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| **Author(s):** | Silvia Rodrigues Machado; Carmen Regina Marcati; Ray F. Evert and Pieter Baas |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
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| **Author(s):** | Sherwin Carlquist; C. Matt Guilliams |
| **Title:** | **Distinctive wood anatomy of the root-parasitic family Lennoaceae (Boraginales)** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 3 – 12 |
| **Keywords:** | perforation plates; Ecological wood anatomy; holoparasites; succulent plant anatomy |
| **Abstract:** | The four species of Lennoaceae have strands of primary plus secondary xylem in a background of starch-rich parenchyma. These strands constitute a cylinder with large primary rays. The wood within these strands is markedly different from that of other families in the crown group of Boraginales such as Cordiaceae and Ehretiaceae, most of which are woody. Lennoaceae differ because they lack fibrous cells (libriform fibers), lack rays within the vascular strands, and have markedly elliptical vessel-to-vessel pits without vestures. Lennoaceae have secondary xylem with short, wide vessel elements with thick walls, horizontally elongate elliptical pits, simple perforation plates much narrower than the vessel lumen; variously uneven vessel wall thickenings; and axial parenchyma. The wood of Lennoaceae shows resemblances to unrelated succulents such as Kalanchoe (Crassulaceae) and Lithops (Aizoaceae). The vessel features also suggest adaptation to high water tensions as root parasites in desert areas, whereas the lack of imperforate tracheary elements may relate to support of the underground stem portions by sand or rock detritus. Habit and ecology are more important in the architecture of lennoaceous xylem than systematic affinities. The four species of Lennoaceae differ from each other in minor xylary features. |
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| **Author(s):** | Ekaterina L. Kotina; Alexei A. Oskolski; Patricia M. Tilney and Ben-Erik Van Wyk |
| **Title:** | **Bark and wood anatomy of Leucosidea and Cliffortia (Sanguisorbeae, Rosaceae)** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 13 – 28 |
| **Keywords:** | pseudotori; pit membranes; Storied structure; reticulate wall thickenings; stratification |
| **Abstract:** | The wood and bark structure of Leucosidea sericea and two species of Cliffortia, the South African members of the tribe Sanguisorbeae (Rosaceae) are described. These two genera share few anatomical traits (the presence of schizo-rhexigenous intercellular spaces in the cortex, almost exclusively simple perforation plates, small alternate intervessel pits, etc.) with other Rosaceae. However, Leucosidea shows a distinct storied structure of the secondary phloem and wood as well as stratification of the secondary phloem, with conductive elements and nonsclerified crystalliferous axial parenchyma arranged into alternating bands. These conditions are recorded for the first time for the family Rosaceae. In contrast to Leucosidea, two species of Cliffortia show neither storied structure of secondary phloem and xylem, nor stratification of secondary phloem. |
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| **Author(s):** | Carla J. Harper; Anne-Laure Decombeix; Edith L. Taylor; Thomas N. Taylor and Michael Krings |
| **Title:** | **Fungal decay in Permian Glossopteridalean stem and root wood from Antarctica** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 29 – 48 |
| **Keywords:** | Glossopteridales; Skaar Ridge; degradation pattern; Basidiomycota; Australoxylon; Vertebraria; white pocket rot |
| **Abstract:** | Evidence of fungal decay is frequently encountered in silicified wood. However, studies focusing on fossil fungal wood degradation remain rare. A characteristic pattern of degradation and decay symptoms congruent with present-day white pocket rot occur in Late Permian silicified glossopteridalean stem and root wood (Australoxylon sp.) from Skaar Ridge, Antarctica. Co-occurring with the decay symptoms are fungal hyphae with clamp connections. Hyphae usually progress through the pit apertures, but some may also penetrate tracheid walls. The individual wall layers in some of the infected tracheids are separated from each other, apparently forming appositions. Small, opaque bodies (?arthropod coprolites) occur in some of the decay pockets. The abundance of infected specimens among the silicified woods from Skaar Ridge suggests that white pocket rot fungi were important decomposers in late Paleozoic high-latitude forest ecosystems. |
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| **Author(s):** | Pablo A. Cabanillas; Marcelo R. Pace and Veronica Angyalossy |
