Which name(s) should be used for Araucaria-like fossil wood?—Results of a poll

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Abstract *Araucarioxylon* Kraus is a widely known fossil-genus generally applied to woods similar to that of the extant Araucariaceae. However, since 1905, several researchers have pointed out that this name is an illegitimate junior nomenclatural synonym. At least four generic names are in current use for fossil wood of this type: *Agathoxylon* Hartig, *Araucarioxylon*, *Dadoxylon* Endl. and *Dammaroxylon* J.Schultze-Motel. This problem of inconsistent nomenclatural application is compounded by the fact that woods of this type represent a wide range of plants including basal pteridosperms, cordaitaleans, glossopterids, primitive conifers, and araucarian conifers, with a fossil record that extends from the Devonian to Holocene. Conservation of *Araucarioxylon* has been repeatedly suggested but never officially proposed. Since general use is a strong argument for conservation, a poll was conducted amongst fossil wood anatomists in order to canvass current and preferred usage. It was found that the community is divided, with about one-fifth recommending retention of the well-known *Araucarioxylon*, whereas the majority of others advocated use of the legitimate *Agathoxylon*. The arguments of the various colleagues who answered the poll are synthesized and discussed. There is clearly little support for conservation of *Araucarioxylon*. A secondary aspect of the poll tackled the issue as to whether Araucaria-like fossil woods should be either gathered into a unique fossil-genus, or whether two fossil-genera should be recognized, based on the respective presence or absence of axial parenchyma. A majority of colleagues favoured having one fossil-genus only. *Agathoxylon* can be used legitimately and appears to be the most appropriate name for such woods. However, its original diagnosis must be expanded if those woods lacking axial parenchyma are to be included.

Keywords *Agathoxylon*; *Araucarioxylon*; *Dadoxylon*; fossil wood; nomenclature

■ INTRODUCTION

Petrified woods are among the most common and popular fossils. Both public and private collections contain abundant specimens, ranging from small fragments to huge logs. Homoxylic woods dominate several collections, and wood similar to that of modern Araucariaceae (*Araucaria*, *Agathis*, *Wollemia*) is the most common group. Araucaria-like fossil wood (i.e., isolated pieces of secondary xylem with araucarian pitting on the radial faces of the tracheids and araucarioid crossfields, together with mostly uniseriate rays), unless it bears special features (e.g., resin canals, inflated axial parenchyma, or ray cell wall thickenings), has been given various names, including *Agathoxylon* Hartig, *Araucarioxylon* Kraus, *Dadoxylon* Endl., *Dammaroxylon* J.Schultze-Motel and, much more rarely, *Colymboxylon* Hartig, *Araucarites* C.Presl sensu Goeppert, *Ullmannites* Tuzson, amongst others (Philippe, 1993). Numerous contributions have discussed the taxonomic, nomenclatural and systematic problems relating to these woods following the work of Gothan (1905) and continuing up until that of Zheng (2000) and Kurzawe & Merlotti (2009, 2010).

Despite these debates, consensus has not been attained on the application of a name for such woods that is in accordance with the rules of the *Melbourne Code* (McNeill & al., 2012). Most nomenclatural types are lost, or display a wood anatomy completely departing from that of Araucaria-like fossil wood as defined above. Most original generic diagnoses do not describe features which are nowadays considered crucial in fossil-wood determination. As stated once by an anonymous reviewer "every example of bad practice one could possibly imagine can be found somewhere in the literature on fossil wood".

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As a first step towards achieving a consistent and legitimate nomenclature for these woods to the satisfaction of all palaeobotanists/palaeoxylotomists interested in this topic, a poll was launched in November 2011, following a proposal by Ronny Rößler and subsequent discussion held in Budapest during the 8th European Palaeobotany and Palynology Conference (EPPC, held in 2010). More than 50 answers were received and they are analyzed here. In this paper, we review the nomenclature and taxonomy backgrounds related to Araucaria-like fossil woods, summarize the opinions of palaeobotanists and make firm recommendations for future nomenclature.

