Supplementary Materials

Taiyuanostachya: An Abominable Angiosperm from the Early Permian of China

Materials and Methods

Most of the specimens (GP0093, GP0094, GP0094-A, GP0095) were collected by Gao from exposures of the Lower Shihhotse Formation, Lower Permian, in Simugedong approximately 5 km northeast of East Hill Mine, Taiyuan, Shanxi, China. The flora assemblage are composed of pteridophytes, cycadophytes, and Noeggerathiales[1].

One additional specimen (B461) was collected in 1980 by Zhu and Du[2] from the Lower Shihhotse Formation, Lower Permian of East Hill, Taiyuan, Shanxi, China. The primary result of Zhu and Du's outcome is the publication of *Primocycas chinensis* Zhu and Du. The specimen is in the specimen case containing *Primocycas chinensis*.

During both excursions, the collectors found that the *Taiyuanostachya* gen. nov specimens were associated with *Taniopteris* spp., *Tingia hamaguchii*, *Sphenopteris* spp., *Emplectopteris triangularis*, *Sphenophyllum* sp., *Cathaysiopteris whitei*, *Primocycas chinensis*, *Crosszamia minor*, *C. cucullata*, *C. spadicia*, *Tianbaolinia circinalis*, *Discinites dentilongus*[1-5]. This assemblage is typical of the Lower Shihhotse Formation, Lower Permian [6].

Figure S1 General view specimens of *Taiyuanostachya* gen. nov. A. *T. ovuilifera* gen. et sp. nov. B461, deposited in the Beijing Museum of Natural History, Beijing, China. Scale bar = 1 cm. **B**. T. *ovuilifera* gen. et sp. nov. Counterpart of the specimen shown in Fig. 1a. GP0094-A. Scale bar = 1 cm. **C**. Several specimens of *T. ovuilifera* gen. et sp. nov and associated fossils preserved on the same slab. GP0093. Scale bar = 1 cm.

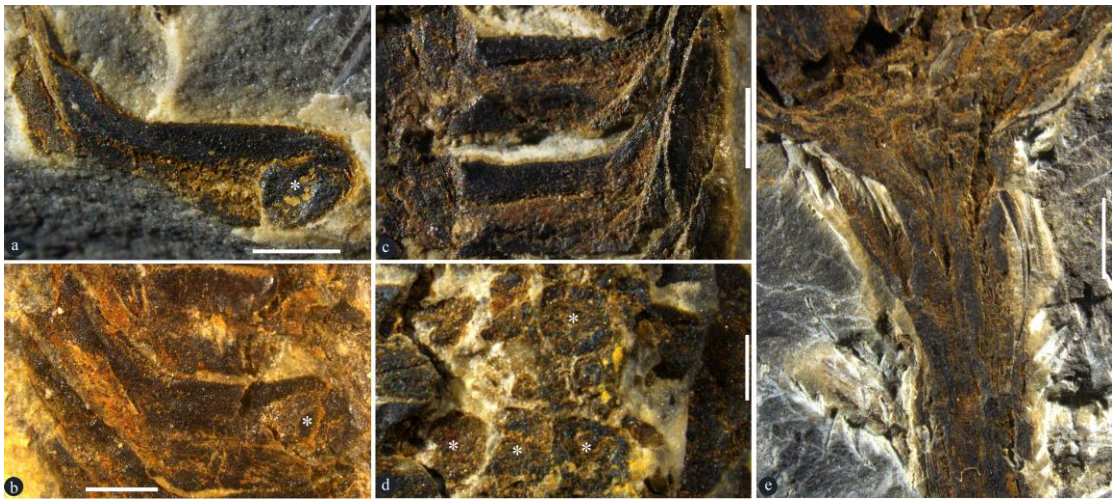

Figure S2 Detailed views of lateral appendages of *Taiyuanostachya ovuilifera* gen. et sp. nov and a closely associated leaf. A. A basally broken lateral appendage showing exposed ovule/seed (asterisks). GP0095, Scale bar = 1 mm. **B.** A basally broken lateral appendage showing exposed ovule/seed (asterisks). GP0093. Scale bar = 1 mm. **C.** A lateral appendage with up-turning distal part. GP0093. Scale bar = 1 mm. **D.** Detailed view of the specimen shown in Fig. 1d, showing ovules/seeds (asterisks) directly attached to the axis. GP0095. Scale bar = 1 mm. **E.** Junction between the peduncle and the organ. Note scales on the peduncle. Scale bar = 2 mm.