| **Title:** | **Structure and ontogeny of the fissured stems of Callaeum (Malpighiaceae)** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 49 – 66 |
| **Keywords:** | discontinuous cambium; lobed cambium; disruptive parenchyma; lianas; Cambial variant; phloem wedges |
| **Abstract:** | Stem ontogeny and structure of two neotropical twining vines of the genus Callaeum are described. Secondary growth in Callaeum begins with a typical regular cambium that gradually becomes lobed as a result of variation in xylem and phloem production rates in certain portions of the stem aligned with stem orthostichies. As development progresses, lignified ray cells of the initially formed secondary xylem detach on one side from the adjacent tissues, forming a natural fracture that induces the proliferation of both ray and axial nonlignified parenchyma. At the same time, parenchyma proliferation takes place around the pith margin and generates a ring of radially arranged parenchyma cells. The parenchyma generated in this process (here termed disruptive parenchyma) keeps dividing throughout stem development. As growth continues, the parenchyma finally cleaves the lignified axial parts of the vascular system into several isolated fragments of different sizes. Each fragment consists of xylem, phloem and vascular cambium and is immersed in a ground matrix of disruptive parenchyma. The cambium present in each fragment divides anticlinally to almost encircle each entire fragment and maintains its regular activity by producing xylem to the centre of the fragment and phloem to the periphery. Additionally, new cambia arise within the disruptive parenchyma and produce xylem and phloem in various polarities, such as xylem to the inside and phloem to the outside of the stem, or perpendicularly to the original cambium. Unlike the very distinctive stem anatomical architecture resulting from this cambial variant in Callaeum, its secondary xylem and phloem exhibit features typical of lianas. These features include very wide conducting cells, abundant axial parenchyma, high and heterocellular rays and gelatinous fibres. |
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| **Author(s):** | [Shan Li](http://booksandjournals.brillonline.com/search?value1=&option1=all&value2=Shan+Li&option2=author); [Steven Jansen](http://booksandjournals.brillonline.com/search?value1=&option1=all&value2=Steven+Jansen&option2=author) |
| **Title:** | **The root cambium ultrastructure during drought stress in *Corylus avellana*** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 67 – 80 |
| **Keywords:** | fusiform cambial cells; ray cambial cells; embolism; water potential; Electron microscopy |
| **Abstract:** | The activity of the vascular cambium, which plays an important role in plant growth and development, is well known to respond to environmental changes such as drought. Although plant death is suggested to be tightly associated with the death of cambium and other meristematic tissues, direct observations of the cambium ultrastructure during drought-induced mortality remain poorly documented. Here, seedlings of *Corylus avellana* were drought stressed over various days in autumn to reach xylem water potentials (Ψx, -MPa) between -1 and -5.2 MPa. Light and transmission electron microscopy was applied to visualize the ultrastructure of the root cambial cells, while stem vulnerability curves were obtained to quantify embolism resistance. Seedlings that were moderately water stressed with Ψx less negative than P 50 (-2.0 MPa, i.e., the xylem water potential at 50% loss of hydraulic conductivity) showed intact cambium cells. In contrast, the cell membrane of fusiform cambial cells became detached, the tonoplast was shrunken or damaged and cell organelles started to disintegrate in severely water stressed plants with Ψx more negative than P50. Ray cambial cells, however, remained intact and alive for a longer period than fusiform cells. Death of the cambial fusiform cells corresponded more or less to the lethal water potential of this species (Ψlethal = -4.83 MPa). These observations suggest that drought-induced mortality of *C. avellana* is closely associated with cambial death. |
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| **Author(s):** | Oliver Dünisch |
| **Title:** | **Relationship between anatomy and vibration behaviour of softwoods and hardwoods** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 81 – 98 |
| **Keywords:** | laser measurements; Wood structure; resonance wood; basic density |