■ NOMENCLATURE BACKGROUND

Agathoxylon Hartig 1848 has been frequently used for Araucaria-like wood only in the past twenty years (Fig. 1). Following a nomenclatural review of such fossil woods, Philippe (1993) noted that *Agathoxylon* Hartig is legitimate, regularly used and was circumscribed by a diagnosis that permits inclusion of fossil species with Araucaria-like anatomy. That review consequently proposed that *Agathoxylon* be used for all such woods as it is the earliest name that can be applied unambiguously to fossil woods with Araucaria-like anatomy. This proposition has been variously accepted (e.g., Ottone & Medina, 1995; Valenzuela & al., 1998; Zamuner & Falaschi, 2005; Poole & Mirzaie Ataabadi, 2006; Salunkhe & Yagayani, 2006; Crisafulli & al., 2009; De Wit & al., 2009; Gnaedinger & Herbst, 2009; Vera & Césari, 2012; Kustacher & al., 2013), questioned (Falcon-Lang & Cantrill, 2001) or ignored (e.g., Wang, 2000; Wang & al., 2000; Ash, 2003; Morgans-Bell & McIlroy, 2005; Noll & al., 2005; Lucas & al., 2010). The original type of *Agathoxylon* is probably lost; hence a neotype should be selected to support its continued use.

Araucarioxylon Kraus in Schimper 1870 has been used for Araucaria-like wood for more than a century. When Kraus published *Araucarioxylon*, however, he included four synonyms, the oldest of which is *Pissadendron* Endl. 1842. The two species originally included in *Pissadendron* by Endlicher are included in *Araucarioxylon* by Kraus with new combinations, together with an explicit statement that he considered *Pissadendron* to be fully included within *Araucarioxylon*. Similarly, *Pissadendron* is a superfluous substitute name for *Pitys* Witham 1833. Thus, *Araucarioxylon* and *Pissadendron* are illegitimate superfluous names typified by the type of *Pitys* (Art. 7.5). *Pitys* Witham (not to be confused with *Pytys* Endl. 1837) was originally spelled "*Pitus*" but the later spelling "*Pitys*" has been conserved (see Doweld & Reveal, 2002; McNeill & al., 2006: 419). The type of *Pitys* Witham is *P. antiqua* (misspelled "*P. antique*" in McNeill & al. 2005: 419).

After Gothan (1905) treated it as a younger synonym of *Dadoxylon*, *Araucarioxylon* became much less used than the latter, until the 1970s, when it experienced a revival (Fig. 1). Only recently has *Agathoxylon* supplanted its position as the most favoured name for such woods.

Dadoxylon Endl. 1847 was extensively used for Araucaria-like wood for more than a century, though that usage has partly been restricted to woods from Palaeozoic (Carboniferous-Permian) occurrences. Philippe (1993), however, considered *Dadoxylon* to be an illegitimate, superfluous, synonym of *Pinites* Lindl. & Hutton 1832. However, though Endlicher included *Pinites* (with references to the works of both Witham, 1833, and Lindley & Hutton, 1832) as a synonym of *Dadoxylon*, he also (1847: 293) clearly excluded *Pinites eggensis* Lindl. & Hutton. Recently this species name has been taken as the type of *Pinites*. New investigations by Falcon-Lang (pers. comm.) of the publication dates of the fascicules of *The fossil flora of Great-Britain* (Lindley & Hutton, 1832–1836) improved those given by Stafleu & Cowan (1981: 54). Falcon-Lang found that *P. eggensis* was validly published in April 1832 (cf. *Melbourne Code*, Art. 31.3). The remaining three species of *Pinites* were not validly published in the first issue (dated July 1831) of *The fossil flora of Great Britain* (as three species are simultaneously published without a generic diagnosis). These conclusions indicate that Endlicher was using the name *Pinites* in a sense exclusive of its type and therefore, *Dadoxylon* should not be taken as an illegitimate superfluous renaming of *Pinites*.

