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| **Author(s):** | R.C. Mehrotra and Gaurav Srivastava |
| **Title:** | **In situ Lecythidaceae wood from the Oligocene of Makum Coalfield, Northeast India** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 162 – 169 |
| **Keywords:** | Oligocene; palaeoclimate; Fossil wood; Lecythidaceae; Assam; Careya |
| **Abstract:** | Fossil wood was collected from an in situ upright tree encased in the late Oligocene mudstone sediments exposed in the Tirap Mine, Makum Coalfield, Tinsukia district, Assam. The wood belongs to Careya of the Lecythidaceae. This genus is reported for the first time from Paleogene sediments. Its presence supports the occurrence of tropical evergreen to deciduous forests in the region during the depositional period. |
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| **Author(s):** | Jimmy Thomas and David A. Collings |
| **Title:** | **Detection and mapping of resin canals by image analysis in transverse sections of mechanically perturbed, young *Pinus radiata* trees** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 170 – 181 |
| **Keywords:** | radiata pine; compression wood image analysis; resin canals; Circularly polarised light |
| **Abstract:** | We describe a novel, semi-automatic method for the detection, visualisation and quantification of axially oriented resin canals in transverse sections of Pinus radiata D. Don (radiata pine) trees. Sections were imaged with a flatbed scanner using circularly polarised transmitted light, with the resin canals that contained only primary cell walls appearing dark against a bright background of highly-birefringent tracheids. These images were analysed using ImageJ software and allowed for a non-biased, automated detection of resin canals and their spatial distribution across the entire stem. We analysed 8-month-old trees that had been subjected to tilting to induce compression wood and rocking to simulate the effects of wind. These experiments showed that both rocking and tilting promoted the formation of wood and confirmed that resin canals were most common adjacent to the pith. Both the rocking and tilting treatments caused a decrease in the number of resin canals per unit area when compared to vertical controls, but this change was due to the increased formation of wood by these treatments. In tilted samples, however, analysis of resin canal distribution showed that canals were more common on the lower sides of stems but these canals were excluded from regions that formed compression wood. |
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| **Author(s):** | Mengyu Dong; Haibin Zhou; Xiaomei Jiang; Yun Lu; Weibin Wang and Yafang Yin |
| **Title:** | **Wood used in ancient timber architecture in Shanxi Province, China** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 182 – 200 |
| **Keywords:** | Wood identification; forest resources; dynasty; timber-tree genera; timber selection |
| **Abstract:** | We examined fifty main structural components from fifteen historical wood buildings located in the northern, central, southern and south-eastern regions of Shanxi Province, China and dating from the Tang to the Qing Dynasty. Eleven timber-tree genera were identified: *Cupressus*, *Larix*, *Malus*, *Picea*, *Pinus* subg. *Diploxylon*, *Populus*, Quercus, *Sophora*, *Sorbus*, *Ulmus* and *Zizyphus*. Furthermore, wood specimens of *Larix* and *Pinus* subg. *Diploxylon* were determined to species level, viz. *Larix gmelinii* var. *principis-rupprechtii* and *Pinus tabuliformis*, according to their original geographical distribution in this region. Natural distribution of the wood species was apparently the leading criterion for timber selection since most identified genera are native to the areas surrounding the buildings investigated. |
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| **Author(s):** | Chieuda Nguyen; Ashley Andrews; Pieter Baas; Jason E. Bond; Maria Auad and Roland Dute |
| **Title:** | **Pit membranes and their evolution in the Oleinae of the Oleaceae** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 201 – 219 |
| **Keywords:** | torus; scanning electron microscope; atomic force microscope; Osmanthus; SEM; AFM; Olea; Chionanthus; pit membrane |
| **Abstract:** | *Chionanthus retusus* and most *Osmanthus* spp. possess torus-bearing intervascular pit membranes in their woods. Because the genera involved are thought to be closely related and are members of the subtribe Oleinae, we hypothesized that torus morphology should be similar across taxa. A study combining light, scanning electron, and atomic force microscopy indicates that tori in both genera comprise a bipartite thickening containing a central pustular region and an encircling corona. Removal of incrusting material from the torus exposes subtending sets of parallel microfibrils. We hypothesize that the torus structures of *C. retusus* and *Osmanthus* spp. (as represented by *O. armatus*) have the same morphology. Optimizing torus-bearing pits on published molecular phylogenies of the subtribe Oleinae indicates parallel evolution as an explanation for torus similarity between these two groups, although a robust and well-resolved phylogeny of the Oleaceae is still lacking. A brief study of the wood anatomy of *Olea dioica* was also undertaken. This species is a member of the subgenus *Tetrapilus* and thought to be closely related to torus-bearing genera of the Oleaceae. Despite the close relationship, no tori were observed in *O. dioica*. |
