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OLD TREASURES NEWLY DISCOVERED: *SCYTOPHYLLUM BERGERI* FROM THE LADINIAN OF THE DOLOMITES IN THE HISTORICAL COLLECTIONS OF THE GEOLOGISCHE BUNDESANSTALT WIEN

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With 1 figure and 2 plates

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Abstract

A specimen of *Scytophyllum bergeri* Bornemann from Corvara, that was mentioned in literature from the 19th century under various names but has never been described and figured, has been rediscovered in the collections of the Geological Survey in Vienna. It is the first specimen of this species from Ladinian sediments in the Dolomites and is described, figured and discussed here.

Zusammenfassung

Aus dem Ladinium von Corvara wird erstmals *Scytophyllum bergeri* Bornemann beschrieben, abgebildet und diskutiert. Dieses Exemplar, welches in wenigen Publikationen aus dem 19. Jahrhundert unter verschiedenen Namen erwähnt, jedoch niemals beschrieben und abgebildet worden ist, konnte in der Sammlung der Geologischen Bundesanstalt in Wien wieder entdeckt werden.

1. Introduction

Fossil plants of Ladinian age (referred to the "Buchensteiner Schichten" or "Wengener Schichten") from the Dolomites have been known for over 120 years. The first fragment of a fern frond from the Ladinian of the Dolomites has been figured by Wissmann & Münster (1841); for a detailed historical overview see also Wachtler & Van Konijnenburg – Van Cittert (2000a, b), Kustatscher (2004) and Kustatscher & van Konijnenburg – van Cittert (2005). In the latter also a detailed list of both inedited and revised material stored at several local and international museums and universities has been published.

During an extended research on the plant fossils mentioned by Mojsisovics (1879, pp. 57-8, 244) the first author detected at the Austrian Geological Survey, a frond fragment originating from the "Halobienschichten" of "Corfara". This specimen and its various entries in the historical literature are the topic of this article.

2. History of the specimen in the literature

The specimen stored at the Austrian Geological Survey has two different labels: The original label indicates that the "*Zamites* n. sp." has been collected by "v. Richthofen" in 1856 from the "Halobienschichten" of "Corfara". The second one, dated probably from the period around 1938-1945, says *Thinnfeldia richthofeni* Stur from the Upper Triassic (Carnian) of the same locality.

As far as the authors could detect, the specimen is mentioned only a few times in literature, but has never been figured or described in detail.

For the first time it has been cited by Richthofen in 1860 (p. 69). The article suggests that it has been collected, together with a shoot of "*Araucarites*", in

the "Schichten von Wengen (Halobienschichten)" of "Corfara". Constantin R. von Ettingshausen (probably by personal communication; there was never any publication) attributed the specimen to a new species of *Zamites*, characterized by particularly wide pinnae (see Richthofen 1860).

The same specimen was mentioned also by Stur (1868a, p. 113) as a frond fragment collected by "Ferdinand Freiherr von Richthofen" in the "Wengerschiefer" arround St. Kassian. He disagreed with Richthofen's (1860, p. 69) attribution of the specimen to the genus *Zamites* and assigned the frond fragment instead to the genus *Thinnfeldia*, considered by him as a fern genus.

Later in the same year, Stur (1868b, p. 550, 563), however, cited the same specimen as "*Thinnfeldia richthofeni* n. sp.", without figuring or giving a diagnosis. He mentioned also two newly found plant remains from the "Wenger Schiefer" near Corvara, *Neuropteris* cf. *ruetimeyeri* Heer and *Pterophyllum giganteum* Schenk (Stur, 1868b, p. 551, 563).

Mojsisovics (1879), too, cited plant remains from the "Wengener Schichten" of 'Corvara in Enneberg', including *Thinnfeldia richthofeni* Stur (on his p. 244). In a list composed of 19 taxa (on his p. 56-7), however, he mixed *Th. richthofeni* Stur and *Neuropteris* cf. *ruetimeyeri* Heer collected at 'Corvara in Enneberg' with others from 'Idria in Krain', just referring to Stur as the person who made the classification.