The type of *Dadoxylon* has been problematic. In conflict with Art. 10.5(b) (McNeill & al., 2012), Andrews (1955: 143) automatically selected the first species cited by Endlicher (1847: 34) as the type, namely *D. withamii* (≡ *Pinites withamii* Lindl. & Hutton 1833). *Pinites withamii* is a wood with multiseriate rays that today is usually assigned to *Pitys* Witham 1833. Andrew's (1955) choice is superseded by the designation

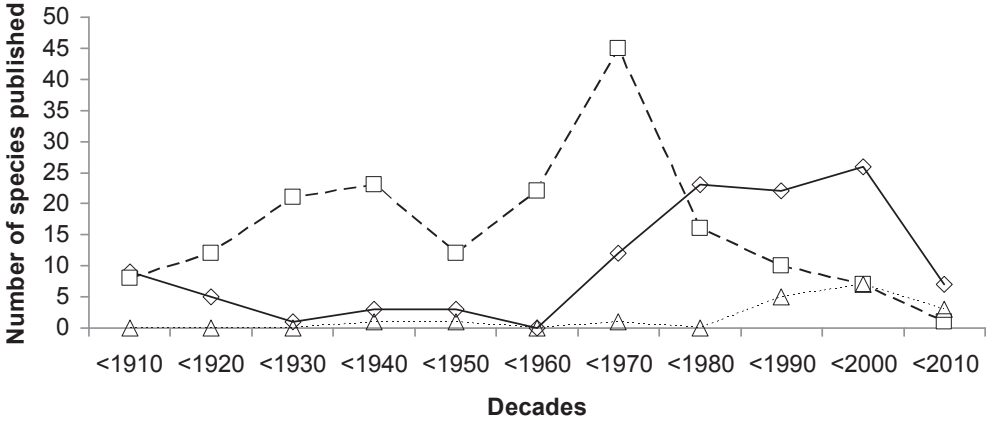

Fig. 1. Number of species described versus time for the genera *Araucarioxylon* (diamond and solid line), *Dadoxylon* (square and dashed line) and *Agathoxylon* (triangle and dotted line), updated from Philippe (2011). Note the reversal in the use of *Araucarioxylon* versus *Dadoxylon* in the 1970–1980 interval.

of Lepechina & Jatsenko-Chmelevsky (1966: 68), *D. brandlingii* (≡ *Pinites brandlingii* Lindl. & Hutton ex Witham 1833). Andrews (1955: 212) also erroneously quoted *P. brandlingii* as the type of *Pinites* Lindl. & Hutton 1832. Both Endlicher (1847: 298) and Lepechina & Jatsenko-Chmelevsky (1966: 68) clearly included features of the pith, primary xylem and secondary xylem in their diagnosis of *Dadoxylon*. The secondary xylem of *Pinites brandlingii* has anatomical characters similar to those of modern Araucariaceae, but its age and primary structures suggest that it represents a cordaitalean.

Dammaroxylon J.Schultze-Motel 1966 (type: *D. africanum* J.Schultze-Motel 1966) is validly published and legitimate. However, its diagnosis includes "*Randzellen*" (literally "marginal cells"), the nature of which is unclear. Such features may represent genuine spaces flanking the rays or simply preservational artefacts caused by the dissolution of primary cell walls or the local accumulation of gases during decay, or shrinkage of cells during fossilisation. No one has yet advocated using *Dammaroxylon* for all Araucaria-like woods.

"*Megadendron*" Rchb. 1836 was used for a large trunk from the Early Permian of Chemnitz, found in 1751. One piece of this famous trunk is still available in the Senckenberg Natural History Collections in Dresden. Göppert (1865: 251) already treated this as a gymnosperm wood of the Araucaria-type (no description, only by placement in synonymy). Re-investigation by Noll & al. (2005: 30) confirmed this. If it had been validly published, "*Megadendron*" could have been a taxonomic synonym of *Araucarioxylon*. However, "*Megadendron*" Rchb. was not validly published by Reichenbach (Leitfaden Königl. Sächs. Naturhist. Mus.: 6. 1836) or by Gutbier (in Geinitz & Gutbier, Verstein. Perm. Form. Sachsen 2: 26. 1849) or Gothan (Abh. Königl. Preuss. Geol. Landesanst., n. F., 44: 14. 1905.) (see Farr & Zijlstra, 1996–). *Megadendron* has since been validly published by Miers (in Trans. Linn. Soc. London, Bot. 1: 109, t. 15, fig. 1–8. 1875) for an extant taxon closely related to *Barringtonia* J.R.Forst. & G.Forst.