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| **Author(s):** | Roberto R. Pujana and Daniela P. Ruiz |
| **Title:** | **Podocarpoxylon Gothan reviewed in the light of a new species from the Eocene of Patagonia** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 220 – 244 |
| **Keywords:** | cross-field pits; wood anatomy; Fossil wood; conifers; Podocarpaceae |
| **Abstract:** | A new species of *Podocarpoxylon* Gothan is described based on samples collected from sediments of the Río Turbio Formation. The fossil-bearing strata are lower Eocene (47–46 Mya) according to recent geochronological ages. The new species has indistinct growth ring boundaries, abundant and frequently tangentially zonate axial parenchyma, uniseriate pitting on radial walls, one half-bordered pit (= oculipore) with reduced borders and vertical aperture inclination per cross-field and medium height uniseriate rays. The new material is compared with all fossil-species of *Podocarpoxylon* and an inventory of all *Podocarpoxylon* species previously described is provided. Cross-field characters of the new species indicate affinity to the Podocarpaceae. The presence of Podocarpaceae wood augments other evidence of this family from the same stratigraphic unit. |
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| **Author(s):** | Barbara Ghislain and Bruno Clair |
| **Title:** | **Diversity in the organisation and lignification of tension wood fibre walls – A review** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 245 – 265 |
| **Keywords:** | fibres; S1 + S2 + S3 + G; Tension wood; G-layer; lignification; multilayered tension wood fibre walls; diversity |
| **Abstract:** | Tension wood, a tissue developed by angiosperm trees to actively recover their verticality, has long been defined by the presence of an unlignified cellulosic inner layer in the cell wall of fibres, called the G-layer. Although it was known that some species have no G-layer, the definition was appropriate since it enabled easy detection of tension wood zones using various staining techniques for either cellulose or lignin. For several years now, irrespective of its anatomical structure, tension wood has been defined by its high mechanical internal tensile stress. This definition enables screening of the diversity of cell walls in tension wood fibres. Recent results obtained in tropical species with tension wood with a delay in the lignification of the G-layer opened our eyes to the effective presence of large amounts of lignin in the G-layer of some species. This led us to review older literature mentioning the presence of lignin deposits in the G-layer and give them credit. Advances in the knowledge of tension wood fibres allow us to reconsider some previous classifications of the diversity in the organisation of the fibre walls of the tension wood. |
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| **Author(s):** | Philip D. Evans; Ignacio A. Mundo; Michael C. Wiemann; Gabriela D. Chavarria; Pamela J. McClure; Doina Voin and Edgard O. Espinoza |
| **Title:** | **Identification of selected CITES-protected Araucariaceae using DART TOFMS** |
| **Source:** | IAWA Journal, Volume 38, Issue 2 |
| **Publication Year:** | 2017 |
| **Pages:** | 266 – S3 |
| **Keywords:** | Wollemia; Araucaria; illegal logging; Agathis; multivariate statistics; Forensics |
| **Abstract:** | Determining the species source of logs and planks suspected of being Araucaria araucana (Molina) K.Koch (CITES Appendix I) using traditional wood anatomy has been difficult, because its anatomical features are not diagnostic. Additionally, anatomical studies of Araucaria angustifolia (Bertol.) Kuntze, Araucaria heterophylla (Salisb.) Franco, Agathis australis (D.Don) Lindl., and Wollemia nobilis W.G.Jones, K.D.Hill & J.M.Allen have reported that these taxa have similar and indistinguishable anatomical characters from A. araucana. Transnational shipments of illegal timber obscure their geographic provenance, and therefore identification using wood anatomy alone is insufficient in a criminal proceeding. In this study we examine the macroscopic appearance of selected members of the Araucariaceae and investigate whether analysis of heartwood chemotypes using Direct Analysis in Real Time (DART) Time-of-Flight Mass Spectrometry (TOFMS) is useful for making species determinations. DART TOFMS data were collected from 5 species (n =75 spectra). The spectra were analyzsed statistically using supervised and unsupervised classification algorithms. Results indicate that A. araucana can be distinguished from the look-alike taxa. Another statistical inference of the data suggests that Wollemia nobilis is more similar and within the same clade as Agathis australis. We conclude that DART TOFMS spectra can help in making species determination of the Araucariaceae even when the geographic provenance is unknown. |
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