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Checklist of the Triassic wood (updated June 2024)

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Abstract

A list of all known fossil wood taxa recorded from the Triassic, up to June of 2024, is provided. The list contains 50 genera and 130 species of gymnospermous wood taxa documented from 16 countries across seven continents. Specifically, 17 genera and 27 species were reported from Asia, 10 genera and 39 species from Europe, 3 genera and 3 species from Africa, 5 genera and 6 species from North America, 21 genera and 43 species from South America, 9 genera and 16 species from Australia and 4 genera and 7 species Antarctica. Taxonomically, 7 genera and 8 species were documented from the Lower Triassic, 7 genera and 8 species from the Middle Triassic, and 37 genera and 98 species from the Upper Triassic. Systematically, 5 genera and 7 species belong to Cycadales, 1 monotypic genus belongs to Bennettitales, 2 genera and 3 species belong to Ginkgoales, 30 genera and 97 species of Coniferales, 7 genera and 12 species belong to Pteridosperms, 3 genera and 4 species belong to Cordaitales, and 3 genera and 6 species are *incertae sedis*.

Keywords: fossil wood, Triassic, palaeogeographic distribution, stratigraphic distribution

Introduction

The Triassic was an important period for the diversification and radiation of gymnosperms and saw a great variety of fossil gymnospermous wood at the time (Vogellehner, 1965; Taylor, 1992; Bamford, 2004; Zhang *et al.*, 2015; Wang *et al*., 2017; Bodnar *et al*., 2022). However, there is currently no comprehensive reference for the taxonomy, nomenclature, and literature of Triassic gymnosperms wood. This paper provides the first primitive checklist of the Triassic gymnospermous wood, based on an extensive literature survey, with a peculiar emphasis on their geographical and stratigraphic distributions.

Results

Our study shows that a total of 50 fossil-genera and 130 fossil-species of gymnospermous wood have been formally described from the Triassic of 16 countries spanning all the seven continents (Table 1). Geographically, there are 17 genera and 27 species were reported from Asia, 10 genera and 39 species from Europe, 3 genera and 3 species from Africa, 5 genera and 6 species from North America, 21 genera and 43 species from South America, 9 genera and 16 species from Australia, and 4 genera and 7 species Antarctica (Figs 1, 2), with the most diverse (9 genera and 13 species) fossil wood documented in China. Stratigraphically, 7 genera and 8 species were documented from the Lower Triassic, 7 genera and 8 species from the Middle Triassic, and 37 genera and 98 species from the Upper Triassic, respectively (Fig. 3). Systematically, 5 genera and 7 species belong to Cycadales, 1 monotypic genus belongs to Bennettitales, 2 genera and 3 species belong to Ginkgoales, 30 genera and 97 species of Coniferales, 7 genera and 12 species belong to Pteridosperms, 3 genera and 4 species belong to Cordaitales, and 3 genera and 6 species are *incertae sedis* (Fig. 4).

Most of the Triassic wood taxa were locally distributed either in the Gondwana or Laurasia (Fig. 1). However, six genera were distributed globally and diachronologically dominated the wood-diversity throughout the Triassic (Fig. 5): *Agathoxylon* (= *Araucarioxylon*, *Dadoxylon*, 27 species), *Xenoxylon* (13 species), *Protophyllocladoxylon* (6 species),

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TABLE 1. Fossil gymnospermous wood from the Triassic.