■ TAXONOMY BACKGROUND

Two main taxonomical problems compound the nomenclatural one. First, until Gothan's seminal work (1905), fossil wood with araucarian radial tracheid pitting was considered as Araucaria-like, regardless of the nature of its cross-field pitting, and of the ray seriation as well (Kraus, 1870). Most classifications before Kraus (1870) used features like growth-ring pattern or external appearance, features which are nowadays regarded as of little taxonomical value. Pre-1870 publications, however, established a most intricate web of taxonomical and nomenclatural synonymies (Kurzawe & Merlotti, 2009, 2010). This is worsened by the facts that several types (specimens) are lost and that their descriptions often lack information about cross-fields.

A second issue is that no consensus has ever been reached as to whether one or two genera should be recognized for Araucaria-like fossil wood based on the presence or absence of axial parenchyma. Already in 1848, in its protologue, *Agathoxylon* Hartig is clearly intended for wood with axial parenchyma, as opposed to *Colymboxylon* Hartig and *Trematoxylon* Hartig, two names that have never been used, except by Hartig himself. *Trematoxylon*, said to have large fenestriform cross-field pits, is probably a synonym of *Xenoxylon* Gothan (Philippe & Thévenard, 1996), whereas *Colymboxylon* has not been provided with a type. Despite extensive searching in Germany, we have not been able to locate the type of *Agathoxylon cordaianum* Hartig 1848. It is apparently lost (and a neotype will have to be designated) and it is impossible to be known if it had axial parenchyma (taphonomic artefacts are common in fossil wood). First-hand palaeoxylological experience reveals that it is difficult to confidently discount the absence of axial parenchyma in a fossil wood. Moreover, the occurrence of axial parenchyma is somewhat inconsistent in modern Araucariaceae, so the systematic value of this character is equivocal.

From a nomenclatural perspective it is not a problem to emend the diagnosis of *Agathoxylon* in order to include fossil wood both with and without axial parenchyma, and this was done by Philippe (1995). Nevertheless, should someone defend the taxonomical position that Araucaria-like fossil woods respectively with or without axial parenchyma be assigned to separate genera, *Agathoxylon* (pending an appropriate neotypification of *A cordaianum*) would accommodate the first of these categories. Another name would be required for those woods lacking axial parenchyma, and *Colymboxylon* Hartig would be a logical choice, despite being minimally described and not provided with a type.

■ THE POLL ON ARAUCARIA-LIKE FOSSIL WOOD

In November 2011, R. Rößler and M. Philippe sent a message and questionnaire to 74 colleagues potentially interested in this nomenclatural and taxonomic problem. Each was asked to forward the questionnaire to any further researchers wishing to provide an opinion. In this manner we consider the poll reached at least 90% of the active fossil wood anatomists.

The delivered message included a short summary of the nomenclature background, similar to the one provided above, and remembered that only three names have been in use for Araucaria-like fossil wood since now about a century: *Agathoxylon*, *Araucarioxylon* and *Dadoxylon*. Following the introduction, three alternative nomenclatural proposals were outlined. Researchers were asked to provide a recommendation for the most appropriate course of action. The proposals were presented as follows:

> *Among our community of paleoxylologists there is discussion about three possibilities to name isolated secondary xylem pieces with an Araucaria-like anatomy:*
>
> *1 – Use* Araucarioxylon *(in this case a proposal should be prepared for conservation and a type selected);*
> *2 – Use* Dadoxylon *also for isolated secondary xylem;*
> *3 – Use the validly published and legitimate* Agathoxylon *Hartig (the type of which is apparently lost; a neotype should be selected).*

