

Research Advances

A New Species of Mongolarachnidae from the Yixian Formation of Western Liaoning, China



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Objective

Mongolarachnidae are large netted spiders, living in tropical and subtropical regions. The earliest fossil record is *Nephila jurassica*, which was discovered from the Middle Jurassic Jiulongshan Formation in Daohugou, Ningcheng City, Inner Mongolia of China. The type specimen of *N. jurassica* female was the largest fossil spider known in 2011. In 2013, Selden *et al.* found a male specimen of *N. jurassica* at the same locality and erected a new genus *Mongolarachne* and family Mongolarachnidae based on the morphologies both male and female specimens of *N. jurassica*. This paper describes a new large female fossil spider from Dawangzhangzi, Lingyuan City, Liaoning Province of China. This new material represents a new species of *Mongolarachne*, which is important for understanding the geographic and geological period distribution of this clade.

Methods

The fossil was examined under an Olympus SZX12 dissecting microscope. The photographs were taken by Cannon EOS 5D Mark III with EF 100 mm 1:2.8 zoom-in and finally readjusted through image-editing software (Adobe Photoshop). The line-drawings were drawn directly by Adobe Illustrator CS.

Results

Judging from impressions, the carapace is relatively pear-shaped. The labium is only partly visible due to the occlusion of the endite and trochanter of pedipalp, obvious bounded with sternum. The center of the sternum has an elliptical bulge. The chelicera is short and square in shape. Most of them protrude the carapace. The fangs are slim and curved, 2/3 the length of the chelicera. The pedipalps are clothed with setae and short spines on the superior surface of the tarsus. The conical tarsus is not enlarged.

The legs are long and slender. The leg formula (longest to shortest) is 1423. The coxa is sub-ovate and the trochanters are relatively short. The length of the patella and tibia 1 is about 80% of the carapace.

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All podomeres of legs are densely covered with fine and smooth short hairs. Groups of trichobothria are certainly present on the femora of leg 2, 4, and on the tibia of legs 1–4. One trichobothria is present on the patella of leg 3. All tarsi are spineless, bearing two small, non-pectinate paired claws.

The abdomen is ovate, which margins are densely covered with short hairs. A pair of subtriangular areas of darker cuticle can be observed, possessing a small dark patch at the anterior part of the central abdomen. These are interpreted as book-lung opercula. The epigynum is visible in media view on the abdomen. The spoon-shaped scape is thick and long. Two pairs of spinnerets are visible in the posterior portion of the abdomen. The anal tubercle is not prominent.

The new material can be assigned to *Mongolarachne* by its large size, tibial gaiters on leg3 as well as all other legs and nose-shaped epigyne. It is distinguished from the type species by its longer legs; slender leg1 longest and leg4 the second (leg2 the second in *M. jurassica*); the number and arrangement of trichobothria of femora and tibia (weak gaiters on distal ends of tibiae1–4 in *M. jurassica*); the thick and long scape spoon-shaped (Low-angle light reveals compact, human nose-shaped epigyne in median position on epigastric furrow in *M. jurassica*). So, the new species is erected as *Mongolarachne chaoyangensis* sp. nov. (Fig. 1).

Conclusions

A new fossil spider, discovered from the Early Cretaceous Yixian Formation of Dawangzhangzi, Lingyuan City, Liaoning Province, represents a new species-*Mongolarachne chaoyangensis* sp. nov.. This discovery not only enriches the assemblages of Jehol Biota, but also further expands the geographic and geological period distribution of *Mongolarachne*.