Species	Preservation Status	Horizon and Age	Locality	References
Agathoxylon sp.	Secondary xylem	Llantenes Fm., Jogyeri Fm.; Early–Late Triassic	Brazil; China; Argentina; South Korea; South Africa	Bamford, 2004; Kim *et al*., 2005; Zuliani & Crisafulli, 2021; Wan *et al*., 2021a; dos Santos *et al*., 2023
Agathoxylon amraparense Crisafulli & Herbst, 2011	Secondary xylem	Laguna Colorada Fm.; Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2011
Agathoxylon argentinum Bodnar, 2022	Secondary xylem	Ischigualasto Fm.; Late Triassic	San Juan Province, Argentina	Bodnar *et al*., 2022
Agathoxylon cozzoi Gnaedinger & Zavattieri, 2020	Secondary xylem	Chihuido Fm.; Late Triassic	Mendoza Province, Argentina	Gnaedinger & Zavattieri, 2020a
Agathoxylon dallonii Crisafulli & Herbst, 2010	Secondary xylem	Laguna Colorada Fm., Llantenes Fm.; Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2010, 2011; Gnaedinger & Zavattieri, 2020a
Agathoxylon lamaibandianus Gnaedinger & Zavattieri, 2020	Secondary xylem	Laguna Colorada Fm., Llantenes Fm., Chihuido Fm.; Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2011; Gnaedinger & Zavattieri, 2020a
Agathoxylon protoaraucana Brea, 1997	Secondary xylem	Paramillo Fm., Llantenes Fm.; Middle–Late Triassic	Mendoza Province, Argentina	Brea, 1997; Zuliani & Crisafulli, 2021
Araucariopitys dibneri Shilkina, 1967	Secondary xylem	Late Triassic	Russia	Shilkina, 1967
Araucariopitys gregussii Shilkina, 1967	Secondary xylem	Late Triassic	Russia	Shilkina, 1967
Araucariopitys japonica Yamazaki & Tsunada, 1982	Secondary xylem	Hinabata Fm.; Late Triassic	Japan	Yamazaki *et al*., 1982
Araucarioxylon arizonicum Ash & Creber, 2000	Secondary xylem	Chinle Fm.; Late Triassic	Arizona, New Mexico, USA	Ash & Creber, 2000
Araucarioxylon koreanum Félix, 1887	Secondary xylem	Daedong Gr.; Late Triassic	South Korea	Félix, 1887
Araucarioxylon kumarpurensis Roberts, Bamford & Millateed, 1997	Secondary xylem	Triassic	UK	Roberts *et al*., 1997
Araucarioxylon protoaraucana Brea, 2008	Secondary xylem	Paramillo Fm.; Middle Triassic	Argentina	Brea *et al*., 2008
Antarcticoxylon priestley Seward, 1914	Pith, Primary xylem, Secondary xylem	Triassic	Northern Victoria Land, Antarctica	Seward, 1914
Antarcticycas schopfii Smoot, Taylor & Delevoryas, 1985	Pith, Primary xylem, Secondary xylem	Triassic	Central Transantarctic Mountains, Antarctica	Smoot *et al*., 1985; Hermsen *et al*., 2006, 2009
Baieroxylon chilensis Crisafulli & Herbst, 2010	Secondary xylem	Llantenes Fm.; Late Triassic	Mendoza Province, Argentina	Crisafulli & Herbst, 2010
Baieroxylon cicatricum Prasad & Lele, 1984	Secondary xylem	Hilario Fm., Santa Maria Fm.; Late Triassic	San Juan Province, Argentina; Paraná Basin, Brazil	Prasad & Lele, 1984; Bardola *et al*., 2009
Brachyoxylon pennsylvanianum Wherry, 1912	Secondary xylem	Triassic	Pennsylvania, USA	Wherry, 1912
Cedroxylon brisbanense Sahni, 1920	Secondary xylem	Triassic	Boggo, Australia	Sahni, 1920
Cedroxylon neocaledonicum Salard, 1968	Secondary xylem	Triassic	Noumeol, New Caledonia	Salard, 1968
Cedroxylon regulare Göppert, 2005	Secondary xylem	Daedong Gr.; Late Triassic	County of Cheongyang-gun, Chungcheongnam-do Province, South Korea	Kim *et al*., 2005
Chapmanoxylon daintreei Pant & Singh, 1987	Secondary xylem	Triassic	Boggo, Australia	Pant & Singh, 1987

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TABLE 1 (Continued)

Species	Preservation Status	Horizon and Age	Locality	References
Chapmanoxylon jamuriense Zuliani & Crisafulli, 2021	Secondary xylem	Llantenes Fm.; Late Triassic	Mendoza Province, Argentina	Zuliani & Crisafulli, 2021
Cordaixylon sp.	Secondary xylem	Late Triassic	Kansas, USA	Zhang *et al*., 2015
Cordaixylon brueckneri (Kräusel) Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Cuneumxylon spallettii Artabe & Brea, 2003	Pith, Primary xylem, Secondary xylem	Paramillo Fm.; Triassic	Mendoza Province, Argentina	Artabe & Brea, 2003
Cupressinoxylon llantenesense Gnaedinger & Zavattieri, 2020	Secondary xylem	Llantenes Fm.; Late Triassic	Mendoza Province, Argentina	Gnaedinger & Zavattieri, 2020a
Cupressinoxylon zamunerae Bodnar, 2015	Secondary xylem	Cortaderita Fm.; Middle Triassic	San Juan Province, Argentina	Bodnar *et al*., 2015
Dadoxylon alsaticum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon amraparense Roberts, Bamford & Millateed, 1997	Secondary xylem	Triassic	UK	Roberts *et al*., 1997
Dadoxylon biradiatum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon chaneyi Daugherty, 1941	Secondary xylem	Chinle Fm.; Late Triassic	Arizona, USA	Daugherty & Stagner, 1941
Dadoxylon duplicatum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon franconium Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon gaildorjianum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon graminovillae Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon haidbergense Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon implexum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon keuperianum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon leiningeri Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon orbiculatum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon parenchymatosum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany; UK	Vogellehner, 1965
Dadoxylon poriferum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon rotundatum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Dadoxylon tordoxyloides Vozenin-Serra & Salard-Cheboldaeff, 1992	Secondary xylem	Late Triassic	Moindou, New Caledonia	Vozenin-Serra & Salard-Cheboldaeff, 1992
Elchaxylon zavattieriae Artabe & Zamuner, 2007	Pith, Primary xylem, Secondary xylem	Río Blanco Fm.; Late Triassic	Argentina	Artabe & Zamuner, 2007
Europoxylon germanicum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Europoxylon milkowianum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Europoxylon polonium Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965

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TABLE 1 (Continued)