Preliminary discussions highlighted this poll to be an opportunity to debate a related taxonomical choice, i.e., should one fossil-genus or two be recognized for Araucaria-like fossil wood, depending on the perceived significance of axial parenchyma. Thus, a second question was presented:

> *Should two different fossil-genera be used for isolated Araucaria-like secondary xylem with or respectively without axial parenchyma?*
>
> *4 – No;*
> *5 – Yes (then, please, indicate which names you recommend).*

Fifty-six answers were received (Table 1; Appendix 1). Five colleagues declared insufficient involvement to provide a meaningful opinion. Three others kindly shared their thoughts, but did not express any clear position. Several colleagues emphasized that they would prefer historical priority being ignored where a subsequent name has become well established and is clearly defined. Most answers also emphasized that it would be greatly beneficial to have this question settled definitively, in strict accordance with *ICN* requirements, to avoid further nomenclature confusion. First, results about the taxonomy will be presented, then those about the nomenclature.

Thirty-seven colleagues expressed a position about the taxonomical point. It was often underlined that axial parenchyma being distributed with little consistency among the taxa or even the individuals of the extant Araucariaceae, this feature should not be accorded too much importance. In contrast, other colleagues considered the occurrence of axial parenchyma to be an important phylogenetic trait in conifer woods; at the same time pointing out, however, that axial parenchyma is rather inconsistent in modern Araucariaceae. Some emphasized that axial parenchyma, being a delicate tissue, is often poorly preserved, making it an unreliable feature for fossil wood identification.

The eight colleagues advocating the use of two taxa mostly suggested the use of *Agathoxylon* for woods with axial parenchyma and of *Dadoxylon* for those without (n = 5 persons). The others suggested various name pairings for woods respectively with and without axial parenchyma: *Agathoxylon* and *Araucarioxylon*, *Araucarioxylon* and *Agathoxylon*, and *Araucarioxylon* and *Dadoxylon* (n = 1 each).

With respect to the initial nomenclature question, ten responses recommended the use of *Araucarioxylon* as a general name for Araucaria-like woods, owing to it being a familiar and optimally informative name. It was also regularly asserted that *Araucarioxylon* is preferable in being not "as general" or "as widely encompassing" as *Dadoxylon*.

Even though *Dadoxylon* is now recognized to be legitimate, only seven contributors advocated use of this name. Respondents repeatedly alluded to Felix's (1886) policy, i.e., to use *Dadoxylon* for Palaeozoic woods and *Araucarioxylon* for Mesozoic and Cenozoic ones. Other contributors noted that such a policy is difficult to employ, since in the protologue most *Araucarioxylon* species are based on Palaeozoic material. Furthermore, geological age alone should not be used for taxonomical differentiation (Bateman & Hilton, 2009).

Thirty-one replies (65% of the 48 answers with a choice) recommended the use of *Agathoxylon*, mostly based on this being the first validly published and legitimate name that can be used unambiguously for isolated pieces of secondary xylem. Two responses emphasized that, should *Agathoxylon* be selected, this would necessitate numerous new combinations. However, one contributor noted that this should not be seen as a disadvantage, but rather an ideal opportunity to check all the published species and to transfer to *Agathoxylon* only those genuinely representing "Araucaria-like fossil woods" as defined here.

One respondent argued that, all names being problematic, the one selected should be that which has enjoyed most usage in the palaeobotanical community over the last 20 years. Two other colleagues underlined that, should the name *Araucarioxylon* be proposed for conservation against *Pitys*, and should this conservation be accepted, then *Araucarioxylon* would fall into taxonomical synonymy with *Agathoxylon* Hartig. One answer noted that Hartig (1848) also proposed *Colymboxylon* for Araucaria-like fossil wood (but without axial parenchyma), albeit that name has never been used subsequently and has no designated type.

Finally, it was also suggested that it might be possible to retain *Araucarioxylon* and *Dadoxylon*, not as names for well-defined plant fossil-genera, but as names for informal morphological groupings without any formal taxonomical status (such as "turmae" in palynology), for those fossil woods left in open nomenclature.

