

1–15. 2002) and palynological (Raj in Rev. Palaeobot. Palynol. 39: 364. 1983) accounts. In contrast, the name *B. pseudogervao* has become practically obsolete because it has been placed in synonymy since Moldenke's monograph, with the sole exception of Govaerts's checklists (l.c. 1996, l.c. 2018). Searches using Google Scholar (accessed on 12 Nov 2018) retrieved ca. 16 articles dealing with this name, all as a synonym of *B. fluminensis*, thus revealing how widespread is the use of this latter name.

Thereby, for the sake of nomenclatural stability in accordance with Art. 14.2 of the *ICN*, we believe it would be best to retain the well-known epithet of *Verbena fluminensis* against that of the rather obscure name *V. pseudogervao*, which has been subsumed in synonymy since Moldenke's publication of *Bouchea fluminensis* in 1940. Acceptance of this proposal would prevent a name (i.e.,

B. pseudogervao) that has fallen into obscurity for over 75 years from becoming, for purely nomenclatural reasons, the correct name for the economically significant species currently widely known as *B. fluminensis*.

Author Information

PM, <http://orcid.org/0000-0001-5306-476X>

NO, <http://orcid.org/0000-0001-7414-3416>

Acknowledgements

This work has received financial support from CONICET PIP 00537/13 to the authors. We are grateful to Gustavo Hassemmer for his constructive comments and to John McNeill and John Wiersema for their patient and clear advice that greatly contributed to improving this proposal.

(2674) Proposal to conserve the name *Thaumatopteris* (fossil *Pteridophyta*: *Dipteridaceae*) with a conserved type

Gea Zijlstra  & Johanna H.A. van Konijnenburg-van Cittert 

Marine Palynology, Vening Meinesz Building A, Princetonlaan 8A, 3584 CB Utrecht, the Netherlands

Address for correspondence: Gea Zijlstra, g.zijlstra@uu.nl

DOI <https://doi.org/10.1002/tax.12010>

(2674) *Thaumatopteris* Göpp., Gatt. Foss. Pfl. 1–2(2): 2. Jan 1841, nom. cons. prop.

Typus: *T. brauniana* Popp (in Neues Jahrb. Mineral. Geol. 1863: 409. 1863), typ. cons. prop.

Thaumatopteris was published by Göppert (Gatt. Foss. Pfl. 1–2(2): 2. 1841) with a generic description based on sterile and fertile leaf fragments, and a description of one species, *T. muensteri*. Within this species, he included three varieties, based on four *Phlebopteris* species of Münster (in Neues Jahrb. Mineral. Geognosie 1836: 511–512. 1836): *T. muensteri* α *abbreviata* based on *P. brevipinnata*, β *elongata* on *P. speciosa*, and γ *longissima* on both *P. longipinnata* and *P. serrata*. At that time, the concept of typification was not yet widespread, and Göppert did not indicate which of those four species names could provide the type of *T. muensteri*, which is an illegitimate name, since Göppert did not adopt the epithet of one of those four species names.

Since then, there has been general agreement that the four leaves, described by Münster as separate species, probably belong to a single species. The material comprises leaf fragments of very long leaves, in which there are differences in the margins and the venation at the base, midway, and near the apex. We consider *T. brauniana* var. *abbreviata* (“ α ”), based on *Phlebopteris brevipinnata*, the most characteristic element.

We will not make, however, a new combination in *Thaumatopteris* with the epithet *brevipinnata*, because that nomenclatural issue is not the reason for this proposal. A taxonomic problem also exists. *Thaumatopteris* has long been in use without its only original species! *Thaumatopteris muensteri* has been placed in

Dictyophyllum Lindl. & Hutton (Foss. Fl. Gr. Brit. 2: [66]. 1834) (see below) – another genus of the *Dipteridaceae* and a name with priority over *Thaumatopteris*.

In other words, the lack of an evident type for the name of its only original species is not the biggest problem with *Thaumatopteris*. Several authors added more species to this genus. The first was Popp (in Neues Jahrb. Mineral. Geol. 1863: 409. 1863), who described (without figure) *T. brauniana* Popp. In 1867 Schenk (Foss. Fl. Keup. Franksens: 73, t. XVIII, fig. 1–3 & t. XIX, fig. 1) gave a good description and illustration of that species, after having studied some of Popp's specimens and some specimens that he himself had collected.

In 1875, after having studied the fossil flora of Pålssjö in Sweden, Nathorst (in Förh. Geol. Fören. Stockholm 2: 380. 1875) published the conclusion that *Thaumatopteris muensteri* belonged in *Dictyophyllum* and published the new combination *Dictyophyllum muensteri* (Göpp.) Nath. Moreover, he stated that *T. brauniana* probably did not belong to *Dictyophyllum*. So he already divided *Thaumatopteris*, excluding its original type, but at a time when the type concept was still scarcely used in palaeobotany, even though A.T. Brongniart (Dict. Class. Hist. Nat. 3: 350. 1823 & 9: 490, 558. 1826), for example, had already published type designations for names of some recent ferns.