On the basis of the labels and the information in the literature, we assume that this plant fossil originated from the surroundings of Corvara (Fig. 1). Regarding the age of the specimen, the "Schichten von Wengen (Halobienschiefer)" of Richthofen (1860) as well as the "Wengerschiefer" of Stur (1868a, b) and the "Wenger Schichten" of Mojsisovics (1879) correspond today to the "Gruppo di Wengen" as introduced by Assereto *et al.* (1977). The Wengen Group is characterised at its base by the start of the basic volcanic activity and comprises today several different formations of Ladinian age (comm. pers. Piero Gianolla, 2005).

The specimen has been studied macroscopically and a small sample has been analysed using Schulze's method for cuticular analysis. The specimen lies on the surface of a dark brown and thin sediment block which is finely parallel bedded. On the backside the sediment has a gray colour. The frond is accompanied by some *Trachyceras*-like ammonoids and an imprint of the bivalve of the genus *Daonella* (comm. pers. Alexander Lukeneder) (Plate 2, Fig. 1, 4). The gross morphology of the specimen is well preserved, but the secondary venation is missing.

The specimen yielded, due to its preservation, just small pieces of a well-preserved cuticle. Notable are the numbers next to the apical end of the pinnae on the right half of the frond, counting the numbers of pinnae. It is not known, who has written this numbers and when it has been done.

3. Systematic descriptions and discussion

Order Peltaspermales Taylor, 1981
Family Peltaspermaceae Pilger & Melchior, 1954
(In: Melchior and Werdermann, 1954)

Genus *Scytophyllum* Bornemann, 1856
***Scytophyllum bergeri* Bornemann, 1856**
Plate 1, Fig. 1; Plate 2, Fig. 1-4

Description:
The specimen represents an (almost) entire frond of *Scytophyllum bergeri* of c. 27 cm length and 14 cm width (Plate 1, Fig. 1). The slightly curved rachis is 7 mm wide at the base and reduces just slightly apically. Nineteen partially to entirely preserved pinnae arise (sub)alternately from the rachis, at an angle of c. 45 degrees. The distance between single pinnae decreases from 23-30 mm at the base to 13 mm at the top (Plate 2, Fig. 1, 3), with the last two pinnae oppositely inserted (paripinnate). The pinnae are lanceolate with an acute apex (Plate 2, Fig. 2, 4); the margin is always entire, sometimes slightly undulate. The basal pinnae are small, 55 mm long and 12 mm wide. The length of the pinnae increases upwards reaching a length of 102 mm and a width of 15 mm at 2/3 of the frond. Then they decrease again apically, the last entire pinna measuring 75 mm in length and 12 mm in width, while the two apical pinnae are not preserved entirely (Plate 2, Fig. 1). The lamina of the pinnae is always broadly attached at the basal side, while it is usually slightly constricted at the apical side (Plate 2, Fig. 3). The midrib of the pinnae is distinct and up to 2.5 mm wide, secondary venation is not visible.

Due to the preservation of the cuticle just small fragments were obtained. The epidermal cells are isodiametric to hexagonal, covered by strong papillae. The stomata are scarce and scattered on the surface, without visible order but probably situated

between veins. The sunken guard cells are surrounded by 6-7 subsidiary cells. This cuticle differs from usual *S. bergeri* cuticles only in the presence of the papillae on the normal epidermal cells (Linnell, 1933) but the presence of papillae is often caused by environmental circumstances only and is not a diagnostic feature.

Discussion

We disagree with Richthofen (1860) about attributing the specimen to the genus *Zamites*, since the latter is a bennettitalean genus with symmetrical pinnae, with a slightly constricted base on both sides.

Additionally, the cuticle of our specimen is totally different from the bennettitalean cuticle of *Zamites* or the corystosperm one of *Thinnfeldia*, as considered by Stur (1868a, b). Moreover, the new species, proposed by Stur (1868b) and mentioned by Mojsisovics (1879) is not validly published, as no diagnosis or description was given.