Table 1. Poll summary for the 56 answers received. Q1 = How "*to name isolated secondary xylem pieces with an* Araucaria*-like anatomy.*" Q2 = "*Should two different fossil-genera be used for isolated Araucaria-like secondary xylem with or respectively without axial parenchyma?*" If the answer to Q2 was "yes" it was asked to "*indicate which names you recommend*". Answers are given here with their respective score, the name recommended for wood with axial parenchyma first.

	no answer	*Araucarioxylon*	*Dadoxylon*	*Agathoxylon*
Q1	8	10	7	31
	no answer	one genus	two genera	
Q2	19	29	*Agathoxylon*/*Dadoxylon* (5) *Agathoxylon*/*Araucarioxylon* (2) *Araucarioxylon*/*Dadoxylon* (1)	

■ POLL DISCUSSION

Gothan (1905) was probably the first to discuss the naming of Araucaria-like fossil woods according to rules similar to modern criteria. Significantly, his contribution was published at about the same time as the first edition of the code of nomenclature (Briquet, 1906). Gothan selected *Dadoxylon* for Araucaria-like fossil woods, and was followed by most authors until about 1970–1980, after which, for various reasons, most authors preferred *Araucarioxylon* (Fig. 1). From the current poll it is clear that few specialists favour the continued use of *Dadoxylon* for isolated secondary xylem pieces.

The fact that many different species of fossil wood have been assigned to *Dadoxylon*, despite their large taxonomical diversity, is clearly seen as an impediment to retain this generic name. Indeed the botanical affinity of the woods in question is variable. Palaeozoic (Carboniferous–Permian) Araucaria-like woods commonly occur in biological attachment to axes with septate piths and a primary vasculature suggestive of cordaitaleans (Gothan, 1905), although others may represent pteridosperms (Galtier & Scott, 1994) or ullmannian (Lemoigne & Schaarschmidt, 1968) or walchian (Lemoigne & Tyroff, 1967; Noll & al., 2005) conifers. In contrast, most Late Cretaceous–Holocene woods of this type are undoubtedly coniferous, and should almost certainly be placed within the extant Araucariaceae. The affinity of other woods of late Palaeozoic and early Mesozoic age is less certain and may represent a range of conifers, pteridosperms and other extinct gymnosperms (e.g., Pigg & Trivett, 1994). One might even consider proposing the conservation of *Cordaixylon* Grand'Eury 1877, a younger synonym, for the Palaeozoic woods. These cannot, however, be segregated from non-cordaitalean woods on the basis of the anatomy of their secondary xylem alone.

The main reason mentioned for the use of *Araucarioxylon* is overwhelmingly that it is familiar. Indeed, *Araucarioxylon* is used in every textbook and adorns labels in most fossil shops, in every palaeontological museum and in countless popular media outlets (web-sites, field guides, magazines and so forth). *Araucarioxylon* is also widely employed in the scientific literature, although it is rarely indicated to be an illegitimate superfluous synonym. An analysis of new specific names published for Araucaria-like fossil woods between 1900 and 2010 reveals that the name *Araucarioxylon* was rarely used before 1972, became more frequently used than *Dadoxylon* in the 1980s, and then sharply decreased in usage (first relatively and then absolutely and relatively, Fig. 1). An illustration of this astonishing evolution of nomenclature is exemplified by Trivedi & Srivastava (1990) who published four new combinations in *Araucarioxylon*, even though this name had already been stated to be a junior synonym, in the same journal (Vogellehner, 1964, who treated it as a synonym of *Dadoxylon*). It is noteworthy that few of the respondents who supported the use of *Araucarioxylon* have actually published material under this name.

In contrast, answers advocating the use of *Agathoxylon* put forward respect to the *Code* and the obligation to use legitimate names as their guiding principles for the choice of a genus name. It is acknowledged that employment of this name would require numerous new combinations to be coined, although this could also be an opportunity to clarify the character sets of the numerous species described previously. It is clear that among the approximately 440 fossil species described as Araucaria-like secondary xylem, only around half fit the precise definition of this group given above. Further, the synonymy rate among this half is apparently high to very high (Philippe, 2011). The reasons advocated to avoid the use of *Agathoxylon* were mostly that it is not commonly employed, which is true with respect to the general public and even among several colleagues, but incorrect when species described between 1990 and 2010 are considered. It is true that during the last decade equivalent numbers of new species have been ascribed to *Araucarioxylon* and *Agathoxylon* (Table 2), but if the number of published new combinations is taken into account, then *Agathoxylon* greatly outnumbers *Araucarioxylon*.