In 1907, Nathorst (in Kongl. Svenska Vetenskapskad. Handl., ser. 2, 42(3): 5–6) explained two important points of difference between *Thaumatopteris* and *Dictyophyllum*: (1) in *Thaumatopteris*, the leaflets stand almost perpendicular on the rachis, and at the rachis, they are scarcely connected to each other, whereas in *Dictyophyllum* they stand more obliquely (ca. 45°–60°) and are clearly connected at

their base to the adjacent leaflets; and (2) the size of the sporangia: in *Thaumatopteris schenkii* (a species related to *T. brauniana*) only 0.2–0.25 mm and in *Dictyophyllum* of 0.4–0.6 mm in diameter.

Schweitzer (in *Palaeontographica*, Abt. B, Paläophytol. 168: 39. 1978) had a comparable opinion and gave even more details – a clear difference can also be found in the sori: In *Thaumatopteris* there are fewer sori, but they are bigger, with more (commonly 6–12) sporangia in a sorus than in *Dictyophyllum*, but with the sporangia smaller (0.2–0.3 mm); in *Dictyophyllum* there are usually many small sori with a small number (commonly 1–5) of rather large (0.4–0.7 mm) sporangia with many spores.

Another important *Thaumatopteris* character should be mentioned: the margin of the leaflets is often undulated and occasionally the leaves become bipinnate at the end of long pinnules, whereas in *Dictyophyllum* they are straight and bipinnate leaves have never been found so far.

It seems that everybody always agreed that the only original species, *T. muensteri*, should be removed from *Thaumatopteris*. Jongmans & Dijkstra (in *Foss. Cat., Pars Pl.* 40: 1046–1047. 1960) gave many references to publications in which *Dictyophyllum muensteri* is used as an accepted name. (It seems that nobody ever published a legitimate name for this species, e.g., no “*Dictyophyllum brevipinnata*” exists.)

In the 1930s, there was some confusion regarding several species of *Dictyophyllum*: In 1936, Oishi & Yamasita (in *J. Fac. Sci. Hokkaido Imp. Univ., Ser. 4, Geol.* 2: 135–184) published a survey of all fossil *Dipteridaceae* and placed a few species of *Dictyophyllum* in *Thaumatopteris*, even its type, *D. rugosum*! That opinion has, however, long been rejected not only because *Dictyophyllum* is older than *Thaumatopteris*, but also because the two genera have been almost universally recognised as distinct.

Jongmans & Dijkstra (l.c. and in later issues of the *Fossilium catalogus*) also included a number of important *Thaumatopteris*

species that have never been placed in *Dictyophyllum*. We recognise 18 species, of which the most important ones are: *T. lunzensis* Stur ex Krasser (in *Jahrb. K. K. Geol. Reichsanst.* 59: 112–113. 1909), *T. nipponica* Oishi (in *J. Fac. Sci. Hokkaido Imp. Univ., Ser. 4, Geol.* 1: 293–295. 1932), *T. elongata* Oishi (l.c. 1932: 295–296), *T. tenuiserrata* Menendez (in *Revista Inst. Nac. Invest. Ci. Nat., Ci. Bot.* 2: 179–181. 1951), *T. nodosa* Chu (in Hsü & al., *Acta Bot. Sin.* 17: 70–71. 1975) and *T. shirleyi* Herbst (in *Proc. Linn. Soc. New South Wales*, ser. 2, 103: 16. 1979).

This widespread use of *Thaumatopteris* cannot be maintained, unless the name is conserved with a new type.

As its conserved type, we propose *T. brauniana* Popp – the earliest name applied to a species currently included in the genus. To our knowledge, no original Popp specimen of *T. brauniana* still exists. Originally his specimens were preserved in Würzburg, but, after the Second World War, those that survived were moved to Munich. Accordingly a neotype must be designated. We **designate here as neotype** the only remaining specimen of Schenk (l.c.): Number “*As XXVI 14*” in the Munich collection: SNSB Bayerische Staatssammlung für Paläontologie und Geologie, from the lowermost Jurassic (Hettangian) strata from Oberwaiz near Bayreuth (S. Germany). This is the specimen that Schenk (l.c.) figured in his t. XVIII, fig. 1, except that the right top part of this specimen has apparently been lost. The locality lies in the same region as Jägersburg where Popp’s original specimens originated.

Author Information

GZ, <http://orcid.org/0000-0001-9894-9967>

JHAvK-vC, <http://orcid.org/0000-0001-5833-3439>

Acknowledgement

Thanks to John McNeill for improving this proposal.