Remarks: According to ICBN Art. 32 a taxon is not validly published when no diagnosis or description is given (see Greuter et al., 2000).

We attribute, therefore, this specimen due to its macromorphological (pinna shape, margin and attachment, strong midrib) and cuticular features to *Scytophyllum bergeri.*

Scytophyllum bergeri has been described for the first time from the Lettenkohle (late Ladinian) of Germany by Bornemann (1856) and was later discussed in detail by Linnell (1933). It has, however, never been described from the Ladinian of the Alpine area. On the other hand, abundant plant remains attributed to this species have been found in Anisian sediments of the Dolomites. The latter material, already mentioned as *Scytophyllum* sp. in Broglio Loriga *et al*. (2002) and Kustatscher (2004) will be discussed in detail with all its taxonomical and morphological problems in another article (Kustatscher *et al*., submitted).

Other species have been studied from Ladinian sediments from the surroundings of Corvara. At the Museum of Natural History at Vienna a frond fragment of *Cladophlebis leuthardtii* Leonardi, 1953 (2005B0004/0001) is stored (Plate 2, Fig. 5). A leaf fragment attributed as cf. to the cycad genus *Bjuvia* (AS XIII 18) and a leaf fragment of *Taeniopteris* sp.

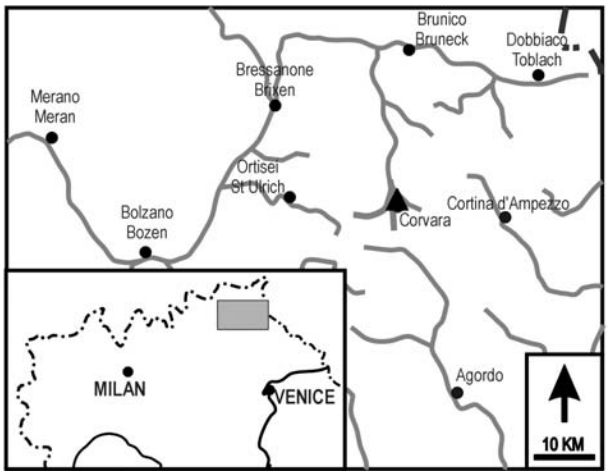

Fig. 1: Map of the fossil plant locality of the discussed specimen.

(1912 III 7) are stored at the Palaeontological Museum of Munich. Both specimens have been already discussed and figured by Ogilvie–Gordon (1927, pl. 8, figs. 2, 6).

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References:

Assereto R., Brusca A., Gaetani M., Jadoul F. (1977): Le mineralizzazioni Pb-Zn nel Triassico delle Dolomiti: quadro geologico ed interpretazione genetica. – L'Industria Mineraria, 28: 367-402.

Bornemann, J. G. (1856): Über organische Reste der Lettenkohlegruppe Thüringens. Ein Beitrag zur Fauna und Flora dieser Formation. - 85 pp., Verlag Wilhelm Engelmann, Leipzig.

Broglio Loriga C., Fugagnoli A., van Konijnenburg-van Cittert J. H. A., Kustatscher E., Posenato R., Wachtler M. (2002): The Anisian macroflora from the Northern Dolomites (Monte Prà della Vacca/Kühwiesenkopf, Braies): a first report. – Riv. Ital. Paleont. Strat., 108: 381-390, 1 pl.

Greuter, W., McNeill, J., Barrie, F.R., Burdet, H. M., Demoulin, V., Filgueiras, T. S., Nicolson, D. H., Silva, P.C., Skog. J. E., Trehane, P., Turland, N. J. and Hawksworth, D. L. 2000. *International Code of Botanical Nomenclature (Saint Louis Code).* Koeltz Scientific Books, Königstein, Germany, 474 pp.

