



[http://app.pan.pl/SOM/app67-VallejosLeiz\\_etal\\_SOM.pdf](http://app.pan.pl/SOM/app67-VallejosLeiz_etal_SOM.pdf)

## SUPPLEMENTARY ONLINE MATERIAL FOR

### **New records of Upper Triassic wood from Argentina and their biostratigraphic, paleoclimatic, and paleoecological implications**

Laura Vallejos Leiz, Alexandra Crisafulli, and Silvia Gnaedinger

Published in *Acta Palaeontologica Polonica* 2022 67 (X): xxx-xxx.  
<https://doi.org/10.4202/app.00939.2021>

#### **Supplementary Online Material**

**SOM Table 1.** Comparison of the anatomical characters of the secondary xylem of *Baieroxylon* species

**SOM Table 2.** Comparison of the anatomical characters of related Triassic species of *Protophyllocladoxylon hilarioense* sp. nov.

**SOM Table 3.** Comparison of the anatomical characters of South American species of *Protophyllocladoxylon*.

#### **References**

**SOM Table 1.** Comparison of the anatomical characters of the secondary xylem of *Baieroxylon* species.

AP= axial parenchyma, HT= helicoidal thickenings, A= absent, P= present, r= rare, d= diffuse. Modified from Gnaedinger (2012).

| Taxon   | Age and country                               | Pith                                      | Secondary xylem   |    |    |                                     |   |          |
|---|---|---|---|----|----|-------------------------------------|---|----------|
|   |   |   | Tracheid radial pitting   | AP | HT | Cross-field pits                    | Xylem rays                              |          |
|   |   |   |   |    |    |                                     | Seriation                               | Height   |
| <i>Baieroxylon multiseriale</i><br>Prasad, 1982                                 | late Permian<br>India                         | A   | 1–4 seriate, circular and hexagonal,<br>alternate, opposite, contiguous and<br>separate | A  | P  | 1–15 circular and<br>oval to simple | 1 seriate                               | 1–15     |
| <i>B. cicatricum</i><br>Prasad and Lele in<br>Crisafulli, 2001                  | late Permian<br>Uruguay                       | Scars, homogeneous<br>parenchymatous pith | 1–2 seriate, alternate, opposite,<br>contiguous and separate                            | A  | p  | Mean 4                              | 1 seriate                               | 3–12     |
| <i>B. cicatricum</i> Prasad and<br>Lele in Crisafulli and<br>Herbst, 2009       | late Permian<br>Paraguay                      | Scars, homogeneous<br>parenchymatous pith | 1–2 seriate, alternate, opposite,<br>contiguous and separate                            | A  | p  | Mean 4                              | 1 seriate                               | 3–12     |
| <i>B. implexum</i><br>Greguss, 1961   | Late Triassic,<br>Germany<br>Permian, Hungary | A   | 1–3 seriate, contiguous   | r  | p  | 1–4 elliptical,<br>simple           | 1 seriate                               | 1–8      |
| <i>B. chilensis</i> Torres and<br>Philippe in Crisafulli and<br>Herbst, 2010    | Late Triassic,<br>Argentina                   | A   | 1 seriate, contiguous, some separate,<br>rarely biseriate alternate                     | P  | P  | Cupressoid, 1–4                     | 1 seriate                               | 1–13     |
| <i>B. cicatricum</i><br>Prasad and Lele, 1984                                   | Late Triassic,<br>India                       | A   | 1–3 seriate alternate-opposite,<br>contiguous and separate                              | A  | P  | Up to 9                             | 1 seriate                               | 1–10     |
| <i>B. cicatricum</i> Prasad and<br>Lele in<br>Bardola et al., 2009              | Late Triassic,<br>Brazil                      | A   | 1–2 seriate, alternate, contiguous and<br>separate, mixed type                          | A  | P  | 1–4                                 | 1 seriate                               | 1–14     |
| <i>B. cicatricum</i> Prasad and<br>Lele, {year?} (Vallejos<br>Leiz et al. 2021) | Upper Triassic,<br>Argentina                  | A   | 1–2 seriate, alternate, contiguous and<br>separate, mixed type                          | A  | P  | Up to 5<br>arranged in<br>crowns    | 1 seriate                               | 2–12     |
| <i>B. graminovillae</i><br>(Zimmermann {year})<br>Prasad and Lele, 1984         | Late Triassic,<br>Germany                     | A   | 1–2 seriate, rarely 3 seriate, araucarioid<br>type                                      | A  | P  | 1–4 oval, simple                    | 1 seriate                               | 1–15     |
| <i>B. cambogdiense</i><br>Serra, 1966a  | Mesozoic,<br>Asia                             | A   | 1–2 seriate, opposite, alternate,<br>with crassulae                                     | A  | A  | 4–19 arranged<br>in crowns          | 1–2 seriate                             | 4–19     |
| <i>B. chilense</i> Torres and<br>Philippe, 2002                                 | Early Jurassic Chile                          | A   | 1–2 seriate, contiguous or separate,<br>sometimes alternate                             | P  | A  | 1–2                                 | 1 seriate,<br>some locally<br>2 seriate | 1–7(–15) |