Species	Preservation Status	Horizon and Age	Locality	References
Europoxylon tubulosum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Ginkgophytoxylon isychozianus Crisafulli & Herbst, 2011	Secondary xylem	Laguna Colorada Fm., Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2011
Haplomyeloxylon triassicum Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Junggaropitys dalongkouensis Shi, Yu, Broutin & Pons, 2015	Pith, Primary xylem, Secondary xylem	Karamay Fm.; Late Triassic	Jimsar, Xinjiang Uygur Autonomous Region, China	Shi *et al*., 2015
Juniperoxylon zamunerae Zuliani & Crisafulli, 2021	Secondary xylem	Middle Triassic	Mendoza Province, Argentina	Zuliani & Crisafulli, 2021
Koleoxylon chaneyi Vogellehner, 1965	Secondary xylem	Late Triassic	Indonesia; Germany	Vogellehner, 1965
Kykloxylon fremouwensis Meyer-Berthaud, 1993	Pith, Primary xylem, Secondary xylem	Fremouw Fm.; Middle Triassic	Central Transantarctic Mountains, Northern Victoria Land, Antarctica	Meyer-Berthaud *et al*., 1992, 1993; Del Fueyo *et al*., 1995; Cúneo *et al*., 2003; Decombeix *et al*., 2014
Liaoningoxylon chaoyangensis Zhang & Zheng, 2006	Pith, Primary xylem, Secondary xylem	Hongla Fm.; Early Triassic	Chaoyang, Liaoning Province, China	Zhang *et al*., 2006a
Lyssoxylon grigsbyi Daugherty, 1941	Secondary xylem	Chinle Fm.; Late Triassic	Arizona, USA	Daugherty & Stagner, 1941
Medulloprotaxodioxylon triassicum Wan, Yang, Tang, Liu & Wang, 2017	Pith, Primary xylem, Secondary xylem	Huangshanjie Fm.; Late Triassic	Dalongkou, Jimsar County, Xinjiang Uygur Autonomous Region, China	Wan *et al*., 2017
Megaporoxylon kaokense Kräusel, 1956	Secondary xylem	Llantenes Fm.; Late Triassic	Mendoza Province, Argentina	Kräusel, 1956; Zuliani & Crisafulli, 2021
Megaporoxylon sinensis Wan, 2021	Pith, Primary xylem, Secondary xylem	Huangshanjie Fm.; Late Triassic	Dalongkou, Jimsar County, Xinjiang Uygur Autonomous Region, China	Wan *et al*., 2021b
Mesembrioxylon rhaeticum Mclean, 1926	Secondary xylem	Late Triassic	Welsh	Mclean, 1926
Neoarthropitys gondwanaensis Gnaedinger, 2020	Pith, Primary xylem, Secondary xylem	Quebrada de los Fósiles Fm.; Middle Triassic	Mendoza Province, Argentina	Gnaedinger *et al*., 2020b
Notophytum krauselii Meyer-Berthaud & Taylor, 1991	Pith, Primary xylem, Secondary xylem	Triassic	Central Transantarctic Mountains, Antarctica	Meyer-Berthaud & Taylor, 1991
Paradoxoxylon sp.	Secondary xylem	Late Triassic	Thüringen, Germany	Süss & Steiner, 1992
Paradoxoxylon leuthardti Kräusel & Leschik, 1955	Secondary xylem	Late Triassic	Austria; Switzerland	Kräusel & Leschik, 1955
Perforatoxylon neocaledonicum Vozenin-Serra & Salard-Cheboldaeff, 1992	Secondary xylem	Late Triassic	Moindou, New Caledonia	Vozenin-Serra & Salard-Cheboldaeff, 1992
Phyllocladoxylon heizyoense Shimakura, 1936	Secondary xylem	Daedong Gr.; Late Triassic	County of Cheongyang-gun, Chungcheongnam-do Province, South Korea	Shimakura, 1936; Kim *et al*., 2005
Planoxylon austral Vozenin-Serra & Salard-Cheboldaeff, 1992	Secondary xylem	Triassic	Ducos, New Caledonia	Vozenin-Serra & Salard-Cheboldaeff, 1992
Planoxylon indicum Vagyani & Mahabale, 1972	Secondary xylem	Kamthi stage of Lower Triassic, Early Triassic	Adhari, India	Vagyani & Mahabale, 1972
Planoxylon lacunosum Salard, 1968	Secondary xylem	Triassic	Noumeol, New Caledonia	Salard, 1968
Planoxylon neocaledonicum Salard, 1968	Secondary xylem	Triassic	Noumeol, New Caledonia	Salard, 1968

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TABLE 1 (Continued)