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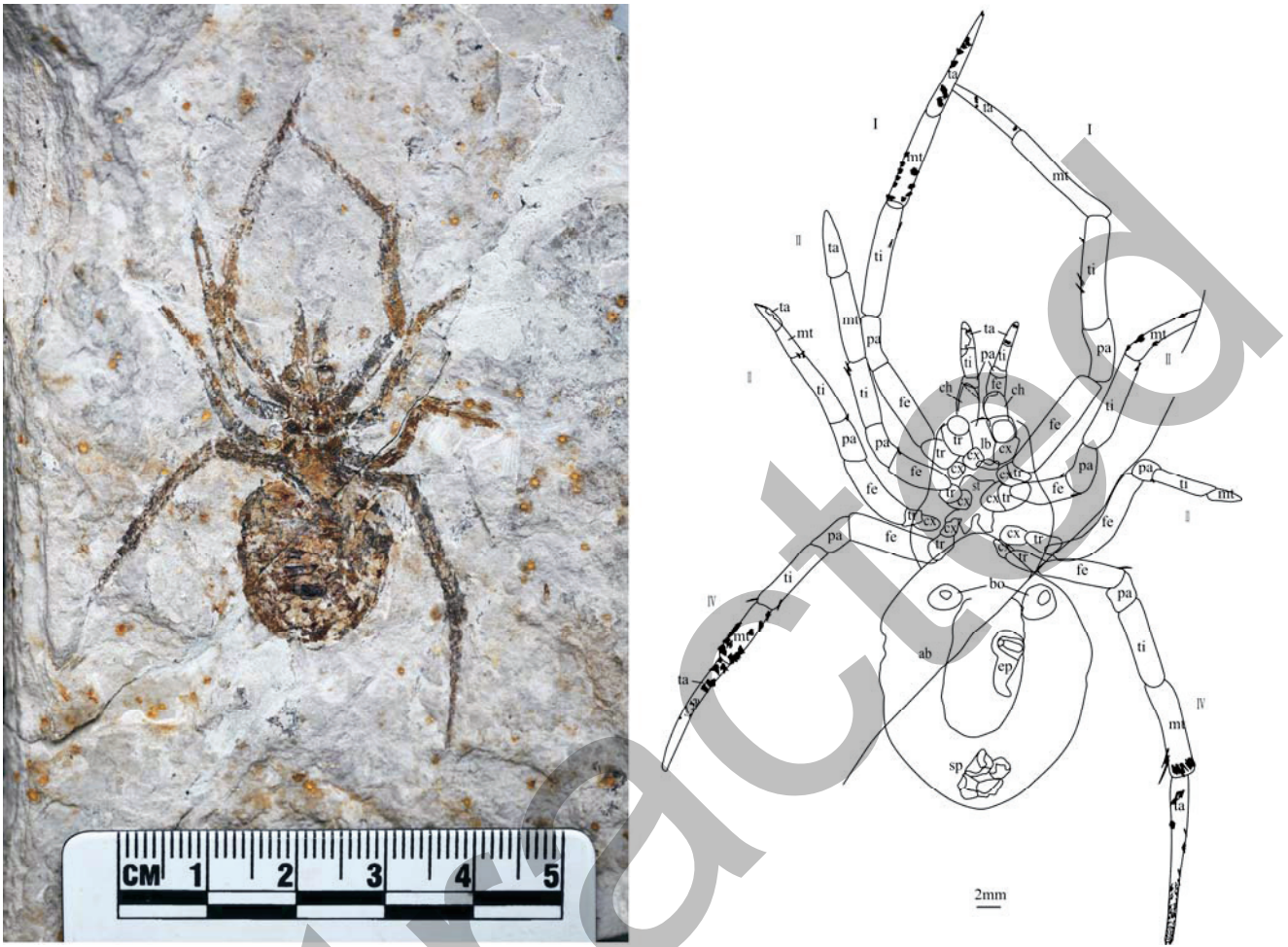


Fig. 1. Photograph and line-drawing of *Mongolarachne chaoyangensis* sp. nov.

ab, Abdomen; bo, Book-lung operculum; chel, Chelicera; ex, Coxa; ep, Epigynum; lb, Labium; fe, Femur; mt, Metatarsus; pa, Patella; sp, Spinnerets; st, Sternum; ta, Tarsus; ti, Tibia; tr, Trochanter.

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