|   |  |   |  |   |   |  |   |      |
|---|--|---|--|---|---|--|---|------|
| <i>B. sp. cf. B. chilense</i><br>Torres and Philippe in<br>Gnaedinger and Herbst,<br>2009 | Early Jurassic<br>Argentina              | A | 1–2 seriate, contiguous or separate,<br>alternate or opposite                                      | A | A | 1–2  | 1 seriate,<br>some locally<br>2 seriate | 2–6  |
| <i>B. lindicianum</i> Philippe,<br>1995 (Philippe and<br>Barbacka 1997)                   | Early Jurassic,<br>France and<br>Hungary | A | 1–2 seriate, alternate- subopposite  | A | A | 4–7 oval   | 1–2 seriate                             | —    |
| <i>B. rocablanquense</i><br>Gnaedinger, 2012  | Early Jurassic<br>Argentina              | A | 1 seriate, contiguous and separate   | A | P | 1–6 circular<br>cupressoid pits, in<br>horizontal rows,<br>sometimes 8<br>arranged in groups<br>or crowns. | 1 seriate                               | 2–8  |
| <i>B. cicatricum</i><br>Prasad and Lele in Rao<br>and Ramanujan, 1986                     | Cretaceous India                         | A | 1–2 seriate, alternate, opposite,<br>contiguous and separate, occasionally 3<br>seriate, alternate | d | A | 1–8 simple pits,<br>elliptic or oval and<br>oblique  | 1 seriate                               | 1–11 |

**SOM Table 2.** Comparison of the anatomical characters of related Triassic species of *Protophylocladoxylon hilarioense* sp. nov. AP= axial parenchyma, GR= growth rings, T= tylosis, A= absent, P= present, ?= uncertain, n.o= not observed, ab= abundant, r= rare.

| Taxon  | Age and country                                | GR | AP | T  | Radial pits  | Tangential pits     | Cross-field pits   | Xylem rays                  |        |
|--|--|----|----|----|--|---------------------|--|-----------------------------|--------|
|  |  |    |    |    |  |                     |  | Seriation                   | Height |
| <i>Protophylocladoxylon zhaobishanensis</i><br>Wan, Yang, and Wang, 2019 | Zhaobishan, Shanshan, Turpan, Xinjiang, China. | P  | A  | P  | 1–2- seriate, rarely 3 seriate; rounded to polygonal rarely flattened in outline, with circular apertures, uniseriate contiguous rarely arranged in groups. Multiseriate pits contiguously and alternatively arranged. | 1–2 seriate         | 1–2; window-like, sometimes circular, oval simple pits                               | 1 seriate                   | 1–28   |
| <i>P. xenoxylodes</i><br>Serra, 1966a                                    | Phnom-Ker, Cambodia                            | A  | P  | P  | 1–2 seriate; alternate, rarely opposite, flattened, elliptic or circular   | n.o.                | 1 occasionally 2; oval to circular horizontal  | 1, rarely 2 seriate         | 1–12   |
| <i>P. thylloides</i><br>Serra, 1966a                                     | Ho-Hom, Quang-Nam, Vietnam                     | P  | ?  | ab | 1–2 seriate; uniseriate flattened; biseriate, alternate, rarely opposite, contiguous or separate, hexagonal  | n.o.                | 1–2; elliptic, oblique to almost vertical, rarely horizontal                         | 1 seriate, rarely 2 seriate | 1–29   |
| <i>P. lechangense</i><br>Wang, 1993                                      | South China                                    | A  | A  | A  | 1–3, rarely 4 seriate; 2–3 seriate in earlywood, alternate, hexagonal, uniseriate in latewood, contiguous, subcircular   | r                   | 1–2; rectangular with rounded angles or elliptic, horizontal                         | 1 seriate                   | 1–11   |
| <i>P. korubaense</i><br>Serra, 1966b                                     | Rovieng, Kompong Thom, Cambodia                | A  | P  | P  | 1–2 seriate; uniseriate, contiguous or separate circular; biseriate, alternate, rarely opposite  | r                   | 1–2; oval to circular  | 1–2 seriate                 | 1–28   |
| <i>P. parathylloides</i><br>Vozenin-Serra, 1970                          | Quang-Nam, Vietnam                             | A  | ?  | ab | 1–2 seriate; araucarian, with a mixed tendency   | n.o.                | 1–2; small more or less oval, obliquely disposed, sometimes with a vertical tendency | 1-2 seriate                 | 1–48   |
| <i>P. szei</i><br>Wang, 1991   | Guangdong, Mongolia                            | A  | A  | A  | 1 seriate; contiguous or sometime separate, circular or sometimes flattened  | n.o.                | 1; large, circular, broadly oval or elliptic, vertical or oblique                    | 1 seriate                   | 1–10   |
| <i>P. hilarioense</i><br>(Vallejos Leiz et al. 2021)                     | Hilario, San Juan, Argentina                   | P  | A  | A  | 1–2 seriate; uniseriate, contiguous to flattened, sometimes separate with abietinoid tendency circular; biseriate, subopposite, contiguous and flattened, rarely separate circular                                     | 1, rarely 2 seriate | 1–2; elliptic, oblique, rarely horizontal  | 1 seriate; partly 2 seriate | 1–10   |