Species	Preservation Status	Horizon and Age	Locality	References
Podocarpoxylon sp.	Secondary xylem	Late Triassic	Taringatira, New Zealand; South Africa	Vozenin-Serra & Grant-Mackie, 1996; Bamford, 2004
Podocarpoxylon indicum Crisafulli & Herbst, 2011	Secondary xylem	Laguna Colorada Fm., Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2011
Podocarpoxylon juniperoides Crisafulli & Herbst, 2010	Secondary xylem	Llantenes Fm.; Early Triassic and Late Triassic	Antarctica; San Juan Province, Argentina	Crisafulli & Herbst, 2010
Podocarpoxylon paralatifolium Crisafulli & Herbst, 2011	Secondary xylem	Laguna Colorada Fm., Late Triassic	San Juan Province, Argentina	Crisafulli & Herbst, 2011
Podocarpoxylon tikiense Crisafulli & Herbst, 2011	Secondary xylem	Llantenes Fm.; Late Triassic	Mendoza Province, Argentina	Crisafulli & Herbst, 2011
Protocallitrixylon kanakense Vozenin-Serra & Salard-Cheboldaeff, 1992	Secondary xylem	Late Triassic	Noumeol, New Caledonia	Vozenin-Serra & Salard-Cheboldaeff, 1992
Protocedroxylon trassicum Yamazaki & Tsunada, 1980	Secondary xylem	Hinabata Fm.; Late Triassic	Japan	Yamazaki, 1980
Protocircoporoxylon cortaderitaense Bodnar, 2007	Secondary xylem	Triassic	San Juan Province, Argentina	Bodnar & Artabe, 2007
Protocircoporoxylon marianaensis Zamuner & Artabe, 1994	Secondary xylem	Paso Flores Fm.; Late Triassic	Río Negro Province, Argentina	Zamuner & Artabe, 1994
Protocircoporoxylon sp.	Secondary xylem	Monina Fm.; Middle Triassic	San Juan Province, Argentina	Drovandi *et al*., 2020
Protochamaecyparixylon klitzchii Lutz, 1999	Secondary xylem	Las Beras Fm.; Late Triassic	Punta del Viento, Chile	Lutz *et al*., 1999
Protocupressinoxylon sp.	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Protocupressinoxylon arizonicum Savidge, 2006	Secondary xylem	Late Triassic	USA	Savidge *et al*., 2006
Protocupressinoxylon carrizalense Correa, 2019	Secondary xylem	Upper Rickard Member, Carrizal Fm.; Late Triassic	El Gigantillo Hill, San Juan Province, Argentina	Correa *et al*., 2019
Protocupressinoxylon dockumense (Torrey) Kräusel, 1949	Secondary xylem	Triassic	USA	Kräusel, 1949
Protocupressinoxylon malayense Vogellehner, 1965	Secondary xylem	Late Triassic	Indonesia; Germany	Vogellehner, 1965
Protojuniperoxylon ischigualastense Bodnar & Artabe, 2007	Secondary xylem	Ischigualasto Fm., Llantenes Fm.; Late Triassic	Mendoza Province, San Juan Province, Argentina	Bodnar & Artabe, 2007; Correa *et al*., 2019; Gnaedinger & Zavattieri, 2020a
Protophyllocladoxylon sp.	Secondary xylem	Laguna Colorada Fm., Late Triassic	Santa Cruz Province, Argentina.	Crisafulli & Herbst, 2011
Protophyllocladoxylon cortaderitaensis Lutz, 1999	Secondary xylem	La Ternera Fm.; Late Triassic	El Carbón, Chile	Lutz *et al*., 1999
Protophyllocladoxylon hilarioense Leiz, Crisafulli & Gnaedinger, 2022	Secondary xylem	Hilario Fm.; Late Triassic	San Juan Province, Argentina	Leiz *et al*., 2022
Protophyllocladoxylon lechangense Wang, 1993	Secondary xylem	Late Triassic	Guangdong, China	Wang, 1993
Protophyllocladoxylo szei Wang, 1991	Secondary xylem	Late Triassic	Guangdong, China	Wang, 1991a
Protophyllocladoxylon zhaobishanensis Wan, Yang & Wang, 2019	Secondary xylem	Early Triassic	Xinjiang, China	Wan *et al*., 2019

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TABLE 1 (Continued)

Species	Preservation Status	Horizon and Age	Locality	References
Prototaxoxylon intertrappeum Crisafulli & Herbst, 2010	Secondary xylem	Llantenes Fm., Las Beras Fm.; Late Triassic	Mendoza Province, Argentina; Chile	Crisafulli & Herbst, 2010
Rhexoxylon sp.	Pith, Primary xylem, Secondary xylem	Middle–Late Triassic	Central Transantarctic Mountains, Antarctica; San Juan Province, Argentina; South Africa	Taylor, 1992; Bamford, 2004
Rhexoxylon brasiliensis Herbst & Lutz, 1988	Pith, Primary xylem, Secondary xylem	Caturrita Fm.; Late Triassic	Sao Pedro do Sul, Brazil	Herbst & Lutz, 1988
Rhexoxylon brunoi Artabe, Brea & Zamuner, 1999	Pith, Primary xylem, Secondary xylem	Los Colorados Fm.; Triassic	Mendoza Province, Argentina	Artabe *et al*., 1999
Rhexoxylon cortaderitaense Bodnar, Artabe, Morel & Ganuza, 2007	Pith, Primary xylem, Secondary xylem	Upper Cortaderita Fm.; Late Triassic	San Juan Province, Argentina	Bodnar *et al*., 2007
Rhexoxylon piatnitzkyi Archngelsky & Brett, 1961	Pith, Primary xylem, Secondary xylem	Caturrita Fm.; Late Triassic	San Juan Province, Argentina	Archngelsky & Brett, 1961
Rudixylon serbetianum Bomfleur, 2014	Pith, Primary xylem, Secondary xylem	Triassic	Central Transantarctic Mountains, Antarctica	Bomfleur *et al*., 2014
Sahnioxylon australe Salard, 1968	Pith, Primary xylem, Secondary xylem	Late Triassic	Longue, New Caledonia; New Zealand	Salard, 1968
Sahnioxylon boureaui Salard, 1968	Pith, Primary xylem, Secondary xylem	Triassic	Noumeol, New Caledonia	Salard, 1968
Sahnioxylon diphtericum Salard, 1968	Pith, Primary xylem, Secondary xylem	Triassic	Longue, New Caledonia	Salard, 1968
Scalaroxylon jalaidqiense Zhang & Zheng, 2006	Pith, Primary xylem, Secondary xylem	Laolongtou Fm.; Early Triassic	Inner Mongolia, China	Zhang *et al*., 2006b
Scalaroxylon multiforium Zhang & Zheng, 2006	Pith, Primary xylem, Secondary xylem	Laolongtou Fm.; Early Triassic	Inner Mongolia, China	Zhang *et al*., 2006b
Scalaroxylon multiradiatum Vogellehner, 1965	Secondary xylem	Late Triassic	France; Germany	Vogellehner, 1965
Sommerxylon spiralosus Pires & Guerra-Sommer, 2004	Pith, Primary xylem, Secondary xylem	Caturrita Fm.; Late Triassic	Faxinal do Soturno, Brazil	Pires & Guerra-Sommer, 2004
Taxaceoxylon sp.	Secondary xylem	Santo Domingo Fm., Late Triassic	La Rioja Province, Argentina	Caminos *et al*., 1995
Tianoxylon duanmutougouense Zhang & Zheng, 2006	Pith, Primary xylem, Secondary xylem	Hongla Fm.; Early Triassic	Chaoyang, Liaoning Province, China	Zheng *et al*., 2008
Tranquiloxylon sp.	Pith, Primary xylem, Secondary xylem	Triassic	Argentina	Herbst & Lutz, 1995
Tranquiloxylon petriellai Herbst & Lutz, 1995	Pith, Primary xylem, Secondary xylem	Laguna Colorada Fm.; Late Triassic	San Juan Province, Argentina	Herbst & Lutz, 1995
Tsugoxylon primaevum Vozenin-Serra & Salard-Cheboldaeff, 1992	Secondary xylem	Triassic	Ducos, Noumeol, New Caledonia	Salard, 1968
Turpanopitys taoshuyuanense Shi, Yu, Broutin & Pons, 2017	Pith, Primary xylem, Secondary xylem	Guodikeng Fm.; Early Triassic	Taoshuyuan, Turpan, Xinjiang Uygur Autonomous Region, China	Shi *et al*., 2017
Xenoxylon sp.	Secondary xylem	Hinabata Fm., Nariwa Gr.; Late Triassic	Japan	Yamazaki, 1980; Yukawa *et al*., 2012
Xenoxylon canoasense Vogellehner, 1965	Secondary xylem	Late Triassic	France; Germany	Vogellehner, 1965