Kustatscher, E. (2004): Macroflore terrestri del Triassico Medio delle Dolomiti e loro inquadramento bio-cronostratigrafico e paleoclimatico mediante palinomorfi. – PhD thesis, Dept. of Earth Sciences, Uni. Ferrara, Italy. 220 pp.

Kustatscher, E., van Konijnenburg-van Cittert, J.H.A. (2005): The Ladinian Flora (Middle Triassic) of the Dolomites: palaeoenvironmental reconstructions and palaeoclimatic considerations. - Geo.Alp, 2: 31-51.

Kustatscher, E., Wachtler, M., van Konijnenburg-van Cittert, J.H.A. Horsetails and seed ferns from the Middle Triassic (Anisian) locality Kühwiesenkopf (Monte Prà della Vacca) in the Dolomites (Northern Italy) – Palaeontology (submitted).

Linnell, T. (1933): Zur Morphologie und Systematik Triassischer Cycadophyten, II. Über *Scytophyllum* Bornemann, eine wenig bekannte Cycadophytengattung aus dem Keuper. - Svensk Bot. Tidskrift, 27: 310-331.

Melchior, H., Werdermann, E. (1954): *A. Engler's Syllabus der Pflanzenfamilien*. Vol. 1. 567 pp., Gebrüder Bornträger, Berlin.

Mojsisovics, E. (1879): Die Dolomit-Riffe von Südtirol und Venetien: Beiträge zur Bildungsgeschichte der Alpen. - 551 pp., A. Hölder Verlag, Wien.

Ogilvie-Gordon, M.M. (1927): Das Grödner-, Fassa- und Enneberggebiet in den Südtiroler Dolomiten. – Abh. Geol. Bundesanst., 24 (2): 1-376.

Richthofen, F., Freiherr von (1860): Geognostische Beschreibung der Umgebung von Predazzo, Sanct Cassian und der Seisser Alpe. - 327 pp., J. Perthes Verlag, Gotha.

Stur, D. (1868a): Beiträge zur Kenntnis der geologischen Verhältnisse der Umgebung von Raibl und Kaltwasser. – Jahrb. geol. Reichsanst., 18 (1): 71-122.

Stur, D. (1868b): III. Eine Exkursion in die Umgebung von St. Cassian – Jahrb. geol. Reichsanst., 18(3): 529-568.

Taylor, T. N. (1981): Paleobotany: An Introduction to Fossil Plant Biology. - 589 pp., McGraw Hill, New York.

Wachtler, M., van Konijnenburg-van Cittert, J.H.A. (2000a): The fossil flora of the Wengen Formation (Ladinian) in the Dolomites (Italy). - Beitr. Paläont., 25: 105-141.

Wachtler, M., van Konijnenburg-van Cittert, J.H.A. (2000b): La flora fossile della Formazione di La Valle - Wengen (Ladinico) nelle Dolomiti (Italia). - Studi Trent. Sci. Nat., Acta Geol., 75: 113-146.