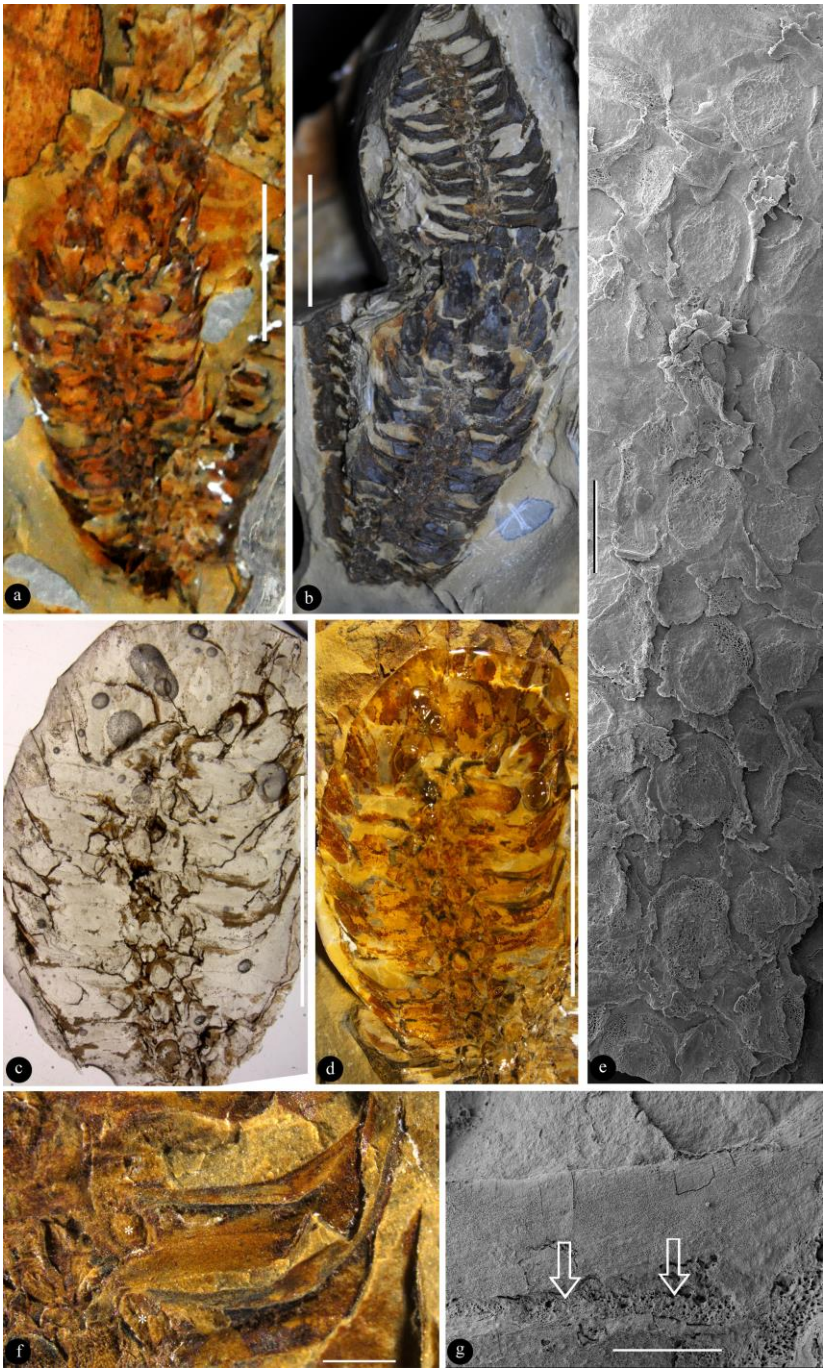

Figure S3 SEM view of lateral appendages of *Taiyuanostachya ovuilifera* gen. et sp. nov. GP0094-A. **A-B.** Two facing parts of the same specimen. Scale bar = 1 cm. **C-D**. Nitric cellulose peel, cleansed and intact, of the specimen in Fig. S3a. Scale bar = 1 cm. **E**. Numerous ovules/seeds attached to the axis of the organ. Scale bar = 1 mm. **F**. Two lateral appendages, with *in situ* ovules/seeds (asterisks). SEM details of the lower one are shown in Fig. S3a. Scale bar = 1 mm. **G**. SEM details of a lateral appendage, showing its smooth upper surface and spongy filling in the central canal (arrows). Scale bar = 0.5 mm.