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TABLE 1 (Continued)

Species	Preservation Status	Horizon and Age	Locality	References
Xenoxylon conchylianum Vogellehner, 1965	Secondary xylem	Late Triassic	France; Germany	Vogellehner, 1965
Xenoxylon ellipticum Müller-Stoll & Schultze-Motel, 1988	Secondary xylem	Hongweikeng Fm.; Late Triassic	Guangdong Province, China; Franken, Germany	Wang, 1991b
Xenoxylon guangyuanense Tian, Wang & Philippe, 2016	Secondary xylem	Xujiahe Fm.; Late Triassic	Town of Wangcang County, Guangyuan City, Sichuan Province, China	Tian *et al*., 2016
Xenoxylon harheri Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Xenoxylon hopeiense Vogellehner, 1965	Secondary xylem	Late Triassic	Franken, Germany	Vogellehner, 1965
Xenoxylon japonicum Vogellehner, 2005	Secondary xylem	Jogyeri Fm., Hinabata Fm.; Late Triassic	South Korea; Japan	Kim *et al*., 2005
Xenoxylon junggarensis Wan, Zhou, Tang, Liu & Wang, 2016	Secondary xylem	Upper part of Huangshanjie Fm.; Late Triassic	Dalongkou, Jimsar County, Xinjiang Uygur Autonomous Region, China	Wan *et al*., 2016
Xenoxylon latiporosum (Cramer) Gothan, 1905	Secondary xylem	Daedong Gr.; Late Triassic	County of Cheongyang-gun, Chungcheongnam-do Province, South Korea; Central Pamir, Tajikistan; Russia; Germany	Gothan, 1905; Shikina, 1967; Khudaiberdyev, 1993; Kim *et al*., 2005
Xenoxylon nariwaense Yamazaki & Tsunada, 1980	Secondary xylem	Hinabata Fm.; Late Triassic	Japan	Yamazaki, 1980
Xenoxylon parvipunctatum Vogellehner, 2005	Secondary xylem	Late Triassic	Germany	Vogellehner, 1965
Xenoxylon phyllocladoides Gothan, 1936	Secondary xylem	Jogyeri Fm.; Late Triassic	County of Cheongyang-gun, Chungcheongnam-do Province, South Korea	Kim *et al*., 2005