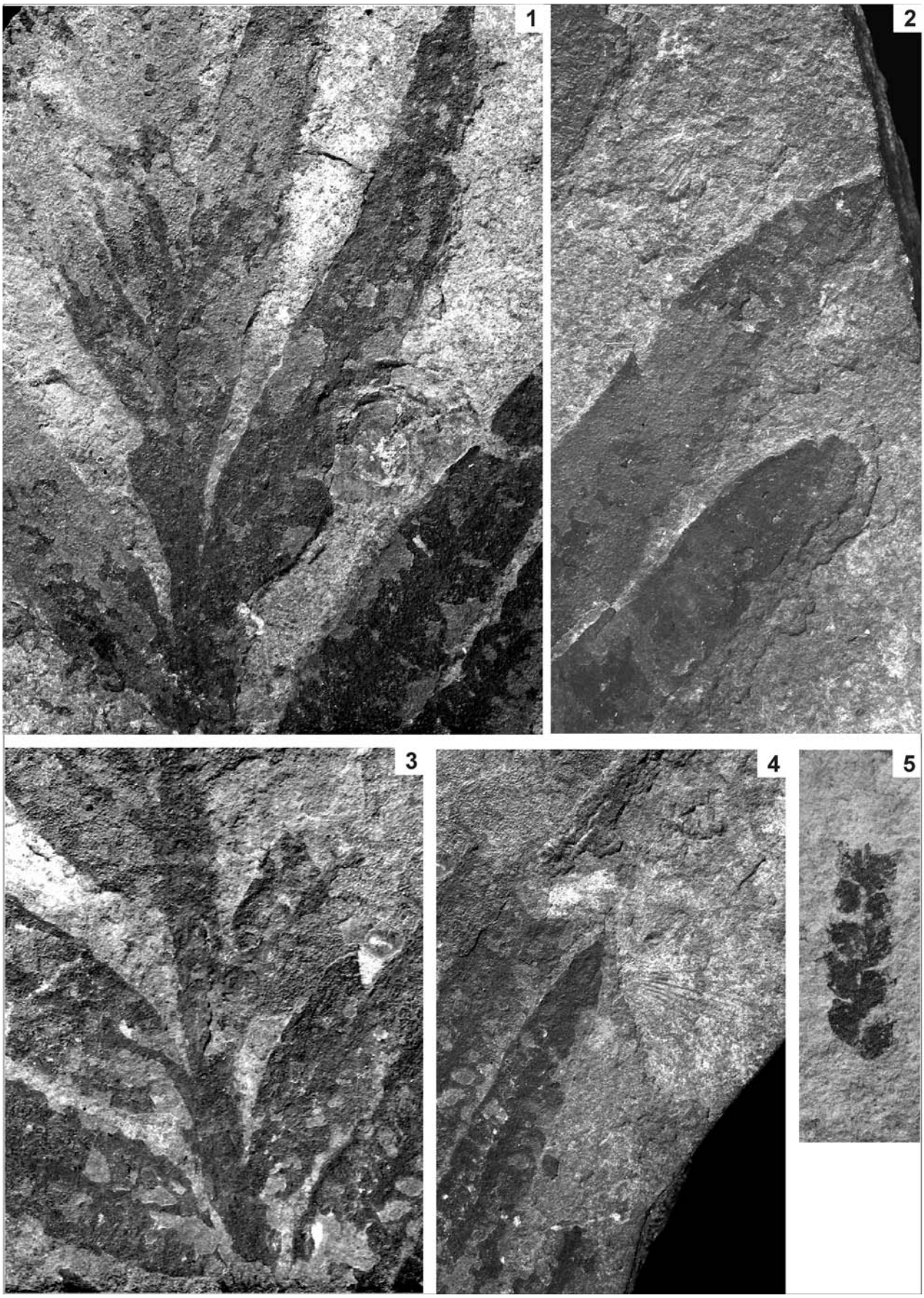
Wissmann, H.L., Münster, Graf von, G. (1841): Beiträge zur Geognosie und Petrefactenkunde des südöstlichen Tirol's vorzüglich der Schichten von St. Cassian. - 152 pp., Buchner'sche Buchhandlung, Bayreuth.

Plate 1

Scytophyllum bergeri Bornemann, 1856 (Nr. 2005/7/1, Austrian Geological Survey, Wien), x 0.9.

Plate 2

1. *Scytophyllum bergeri* Bornemann, 1856, detail of the apical part with imprint of trachiceratide ammonoid (same specimen as on plate 1), x 1.5.
2. *Scytophyllum bergeri* Bornemann, 1856, detail of the pinnae apex (same specimen), x 2.
3. *Scytophyllum bergeri* Bornemann, 1856, detail of the rachis and the pinnae base (same specimen), x 1.5.
4. *Scytophyllum bergeri* Bornemann, 1856, detail of the pinnae apex with imprint of Daonella (same specimen), x 1.5.
5. *Cladophlebis leuthardtii* Leonardi, 1953, frond fragment (Nr. 2005B0004/0001, Natural History Museum Wien), x 2.5.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