| **Abstract:** | The influence of cell type and cell arrangement on the vibration characteristics of 91 softwood and hardwood species was studied under controlled conditions. The vibration of standardized wood plates was measured by means of high-resolution laser sensors with an accuracy of ± 0.02 μm and a sampling frequency of 30 kHz. First and second order waves within the vibration spectra were identified by Fast Fourier Transformation analysis. The amplitudes, the frequencies, and the duration of the waves of the 91 timber species were compared by means of principal component analysis. Special attention was paid to the influence of tracheids, vessels, storied rays, growth rings, and the anatomical direction of the wood on the vibration spectra. Due to significant differences in vibration between samples on which the vibration was induced in the transverse, radial, and tangential plane, a comparison between tree species was only possible if plates with precise and identical orientation of the grain were used. In plates with exactly oriented surfaces along the radial plane, distinct vibration characteristics were found in timber species with tracheids as ground tissue (softwoods), in timbers without distinct growth rings, and in timbers with storied rays. In contrast, no relationship was found between the arrangement of the vessels, the width of the xylem rays and the vibration characteristics of hardwoods. |
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| **Author(s):** | Laurence R. Schimleck; Jorge Luis Monteiro de Matos and Charles Espey |
| **Title:** | **Radial variation in pernambuco (Caesalpinia echinata) wood properties** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 99 – 104 |
| **Keywords:** | pernambuco; Caesalpinia echinata; wood properties; microfibril angle; SilviScan; modulus of elasticity; density |
| **Abstract:** | Caesalpinia echinata Lam. (pernambuco or pau-brasil) is recognized as the premier raw material for manufacturing stringed instrument bows. Several studies have identified properties considered important in determining the suitability of pernambuco wood for bow manufacture including density, modulus of elasticity (MOE), and, possibly, microfibril angle (MFA). No research has been conducted on how these properties vary within individual trees; however, an understanding of how pernambuco wood properties vary within trees is important as it may assist in the identification of trees or provenances most suited for the establishment of plantations, aid in developing an understanding of management practices on wood property variation for plantation-grown pernambuco and also facilitate the identification of regions within trees that possess optimal properties for bow manufacture. Radial variation in density, MFA and MOE was examined using SilviScan for three radial strips representing differing levels of wood quality in terms of perceived suitability for making high-quality bows. The lowest quality sample showed considerable radial variation compared to the higher quality samples for all properties and it also had the lowest average density. It was not possible to identify a strong pith to bark trend for any of the wood properties examined. |
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| **Author(s):** | Isabel Carrillo; Sofía Valenzuela and Juan Pedro Elissetche |
| **Title:** | **Comparative evaluation of *Eucalyptus globulus* and *E. nitens* wood and fibre quality** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 105 – 116 |
| **Keywords:** | Resistograph; fibre length; Pilodyn; basic density; coarseness |
| **Abstract:** | An evaluation of 100 *Eucalyptus globulus* and 100 *E. nitens* trees (six years old) was made using the Pilodyn micro-drilling tool as an indicator of wood density. Thirty *E. globulus* and thirty *E. nitens* trees with high, medium and low density were selected and sampled with an increment borer at breast height for anatomical analysis using fibre tester equipment and the Resistograph device to generate detailed information about fibre biometry and anatomical wood properties of both species for hybrid development. *Eucalyptus globulus* trees had a basic wood density average of 478 kg/m3, while *E. nitens* had a density of 490 kg/m3. Both micro-drilling tools showed significant correlation coefficients with basic wood density. Correlation coefficients between basic wood density and Pilodyn values were negative, being -0.53 (p = 0.01) and -0.68 (p < 0.001) for *E. globulus* and *E. nitens*, respectively. For both species a positive correlation was observed between basic density and Resistograph mean amplitude; the correlation coefficient was 0.84 (p < 0.001) for *E. globulus*, and 0.85 (p < 0.001) for *E. nitens*. *Eucalyptus nitens* trees had a higher density and amplitude average and smaller Pilodyn values than *E. globulus* trees, while the latter had higher coarseness, fibre length and diameter at breast height than *E. nitens* trees. However, *E. nitens* showed larger differences between features of earlywood and latewood in a growth ring than *E. globulus* trees. |