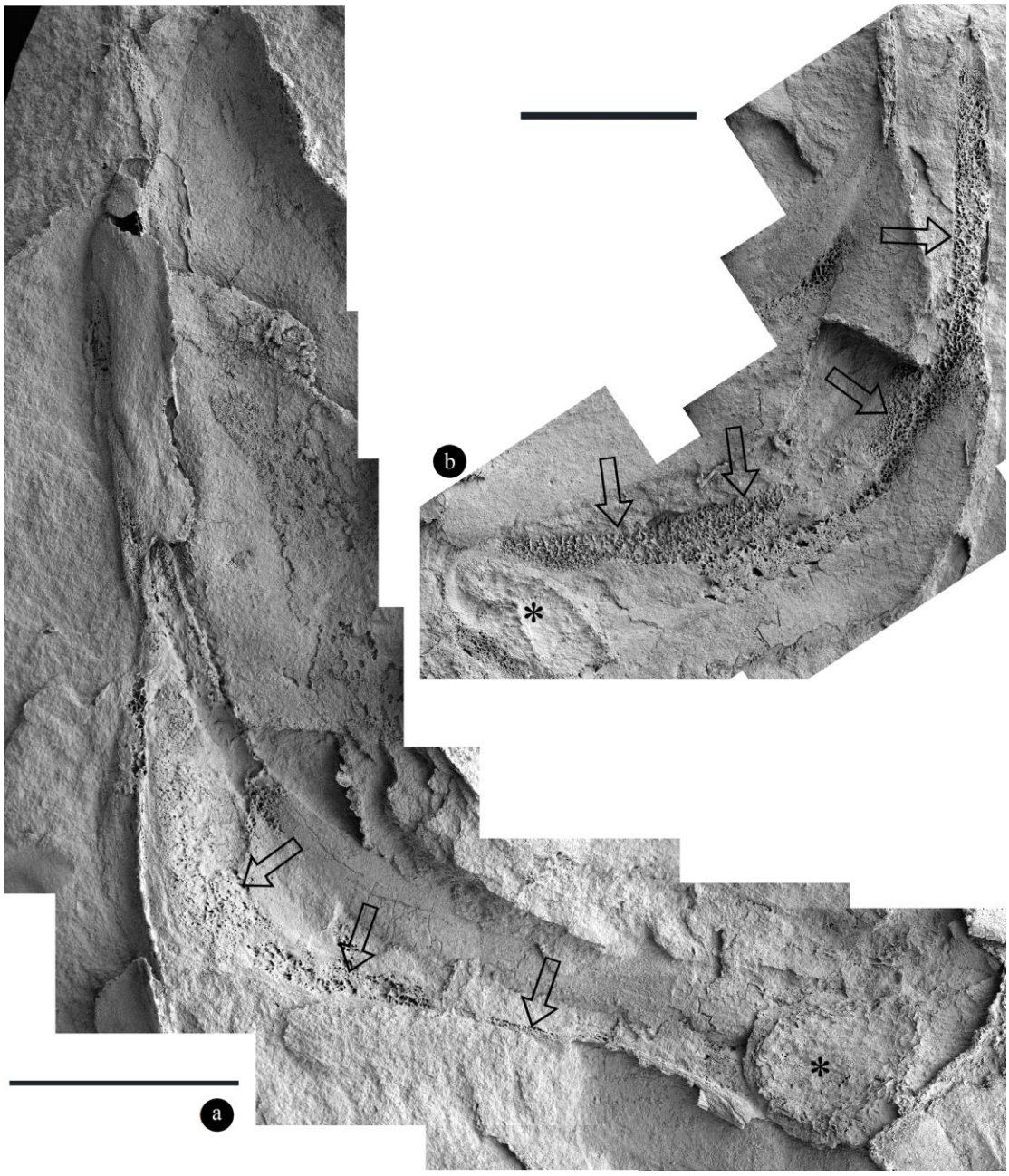

Figure S4 SEM views of lateral appendages in *Taiyuanostachya* gen. nov. A. A median section of a lateral appendage, showing ovule/seed (asterisk), central canal (arrows) with spongy filling, and up-turning distal part. **B**. A median section of the lateral appendage shown in Fig. S3f, showing ovule/seed (asterisk), central canal (arrows) with spongy filling, and up-turning distal part.

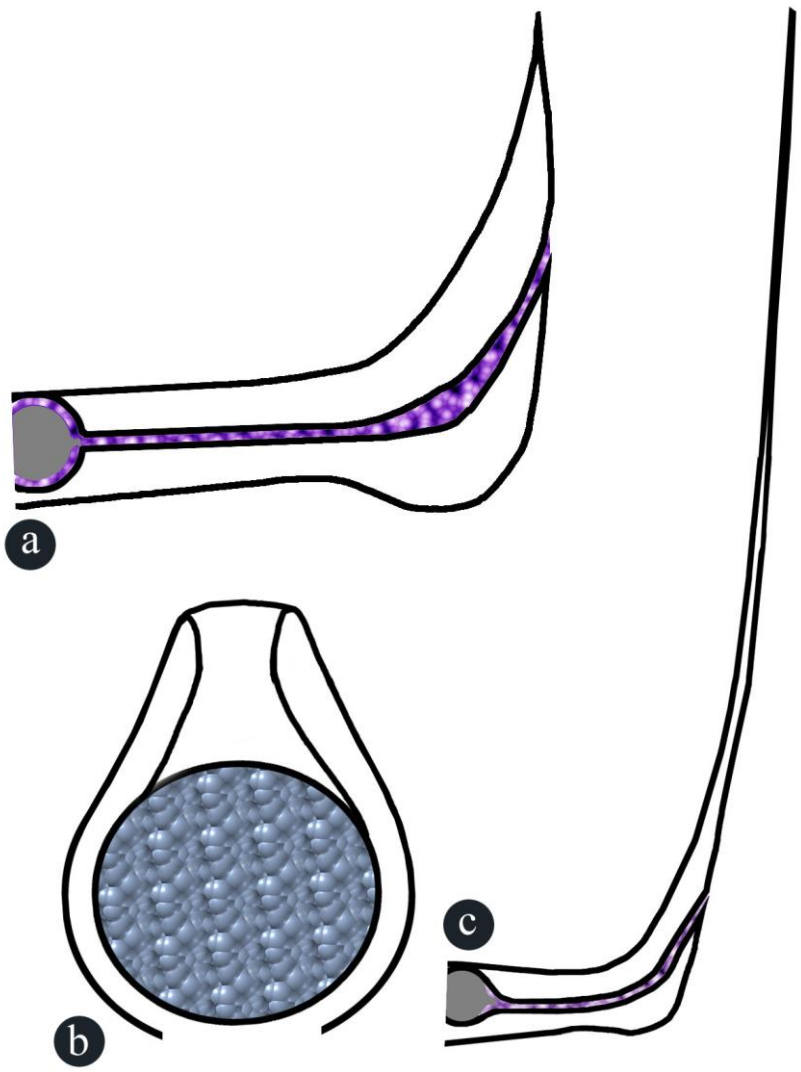

Figure S5 Idealized reconstructions of lateral appendages and ovule in *Taiyuanostachya* gen. nov. A. A median section of a lateral appendage, showing ovule/seed (left), central canal (arrows) with spongy filling, and up-turning distal part. **B**. A median section of ovule, showing micropyle, integument, and nucellus. **C**. A lateral appendage with a central canal and a filamentous tip.

References

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6 Li, X. & Yao, Z. in *Papers for the 9th International Congress of Carboniferous Stratigraphy and Geology* (eds D. Thomas & H.W. Pfefferkorn)Ch. 5, 95-101 (South Illinois University Press, 1985).