Fm: Formation; Gr: Group

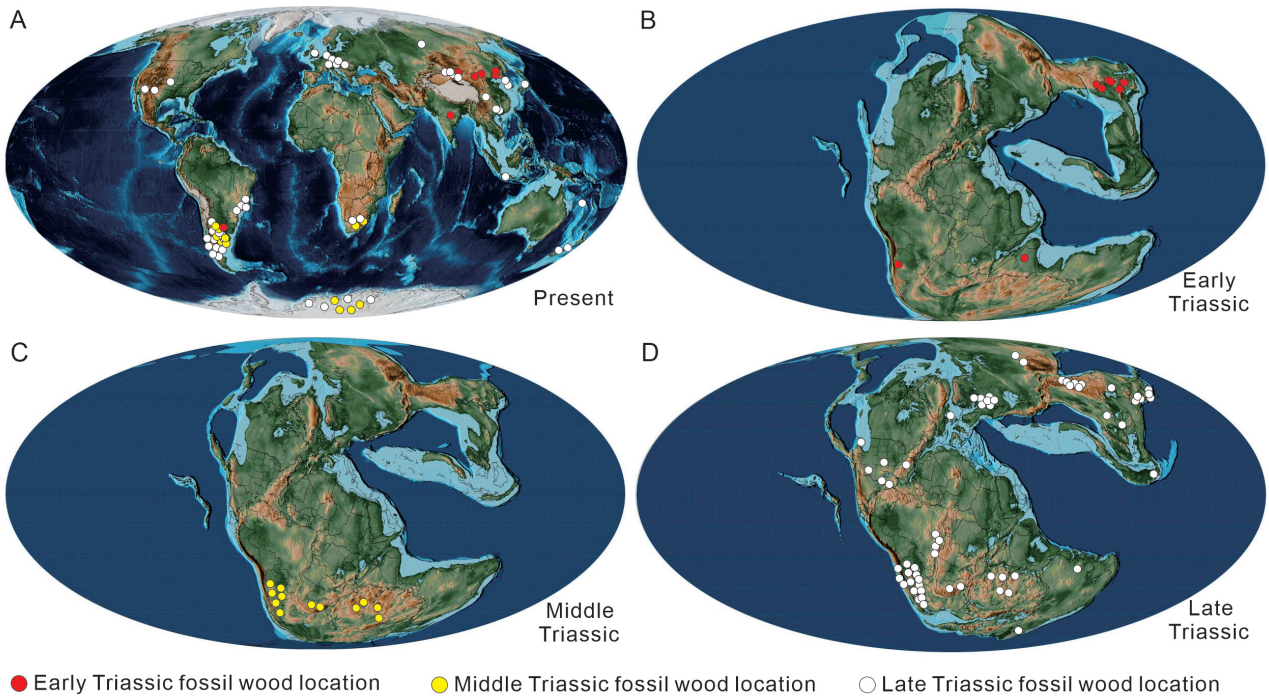

FIGURE 1. Geographic and palaeogeographic maps of the Triassic gymnospermous wood distribution.

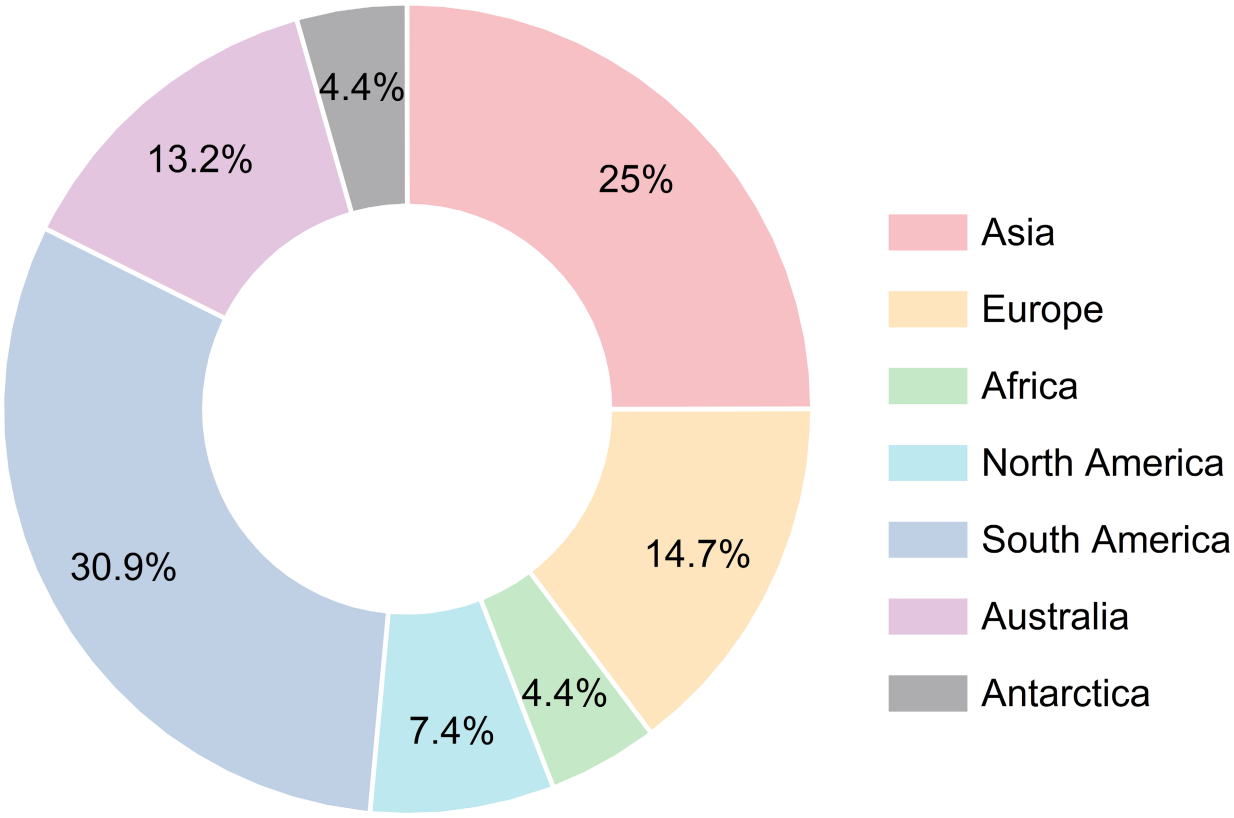

FIGURE 2. The genus number percentage of seven continents.

