearly longer than wide and the second and third vertebrals, even though incomplete, are likely longer than wide.

Based on these comparisons, HGM NR09-11-14 seems to be distinct from all known nanhsiungchelyids, and a new genus and new species are erected: *Yuchelys nanyangensis* n. gen. n. sp. The morphology of the shell, including the narrow neurals, the narrow vertebrals, large posterolateral marginals that are almost as wide as the corresponding peripherals, the wide and relatively short posterior lobe of the plastron, and the intergulars excluded from the entoplastron suggests that the new nanhsiungchelyid from Xiaguan is closely related to *Hanbogdemys* and *Kharakhutulia*, which are, according to a recent phylogenetic analysis, primitive members of the family Nanhsiungchelyidae (Sukhanov et al., 2008).

4.2. Geographical distribution of Nanhsiungchelyidae in China

Nanhsiungchelyid turtles have a wide distribution in the Cretaceous of Asia (Uzbekistan, Mongolia, China and Japan), with the best records in Mongolia (Danilov and Syromyatnikova, 2008; Sukhanov et al., 2008). In China, the remains of nanhsiungchelyids have been reported from the Late Cretaceous of Bayan Mandahu, Inner Mongolia; Nanxiong, Shixing and Heyuan,

Guangdong Province; and Ganzhou, Jiangxi Province (Ye, 1966, 1994; Brinkman and Peng, 1996; Hirayama et al., 2009; Tong and Mo, 2010). *Yuchelys* is the first record of that family in the east-central part of China. Wiman figured one turtle fragment from the Late Cretaceous Wangshi Group, in Laiyang District, Shandong Province (Wiman, 1930, Plate II, fig. 5-5a). The specimen is a fragment of shell, 86 mm long and 24 mm thick, with a long free margin, collected close to the skeleton of the dinosaur *Tanius sinensis*, on April 20th, 1923 at a site situated 1 li (500 m) SW of Chiang-Chün-Ting (Wiman, 1929). According to Wiman, the ornamentation on the surface is reminiscent of *Amyda* or *Aspideretes*. Wiman referred the specimen as ‘Schildkröte A’ since that kind of sculpture is present in different groups of turtles (Wiman, 1930). Based on the figures, the outer surface and margin of the inner surfaces of the plate are covered with a large-celled ornamentation, typical of Nanhsiungchelyidae. This would be the first nanhsiungchelyid remains to have been found in China.

4.3. Ecology of Nanhsiungchelyidae

The ecology of Nanhsiungchelyidae is debated. Ye (1966), on the basis of the primary secondary palate, short phalanges and strong claws, considered *Nanhsiungchelys* as a terrestrial, or at most a semi-aquatic animal. Mlynarsky suggested that the Mongolian nanhsiungchelyid *Zangerlia* was adapted to a terrestrial mode of life and lived in a dry, xerothermic environment such as steppe-desert (Mlynarsky, 1972).

Hutchison and Archibald argued for the ecology of North American nanhsiungchelyid *Basilemys* as follows: “The large full shell with broad plastral bridges and restricted openings for the limbs, complex triturating surfaces of the jaws, stubby elephantine feet, presence of well developed and ossified limb armor, development of strong epiplastral projections as in testudinids, and robust limb bones indicate that *Basilemys* was an herbivorous, terrestrial, and tortoise-like dermatemydid.” (Hutchison and Archibald, 1986). Brinkman, on the basis of the morphology of the triturating surface of the jaws, suggested that *Basilemys* was ecologically similar to tortoises in being terrestrial and herbivore (Brinkman, 2003). The terrestrial mode of life of *Basilemys* is further supported by a histological study (Scheyer, 2007).

On the other hand, it was argued by Sukhanov and Narmandakh (1977) that the presence of powerful forelimbs, the construction of the humerus and range of its possible movements, and the construction of the pelvis and its position in relation to the carapace in *H. orientalis* is inconsistent with a terrestrial mode of life, and that it probably was a specialized swimmer, using the forelimbs to move on the bottom and to cling to the substrate under strong currents (Sukhanov and Narmandakh, 1977; Sukhanov, 2000). However, Hutchison regarded these features advocated for an aquatic adaptation as more likely representing retention of primitive aquatic ancestral features rather than specialization (Hutchison, 2000). A thorough morphofunctional study, and geochemical and morphometrical studies will provide more information on this issue.

5. Conclusion

The first nanhsiungchelyid turtle from Henan Province is described as belonging to a new genus and new species of that family, *Yuchelys nanyangensis* n. g. n. sp. This discovery is an addition to the diversity of Nanhsiungchelyidae in Asia and extends the geographical distribution to the east-central part of China. Together with the record from Shandong, it fills the geographical gap between the western (Uzbekistan, Mongolia, Northern and Southern China) and eastern distribution areas of the family (Japan).

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