

Sphenophyllum sp. (Sphenophyllales) newly found from Upper
Triassic Baegunsa Formation, Nampo Group, Korea.

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(Communicated by Ikuwo OBATA)

Abstract A single leaf-whorl of *Sphenophyllum* sp. was found from the Baegunsa Formation of the Nampo Group, Korea and its description was made in this paper. The present Triassic occurrence of *Sphenophyllum* represents the first and youngest record of the genus.

Foreword

Order Sphenophyllales is one of the most characteristic elements in the Late Palaeozoic floras and has not been found in the Mesozoic plant-beds with two exceptions of *Trizygia ominensis* (ASAMA and NAITO, 1978) and *Parasphenophyllum okafujii* (ASAMA and OISHI, 1980) both known from the Japanese Triassic.

Recently I collected a single leaf-whorl referable to that of *Sphenophyllum* from the Upper Triassic Baegunsa Formation, Nampo Group, together with many interesting fossil plants. This paper deals with the description of *Sphenophyllum* sp. for the first time in the older Mesozoic Daedong Supergroup, Korea.

I express my sincere gratitude to Professor Tatsuaki KIMURA, director of the Institute of Natural History for his kind encouragement and to Dr. Ikuwo OBATA of the National Science Museum (Tokyo) for giving me the facilities to publish this paper.

Description

Class Sphenopsida

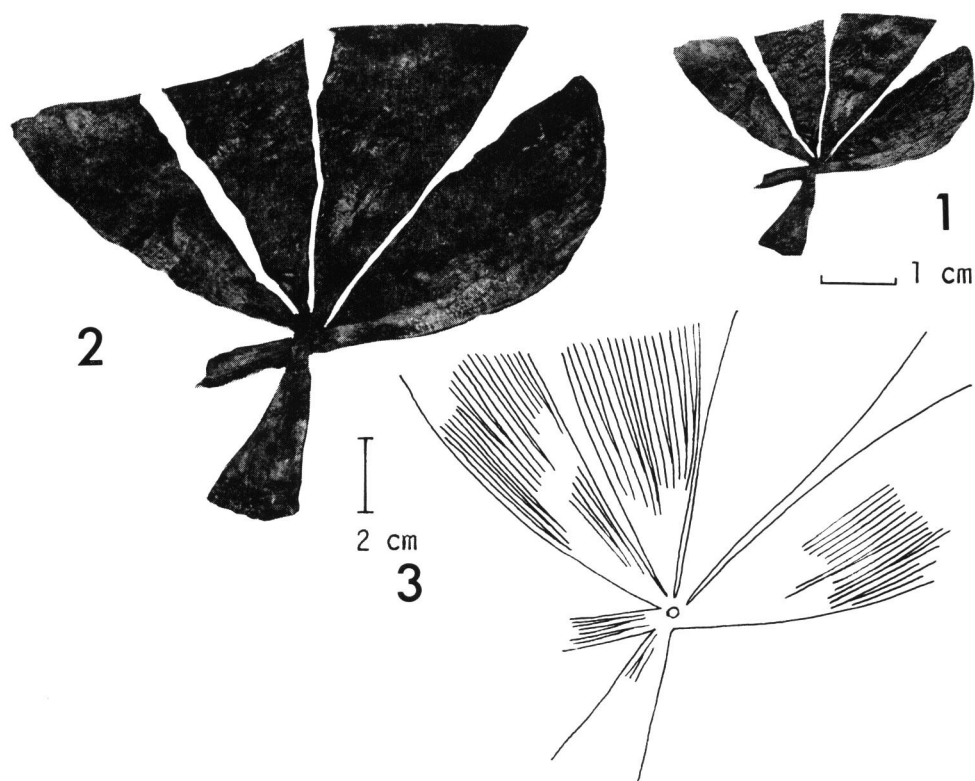
Order Sphenophyllales

Genus *Sphenophyllum* BRONGNIART, 1828

Sphenophyllum sp.

Figs. 1–3

Material: NSM PP-8977. Seongjuri, Misan-myeon, Boyeong-gun, Chungcheongnam-do (roughly 126°38'18"E, 36°20'00"N). The geological age of the Baegunsa Formation was already discussed by KIMURA and KIM (1984) and KIM and



Figs. 1–3. *Sphenophyllum* sp. 1. A single leaf-whorl with six leaflets of which two are preserved only by their basal parts (Reg. no. NSM PP-8977; kept in the National Science Museum, Tokyo). 2. Enlarged from Fig. 1. 3. Drawn from Fig. 2 showing the venation.

KIMURA (1988).

Description: The single specimen is represented by a leaf-whorl with six leaflets of which lower two are preserved only by their basal parts. Leaflets are radially disposed, possibly oblanceolate in outline, more than 3.5 cm long and up to 0.9–1 cm wide, gradually narrowed towards the base. Unfortunately their apices are all missing. Veins are parallel, sometimes repeatedly forked at all levels, typically 15–17 in number at the widest portion of each leaflet.

Discussion and comparison: The present specimen, though incomplete, is characterized by a leaf-whorl having six oblanceolate leaflets disposed radially and with straight veins forked repeatedly. From the arrangement and venation of leaflets, the specimen is referable to the leaf-whorl of *Sphenophyllum*. However, it is difficult to make the specific identity of the present specimen, as the apices of leaflets are all missing. Under the circumstances, I regard it as *Sphenophyllum* sp.