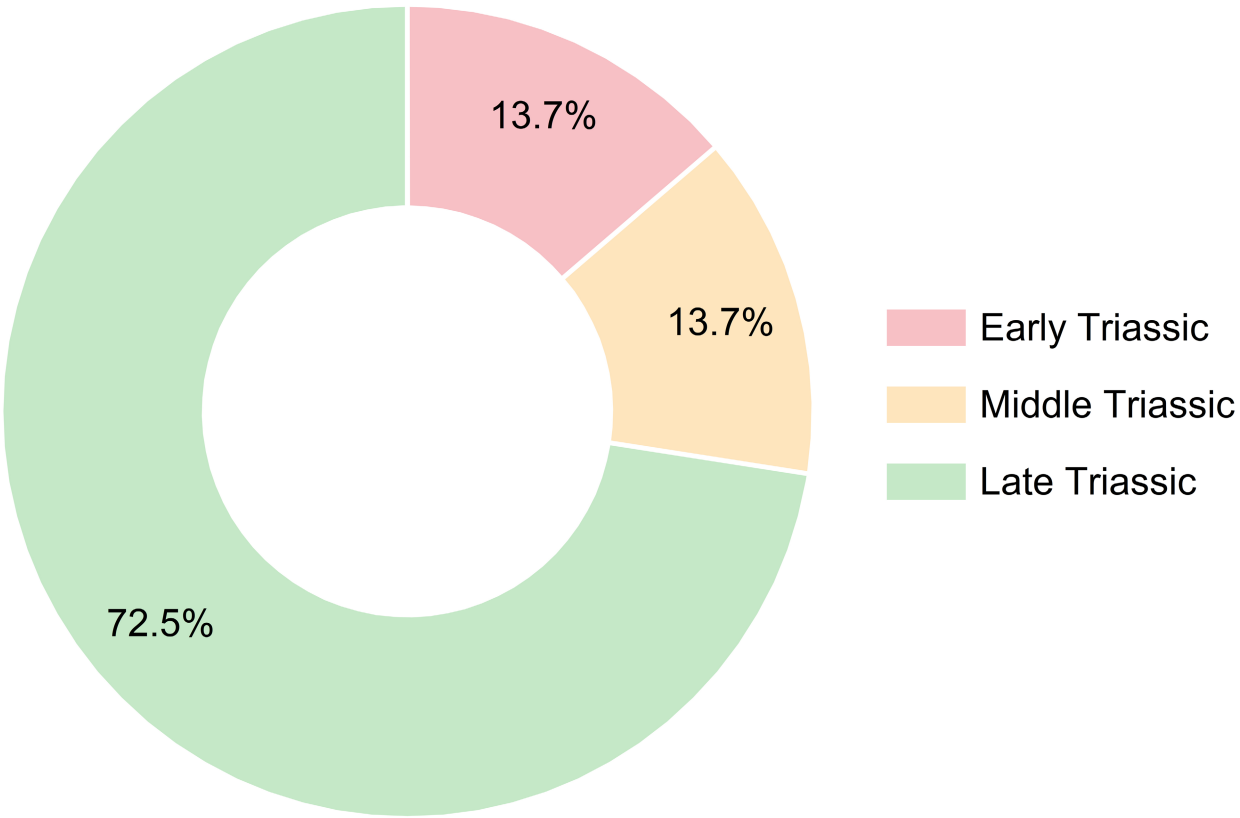

FIGURE 3. The genus number percentage of Early, Middle, and Late Triassic.

