(2575) Proposal to conserve the name *Protocupressinoxylon* with a conserved type against *Protobrachyoxylon* (fossil plants)

Josefina Bodnar

División de Paleobotánica, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Paseo del Bosque s/n, B1900FWA La Plata, Buenos Aires, Argentina; jbodnar@fcnym.unlp.edu.ar

DOI https://doi.org/10.12705/666.25

(2575) ***Protocupressinoxylon*** Eckhold in Jahrb. Preuss. Geol. Landesanst. 42: 490. 1923, nom. cons. prop.
Typus: *P. malayense* Roggeveen in Proc. Sect. Sci. Kon. Akad. Wetensch. Amsterdam 35: 580, fig. 2. 1932, typ. cons. prop.
(=) *Protobrachyoxylon* R. Holden in Ann. Bot. (Oxford) 27: 541. 1 Jul 1913, nom. rej. prop.
Typus: *P. eboracense* R. Holden

The genus *Protocupressinoxylon* was established by Eckhold (in Jahrb. Preuss. Geol. Landesanst. 42: 490–491. 1923) for fossil conifer woods with "annual rings more or less distinct, tracheid pitting in various transitional arrangements, both horizontal and end walls of ray parenchyma cells smooth, resin canals absent, cross-field pits cupressoid, axial parenchyma occasionally present" (translated from the original diagnosis in German). *Protocupressinoxylon* had been first described in an abstract of a thesis (Eckhold, Hoftüpfel Koniferen: [4]. 1921) submitted to the Schlesische Friedrich-Wilhelms-Universität, Breslau (modern Wrocław), but no illustrations were included in the abstract and consequently the name was not validly published there (Art. 42.2 of the *ICN* – McNeill & al. in Regnum Veg. 154. 2012). Eckhold (l.c. 1923: 491) included seven named species in the protologue, without designation of a type: *P. cupressoides* (R. Holden) Eckhold (*Paracupressinoxylon cupressoides* R. Holden), *P. jurassicum* (Göpp.) Eckhold (*Pinites jurassicus* Göpp.), *P. potomacense* (Sinnott & Bartlett) Eckhold (*Paracupressinoxylon potomacense* Sinnott & Bartlett), *P. eboracense* (R. Holden) Eckhold (*Protobrachyoxylon eboracense* R. Holden), *P. koettlitzi* (Seward) Eckhold (*Cupressinoxylon koettlitzi* Seward), *P. vectense* (C.A. Barber) Eckhold (*Cupressinoxylon vectense* Barber), and *P. mesozoicum* (Suzuki) Eckhold (*Cryptomeriopsis mesozoica* Suzuki), as well as two others with doubt. Afterwards, Andrews (in Bull. U.S. Geol. Surv. 1013: 219. 1955) designated *P. cupressoides* (R. Holden) Eckhold as the type of the generic name (but see below).

As noted, Eckhold (l.c. 1923: 491) included *Protobrachyoxylon eboracense* R. Holden in the protologue of *Protocupressinoxylon*. As the only species name included in *Protobrachyoxylon* by Holden (in Ann. Bot. (Oxford) 27: 541. 1913), *P. eboracense* is necessarily the original type of that generic name (Art. 10.2). Thus, as was pointed out by Philippe (in Taxon 42: 77. 1993), Eckhold's name was nomenclaturally superfluous and illegitimate when published (Art. 52.2(a)), and must be typified by *P. eboracense* (Art. 7.5). Consequently, *Protobrachyoxylon* is the legitimate name for the genus currently known as *Protocupressinoxylon*, unless conservation of the latter name is proposed and accepted.

The description by Eckhold (l.c. 1923: 490) is not entirely satisfactory because the number and arrangement of pits in the cross-fields is not specified. Cupressoid pits are bordered pits with the aperture included and definitely narrower than the border; the long axis of the aperture varies in position from vertical to horizontal even within a single specimen (Phillips in Bot. J. Linn. Soc. 52: 268. 1941). As described by Philippe (in Palaeontographica, Abt. B, Paläophytol. 236: 48–49. 1995), cupressoid pits can be organized in two patterns: cupressoid with 1 to 4 (rarely 5 or 6) spaced pits per field

and araucarioid with more than 4 pits per field, arranged in alternate rows with a tendency for crowding (Philippe, l.c. 1995: 48). However, according to the "I.A.W.A. List of microscopic features for softwood identification" (Ritcher & al. in I. A. W. A. J. 25: 53. 2004), when the cupressoid pits are arranged in a araucarioid pattern they are termed araucarioid pits, and thus the term cupressoid should be used only for cross-field pits with a spaced arrangement.