**SOM Table 3.** Comparison of the anatomical characters of South American species of *Protophyllocladoxylon*.

AP= axial parenchyma, GR= growth rings, A= absent, P= present, n.o= not observed, r= rare.

| Taxon  | Locality and country | Age                                | Secondary xylem |    |  |                     |   |                             |        |
|--|----------------------|------------------------------------|-----------------|----|--|---------------------|---|-----------------------------|--------|
|  |                      |                                    | GR              | AP | Radial pits  | Tangential pits     | Cross-field pits                          | Xylem rays                  |        |
|  |                      |                                    |                 |    |  |                     |   | Seriation                   | Height |
| <i>Protophyllocladoxylon dolianitii</i><br>Mussa, 1958   | Brazil               | late Carboniferous (Mississippian) | A               | A  | 1–3 seriate; alternate and polygonal   | n.o.                | 1–2, horizontal or oblique                | 1 seriate                   | 1–30   |
| <i>P. derby</i><br>(Oliveira {year})<br>Maheshwari, 1972 | Brazil               | late Carboniferous (Pennsylvanian) | P               | A  | 1 seriate; oblique and oval  | r                   | 1–2                                       | 1 seriate; partly 2 seriate | 1–47   |
| <i>P. rosablancaense</i><br>Pons, 1971                   | Colombia             | Early Cretaceous                   | A               | A  | 1–2 seriate; uniseriate, contiguous, flattened, rarely circular; biseriate, alternate, flattened   | n.o.                | 1–2, elliptic, oblique, rarely horizontal | 1–2 seriate                 | 1–20   |
| <i>P. hilarioense</i><br>(Vallejos Leiz et al. 2021)     | Argentina            | Upper Triassic                     | P               | A  | 1–2 seriate; uniseriate, contiguous to flattened, sometimes separate with abietinoid tendency, circular; biseriate, subopposite, contiguous and flattened, rarely separate, circular | 1, rarely 2 seriate | 1–2; elliptic, oblique, rarely horizontal | 1 seriate; partly 2 seriate | 1–10   |