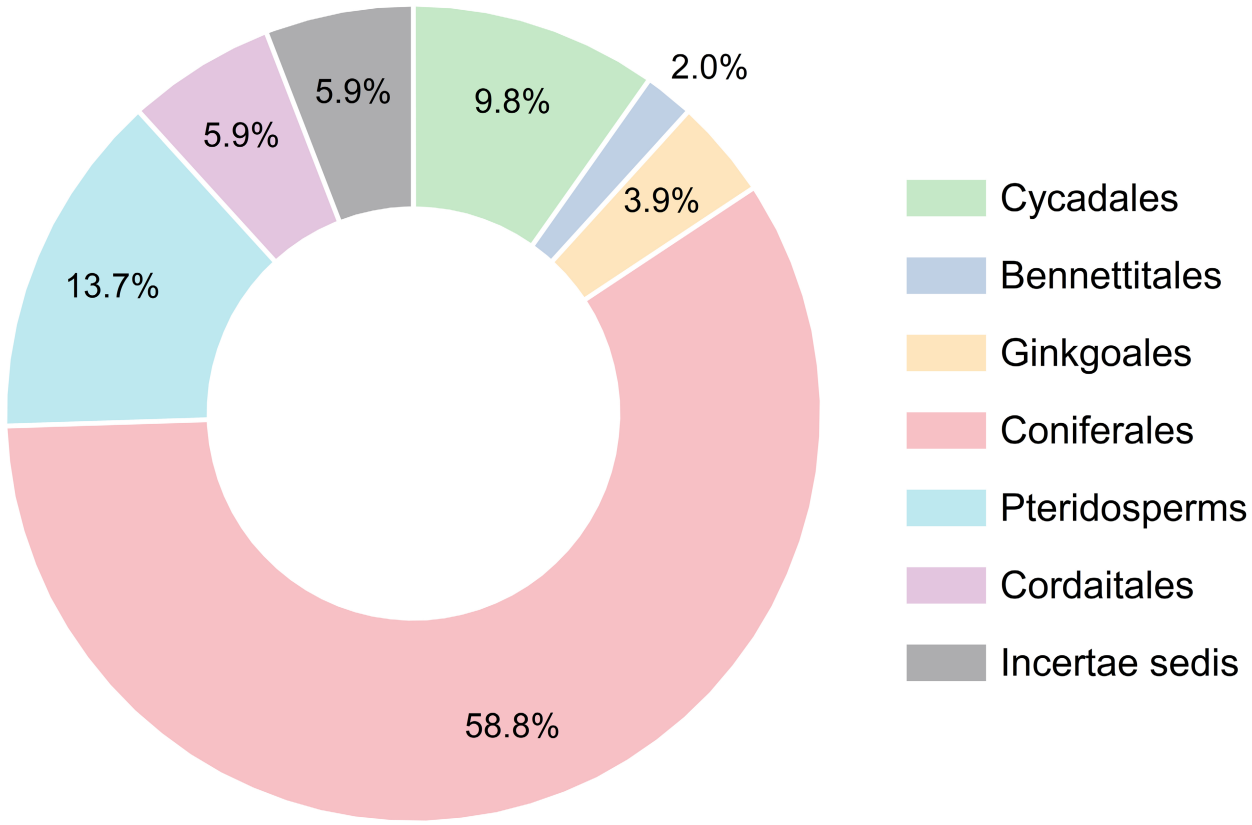

FIGURE 4. The genus number percentage of Cycadales, Bennettitales, Ginkgoales, Coniferales, Pteridosperms, Cordaitales and *Incertae sedis*.

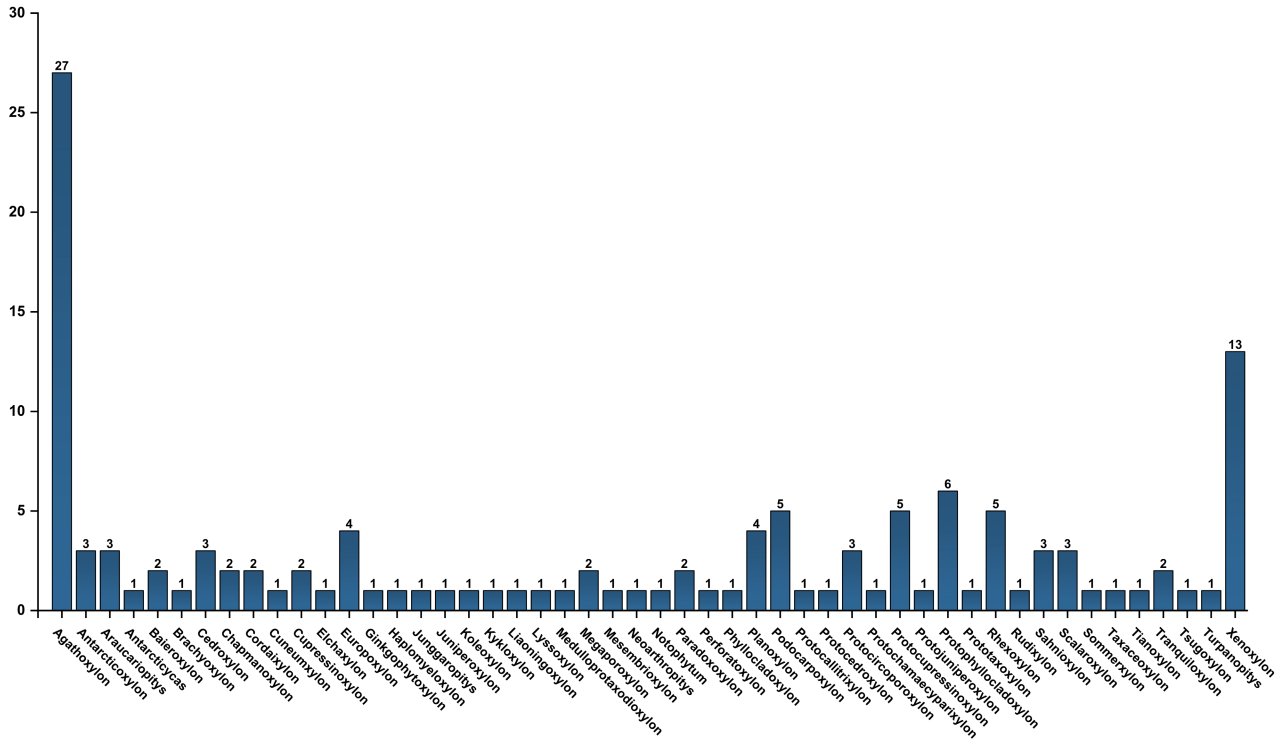

FIGURE 5. The species number of each genus of the Triassic gymnospermous wood.

Podocarpoxylon (5 species), *Protocupressionxylon* (5 species) and *Rhexoxylon* (5 species). Totally, 19 genera were distributed from Triassic to Jurassic worldwide: *Agathoxylon*, *Baieroxylon*, *Brachyoxylon*, *Cedroxylon*, *Cupressionxylon*, *Haplomyeloxylon*, *Juniperoxylon*, *Phyllocladoxylon*, *Planoxylon*, *Podocarpoxylon*, *Protocallitrixylon*, *Protocedroxylon*, *Protocircoporoxylon*, *Protocupressionxylon*, *Protophyllocladoxylon*, *Prototaxoxylon*, *Sahnioxylon*, *Taxaceoxylon*, and *Xenoxylon* (Gou & Feng, 2024).

Although the morphology and structure of the pith and the primary xylem play important roles in the classification and identification of fossil gymnospermous trunks, however, most of the fossil-wood specimens from the Triassic are preserved only with the secondary xylem. To date, only 16 genera and 28 species of permineralized gymnospermous wood with pith, primary and secondary xylems have been described from the Triassic.

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