Table 2. Species of Araucaria-like fossil wood newly described during this century (2001–2012).

Year	Genus	Species	Reference	Age	Locality
2001	*Araucarioxylon*	*agashii*	Narayanaswamy, 2001	Permian	India
2001	*Araucarioxylon*	*chapmannae*	Poole & Cantrill, 2001	Cretaceous	Antarctica
2001	*Agathoxylon*	*ramanujamii*	Narayanaswamy, 2001	Permian	India
2002	*Dadoxylon*	*byeongpungense*	Kim & al., 2002	Cretaceous	Korea
2002	*Agathoxylon*	*liguaensis*	Torres & Philippe, 2002	Jurassic	Chile
2002	*Dadoxylon*	*transylvanicum*	Iamandei & al., 2002	Permian	Romania
2002	*Araucarioxylon*	*xinchangense*	Duan & al., 2002	Cretaceous	China
2004	*Dammaroxylon*	*formosum*	Iamandei & Iamandei, 2004	Cretaceous	Romania
2004	*Agathoxylon*	*ultimus*	Iamandei & Iamandei, 2004	Cretaceous	Romania
2005	*Agathoxylon*	*matildense*	Zamuner & Falaschi, 2005	Jurassic	Argentina
2007	*Araucarioxylon*	*tohegaoense*	Agarwal & al., 2007	Permian	India
2011	*Agathoxylon*	*togeumense*	Oh & al., 2011	Cretaceous	Korea
2011	*Agathoxylon*	*lamaibandianus*	Crisafulli & Herbst, 2011	Triassic	Argentina

A proposal to conserve *Araucarioxylon* would need to address several issues: *Dadoxylon* has been used as frequently as *Araucarioxylon* for naming tracheidoxyls (isolated fragments of pycnoxylic homoxylous secondary xylem); *Araucarioxylon* is automatically typified by the *Pitys* type, which is very different to that usually assigned to *Araucarioxylon*; *Araucarioxylon* has been inconsistently used, even in recent times (Philippe, 2011); and there is no consensus about its application (this poll). These facts suggest that conservation of *Araucarioxylon* should not be pursued.

■ CONCLUSIONS

A recurrent opinion expressed in responses to the questionnaire was the strong desire to achieve general agreement about the naming of Araucaria-like fossil wood. This poll did yield a clear consensus. Although a few people, based on valid reasons, advocated the use of *Dadoxylon* or *Araucarioxylon*, a much larger number recommended the use of *Agathoxylon*. The survey clearly indicates that there is no general agreement to conserve *Araucarioxylon*. Furthermore, conservation of the latter would be difficult to advocate given the complex nomenclatural changes required and the lack of unanimous support.

In the community of fossil wood anatomists, the prevailing view is that only one genus name is necessary for Araucaria-like fossil woods, with or without axial parenchyma, and that this name should be *Agathoxylon*. Its type is provided by the only original species name: *A. cordaianum*. Unsuccessful searches for the holotype of this species suggest that Hartig's original material has been lost. This necessitates the designation of a neotype. Hartig's generic characters are clear from his key on pp. 189–190. Since he recognized only one species, its name is validly published. From the brief species diagnosis on p. 188, however, it is not yet clear which subsequently established species may be synonyms. This matter should be resolved in a future publication, together with combinations under *Agathoxylon* of many species that in the past have been attributed to *Araucarioxylon* and/or *Dadoxylon*.

Several respondents to the poll concluded their comments by stating that naming is not a goal in itself, and that the nomenclatural problem should not obscure the value that fossil woods embody for palaeobiological, palaeoecological and palaeobiogeographical analyses.

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