According to ASAMA (1970), 32 *Sphenophyllum* species have been described from

the Permian Cathaysia floras in East Asia, including floras from the Permian Sadong and Gobangsan Formations in Korea (KAWASAKI, 1927, 1932, 1934, 1939; KAWASAKI and KON'NO, 1932; KIM and ASAMA, 1970; CHEONG and LEE, 1970). These *Sphenophyllum* species are reclassified into four types on the basis of the arrangement and venation of their leaflets, namely, non-trizygoid straight veins (*Sphenophyllum*), non-trizygoid curving veins (*Parasphenophyllum*), trizygoid straight veins (*Trizygia*) and trizygoid curving veins (*Paratrizygia*). Later 4 species of the *Sphenophyllum* type have been added by GU and ZHI (1974) in China.

So far as I know, above mentioned four types of Sphenophyllales are characteristic elements in the Late Palaeozoic floras and have not been recorded in the Mesozoic plant-beds with three exceptions which are *Trizygia ominensis*, *Parasphenophyllum okafujii* and the present *Sphenophyllum* sp.

Trizygia ominensis was originally described by ASAMA and NAITO (1978) from the Carnic Momonoki Formation in western Japan, on the basis of a single leaf-whorl. This species is similar in form, size and venation of leaflet to the present *Sphenophyllum* sp., but is distinguished from the latter by its leaf-whorl consisting of three pairs of leaflets with trizygoid arrangement and each leaflet with large number of veins (24 in number).

Parasphenophyllum okafujii was originally described by ASAMA and OISHI (1980) from the same formation as mentioned above. It resembles the present *Sphenophyllum* sp. in the arrangement and form of leaflets. But the former species is most characterized by its leaflets with straight midrib and lateral veins curving outwards. In general, the leaflets belonging to Sphenophyllales are without midrib as already mentioned by ASAMA and OISHI (1980). However, the midrib of a leaflet is present in such species as *Sphenophyllum koboense* originally described by KOBATAKE (1957) from the Permian Gobangsan Formation.

Genus *Sphenophyllum*, which is one of the representative genera in the Late Palaeozoic floras, is said to be restricted in occurrence to the Late Devonian-Permian in age (MEYEN, 1987). The presence of *Sphenophyllum* in the Baegunsa Formation would indicate that it is a survivor from the Permian Gobangsan flora in the Korean Peninsula, as is the case of *Lobatannularia* (KIM and KIMURA, 1988).

References

- ASAMA, K., 1970. Evolution and classification of Sphenophyllales in Cathaysia Land. *Bull. Natn. Sci. Mus.*, Tokyo, **13**: 291–317. pls. 1–7.
- & G. NAITO, 1978. Upper Triassic *Trizygia* (Sphenophyllales) from Omine, West Japan and evolution of *Trizygia* series. *Ibid.*, C, **4**: 89–98, pl. 1.
- & T. OISHI, 1980. Upper Triassic *Parasphenophyllum* (Order Sphenophyllales) from Omine, Western Japan. *Ibid.*, C, **6**: 115–118.
- CHEONG, C. H. & H. Y. LEE, 1970. Some fossil plants from the Jangseong Formation of the Gangweon Coal Mine, Korea. *Journ. Geol. Soc. Korea*, **6**: 13–27.
- GU & ZHI (Botanical Institute, Beijing and Nanjing Institute of Geology and Palaeontology, Academia Sinica), 1974. Fossil Plants in China. I. Palaeozoic Plants in China. 277 pp., 130 pls. Beijing,

- Science Press. (In Chinese.)
- KAWASAKI, S., 1927. The flora of the Heian System. Part 1. Equisetales and Sphenophyllales. *Bull. Geol. Surv. Chosen (Korea)*, **6** (1): 1–30, pls. 1–16.
- 1931. Ditto. Part 2. Atlas. *Ibid.*, **6** (2): 83 pls.
- 1934. Ditto. Part 2. Text. *Ibid.*, **6** (4): 47–311, pls. 105–110.
- 1939. Addition to the flora of the Heian System. *Ibid.*, **6** (5): 1–39, pls. 1–10.
- & E. KON'NO, 1932. The flora of the Heian System. Part 3. *Ibid.*, **6** (3): 31–44, pls. 100–104.
- KIMURA, T. & B. K. KIM, 1984. Geological age of the Daedong flora in the Korean Peninsula and its phytogeographical significance in Asia. *Proc. Japan Acad.*, **60B**: 337–340.
- KIM, B. K. & K. ASAMA, 1970. Permian Sphenophyllales from the Eunseong Coal Mine. *Bull. Natn. Sci. Mus.*, Tokyo, **13**: 319–330, pls. 1–2.
- KIM, J. H. & T. KIMURA, 1988. *Lobatannularia nampoensis* (KAWASAKI) KAWASAKI from the Upper Triassic Baegunsa Formation, Nampo Group, Korea. *Proc. Japan Acad.*, **64B**: 221–224.
- KOBATAKE, N., 1957. On some plants of the Heian System. Part 1. Sphenophyllales. *Sci. Rep.*, South & North Coll., Osaka Univ., **6**: 139–148, pls. 1–3.
- MEYEN, S. V., 1987. *Fundamentals of Palaeobotany*. xxi + 432 pp. London and New York, Chapman and Hall Ltd.