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| **Author(s):** | Peter Gasson; Caroline Cartwright and Claudia Luizon Dias Leme |
| **Title:** | **Anatomical changes to the wood of Croton sonderianus (Euphorbiaceae) when charred at different temperatures** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 117 – 123 |
| **Keywords:** | pits; cell walls; charring; Caatinga; marmeleiro; gum; charcoal; tyloses |
| **Abstract:** | Wood retains most of its anatomical characteristics when charred, but charring temperature determines the appearance of the resulting charcoal and this depends largely on the proportions and distribution of the constituent vessels, fibres and parenchyma, as well as moisture content. This study describes the structural changes in the charcoal of the wood of Croton sonderianus Muell. Arg. at two temperatures, 400 °C or 600 °C. This species is an important source of charcoal in the caatinga of the northeast part of Brazil. The samples were heated for ten minutes to reach treatment temperature, charred for two hours at either 400 °C or 600 °C and then left to cool to ambient temperature for 30 to 60 minutes. Our observations showed that most of the changes occurred when charcoal was produced at 600 °C, but the qualitative features necessary for identification were retained. At this temperature, cells lost their circular shape, became angular and occasionally amorphous, the middle lamella disappeared and the walls of adjacent cells coalesced, cell walls became thinner, and the prismatic crystals developed cracks and became porous. Our findings are compared with those for two previously studied Mimosa species which have an entirely different anatomy. |
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| **Author(s):** | Pieter Baas; Steven R. Manchester; Elisabeth A. Wheeler and Rashmi Srivastava |
| **Title:** | **Fossil wood with dimorphic fibers from the Deccan Intertrappean Beds of India – the oldest fossil Connaraceae?** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
| **Pages:** | 124 – 133 |
| **Keywords:** | Lagerstroemia; Connarus; Parenchyma-like fiber bands; Melastomataceae; radial tubules |
| **Abstract:** | Wood of Connaroxylon dimorphum (Connaraceae, Oxalidales) from the Deccan Intertrappean Beds of India (KPg Boundary 65–67 MY BP) is described. It is characterized by parenchyma-like fiber bands alternating with normal fibers, septate and nonseptate fibers, vessel-ray pits with strongly reduced borders, uniseriate rays of square and upright cells, and radial tubules in the center of ray cells that are arranged in a herringbone pattern. The overall wood anatomy strongly resembles Melastomataceae p. p., Lagerstroemia p. p. (Lythraceae) and Connarus (Connaraceae). However, the shared radial tubules of Connarus and the fossil strongly tilt the evidence of botanical affinities towards this genus. This would represent the second and by far the oldest fossil wood record of the Connaraceae, also considerably older than the earliest fossil records of the family’s other plant parts, and one of the oldest fossils of the order Oxalidales. |
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| **Author(s):** | Pieter Baas |
| **Title:** | **Timber Trees of Suriname – an identification guide. Chequita R. Bhikhi, Paul J.M. Maas, Jifke Koek-Noorman & Tinde R. van Andel, 288 pp., colour illus. 2016. LM Publishers, Volendam, The Netherlands. ISBN 978-94-6022-391-4. Price EUR 49.50 (hardback).** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
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| **Author(s):** | Pieter Baas |
| **Title:** | **Cites and Timber – a guide to CITES-listed tree species [also available in French and Spanish]. Madeleine Groves & Catherine Rutherford, 92 pp., colour illus. 2016. Kew Publishing, Royal Botanic Gardens Kew, UK. ISBN 978-1-84246-592-9 (paperback and pdf). Price of paperback USD 68.00/GBP 39.00; pdf free of charge available from the web.** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
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| **Author(s):** | [Frederic Lens](http://booksandjournals.brillonline.com/search?value1=&option1=all&value2=Frederic+Lens&option2=author) |
| **Title:** | **wood anatomy news: Message from the outgoing Executive Secretary** |
| **Source:** | IAWA Journal, Volume 38, Issue 1 |
| **Publication Year:** | 2017 |
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