Although the attempted typification by Andrews (l.c.: 219) by *P. cupressoides* (Holden) Eckhold is ineffective, it may be noted that, according to Philippe (in I. A. W. A. J. 23: 322. 2002), the material attributed to this taxon by Holden (l.c.: 538) does not display the structures mentioned in the description or the figs. 15 and 16 of Holden (l.c.: pl. XXXIX). In fact, the figures provided by Holden lack any distinctive features. Müller-Stoll & Schultze-Motel (in Z. Deutsch. Geol. Ges. 140: 54. 1989) proposed a new type: *Protocupressinoxylon koettlitzi* (Seward) Eckhold, also, of course, ineffective; however this species does not coincide with the diagnosis of *Protocupressinoxylon* since it presents cross-fields pits that are not bordered. From the remaining species listed in the protologue, the only one having bordered pits is *P. eboracense*, but it is not clear if the cross-field pits of its type specimen are organized in an araucarioid or cupressoid manner.

When Holden described *Protobrachyoxylon eboracense* (l.c.: 537–538), she did not indicate the characteristics of the cross-fields; therefore, subsequent authors made different interpretations. Eckhold (l.c. 1923: 500), Philippe (l.c. 1993) and Bamford & Philippe (in Rev. Palaeobot. Palynol. 113: 294. 2001) considered that *P. eboracense* was characterized by cupressoid cross-fields, whereas Philippe (l.c. 2002: 324) argued that the type specimen is lost but according to the illustrations provided by Holden it had araucarioid cross-fields. However, the photographs published by Holden are not suitable for determining the diagnostic features of *P. eboracense*. The incomplete description of Holden (l.c.: 541–542), the loss of the type material, and the inadequate illustrations, obstruct the use of *P. eboracense* as the type for *Protocupressinoxylon*.

Despite these inconveniences, conservation of the name *Protocupressinoxylon* is proposed considering that the legitimate name, *Protobrachyoxylon*, has fallen into oblivion. By contrast, *Protocupressinoxylon* has been widely used in palaeobotany for fossil woods ranging from Permian to Cretaceous from all over the world (21 countries from the five continents). More than 40 references to the genus were found in the literature, including contributions on anatomy and taxonomy (e.g., Kräusel in Palaeontographica, Abt. B, Paläophytol. 89: 184. 1949; Vogellehner in Palaeontographica, Abt. B, Paläophytol. 121: 37–38. 1967; Müller-Stoll & Schultze-Motel, l.c.: 54–56; Francis in Palaeontology 26: 281–283. 1983; Shelomenzeva in Palaeont. J. 1: 139–140. 1993; Iamandei & Iamandei in Acta Palaeont. Romaniae 2: 191–194. 1999; Kurzawe & Merlotti in Pesq. Geoci. 37: 46–47. 2010); paleoecology and paleoclimatology (e.g., Zhiyan & Bole in Rev. Palaeobot. Palynol. 59: 134–138. 1989; Brison & al. in Paleobiology 27: 534. 2001; Falcon Lang & al. in Geol. Mag. 138: 566–569. 2001; Philippe & al. in Palaeontology 53: 205–207. 2010; Mendes & al. in Comun. Geol., Portugal 101: 501. 2014; Oh & al. in Acta Palaeontol. Polon. 60: 248–250. 2015), and biogeography (e.g., Philippe & al. in Rev. Palaeobot. Palynol. 129: 146–147. 2004).

In xylological literature *Protocupressinoxylon* is used by most authors as the name of a fossil genus including woods with transitional tracheid pitting and both araucarioid and/or the cupressoid cross-fields, which causes difficulties with the circumscription of the genus. The araucarioid pattern characterizes the fossil wood genus *Brachyoxylon* Hollick & Jeffrey (in Mem. New York Bot. Gard. 3: 55. 1909) and that is essentially the only difference between that taxon and *Protocupressinoxylon*.

However, a detailed analysis of the available information demonstrates that the prevailing usage of the generic name *Protocupressinoxylon* is for wood with cupressoid cross-fields. After Eckhold published the name, 20 species have been recognized in *Protocupressinoxylon* that fit its diagnosis. From these species, 13 have exclusively cupressoid cross-fields, and 7 show both types of patterns. Although several of the latter taxa probably need systematic revision, the use of *Protocupressinoxylon* clearly differs from the circumscription of *Brachyoxylon,* which is restricted to woods with exclusively araucarioid cross-fields.

As a final point, it is proposed that conservation of *Protocupressinoxylon* be with a conserved type in view of the fact that the original specimens of the species names included in the protologue are lost or do not match the diagnosis. The conserved type proposed is *Protocupressinoxylon malayense* Roggeveen (in Proc. Sect. Sci. Kon. Akad. Wetensch., Amsterdam 35: 580–584. 1932) which is based on well-described material and fits the generic diagnosis.