## References

- Bardola, P.T., Degani Schmidt, I., Guerra Sommer, M., and Schultz, C. 2009. Lenhos de Ginkgophyta em florestas petrificadas no Triássico Superior Sul-Rio-Grandense, Brasil. *Revista Brasileira de Paleontologia* 12: 139–148.
- Crisafulli, A. 2001. Leños permicos de la Formación Yaguarí, Republica Oriental del Uruguay. *Ameghiniana* 38: 61–72.
- Crisafulli, A. and Herbst, R. 2009. Gymnospermous wood (Coniferales, Taxales and Ginkgoales) from the Upper Permian Tacuary Formation, Eastern Paraguay. *Paleobiodiversity and Palaeoenvironment* 89: 95–109.
- Crisafulli, A. and Herbst, R. 2010. Revisión de algunas lignofloras pérmicas de Namibia, África. In: *X Congreso Argentino de Paleontología y Bioestratigrafía y VII Congreso Latinoamericano de Paleontología, La Plata, Argentina. Resúmenes*, p. 151.
- Gnaedinger, S. 2012. Ginkgoaleans woods from Jurassic of the Argentina. Taxonomic considerations and palaeobiogeographical distribution. *Geobios* 45: 187–198. Electronic supplement.
- Gnaedinger, S. and Herbst, R. 2009. Primer registro de maderas gimnospérmicas de la Formación Roca Blanca (Jurásico Inferior), provincia de Santa Cruz, Argentina. *Ameghiniana* 46: 59–71.
- Greguss, P. 1961. Permische fossile Holzer aus Ungarn. *Palaeontographica* 109: 131–145.
- Maheshwari, H. 1972. Permian wood from Antarctica and revision of some Lower Gondwana wood taxa. *Palaeontographica* 203: 1–82.
- Muralidhar Rao, G. and Ramanujan, K. 1986. Fossil gymnospermous wood with spiral thickening from Gangapur Formation of Andhra Pradesh. In: *The Indian Geological Congress. Proceedings*. Poona, p. 119–122.
- Mussa, D. 1958. Conifera fósil do Carbonifero Superior de Santa Catarina. *Servicio Grafico do Instituto Brasileiro de Geografia e Estadística. Boletim* 182: 1–22.
- Philippe, M. 1995. Bois Fossiles du Jurassique de Franche-Comté (NE-France). *Palaeontographica Abteilung* 236: 45–103.
- Philippe, M. and Barbacka, M. 1997. A reappraisal of the Jurassic woods from Hungary. *Annales Historico-Naturales Musei Nationalis Hungarici* 89: 11–22.
- Pons, D. 1971. Sur un Bois Fossile du Mésozoïque de la Colombie: *Protophylocladoxylon rosablancaense* nov. sp. *Review of Palaeobotany and Palynology* 11: 101–123.
- Prasad, M.N.V. 1982. An annotated synopsis of Indian Palaeozoic gymnospermous woods. *Review of Palaeobotany and Palynology* 38: 119–156.
- Prasad, M. and Lele, K. 1984. Triassic ginkgoean wood from the South Rewa Gondwana basin, India. *Review of Palaeobotany and Palynology* 40: 387–397.
- Serra, C. 1966a. Étude anatomique et paléogéographique de quelques espèces homoxylées du Sud Viêt-Nam et du Cambodge. *Archives Géologique* 8: 94–116.

- Serra, C. 1966b. *Protophylocladoxylon korubaense* nov. sp., bois fossile du Cambodge. *Comptes-rendus du Congrès des Sociétés Savantes de Paris et des Départements. Section du Scientifique* 91: 199–215.
- Torres, T. and Philippe, M. 2002. Nuevas especies de *Agathoxylon* y *Baieroxylon* del Lías de La Ligua (Chile) con una evaluación del registro paleoxilológico en el Jurásico de Sudamérica. *Revista Geológica de Chile* 29: 151–165.
- Vallejos Leiz, L., Crisafulli A., and Gnaedinger, S. 2021. New records of Upper Triassic wood from Argentina and their biostratigraphic, paleoclimatic, and paleoecological implications. *Acta Palaeontologica Polonica* [published online <https://doi.org/10.4202/app.00939.2021>]
- Vozenin-Serra, C. 1970. Etude de structures homoxylées à oopores du Mésozoïque vietnamien. *Archives Géologiques du Viêt Nam* 13: 60–71.
- Wan, M., Yang, W., and Wang, J. 2019. A new *Protophylocladoxylon* wood from the Induan (Lower Triassic) Jiucayuan Formation in the Turpan–Hami Basin, southern Bogda Mountains, northwestern China. *Review of Palaeobotany and Palynology* 267: 62–72.
- Wang, S.J. 1991. A new permineralized wood of later Triassic from northern Guangdong Province. *Acta Scientiarum Naturalium Universitatis Sunyatseni*: 30, 66–69. [in Chinese, with English abstract].
- Wang, S.J. 1993. *Late Triassic plants from northern Guangdong Province, China*: 100 pp. Universitatis Sunyatseni Press, Guangzhou. [in Chinese, with English abstract].