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| **Author(s):** | Veronica De Micco; Enrica Zalloni; Giovanna Battipaglia; Arturo Erbaggio; Pasquale Scognamiglio; Rosanna Caputo and Chiara Cirillo |
| **Title:** | **Rootstock effect on tree-ring traits in grapevine under a climate change scenario** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 145 – 155 |
| **Keywords:** | functional wood traits; Drought; tree rings; rootstock; Vitis vinifera; water use efficiency |
| **Abstract:** | Projected changes in drought occurrence in the Mediterranean region are raising concerns about the adaptive capability of rainfed crops, such as grapevine, to increasing aridity. Cultivation management, especially the techniques influencing the hydraulic pathway, can play a role in plant adaptation to drought for the consequent changes in wood anatomical functional traits. The aim of this study was to assess the effect of grafting on wood anatomy in tree-ring series of *Vitis vini-fera* L. ‘Piedirosso’ grapevine cultivated in a volcanic area in Southern Italy. Tree-ring anatomy was analysed in vines grown on their own roots or grafted onto 420A rootstock. Results showed that grafted vines had a higher occurrence of wood traits linked with safety of water transport if compared with non-grafted vines. Grafting induced the formation of tree rings with higher incidence of latewood also characterised by narrower and more frequent vessels if compared with non-grafted vines. This study suggested a different regulation of water flow in the grafted and non-grafted vines. Such findings support the analysis of wood anatomy as a tool to drive decisions linked with plant cultivation management. In this specific case, our results encourage to further explore the change from a traditional cultivation with own-rooted grapevines towards grafted models inducing better xylem adaptation to increasing drought. |
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| **Author(s):** | Tatiana V. Tarelkina; Ludmila L. Novitskaya; Nadezhda N. Nikolaeva and Veronica De Micco |
| **Title:** | **Effect of sucrose exposure on the xylem anatomy of three temperate species** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 156–176  |
| **Keywords:** | Vessels; anomalous xylem rays; curly grain; figured wood |
| **Abstract:** | This study is a continuation of research on the role of sucrose in figured wood formation in temperate trees. Different concentrations of sucrose solutions were administered for 7 weeks to trunk tissues of Betula pendula Roth, Alnus incana (L.) Moench and Populus tremula L. Then xylem anatomy was examined with particular emphasis to the number of vessels and the spatial orientation of xylem elements. In B. pendula and A. incana a high level of exogenous sucrose caused a reduction in the number and size of xylem vessels, even to the point of absence of vessels. Sucrose concentrations of 100 and 200 g l-1 induced the formation of curly grain and anomalous club-shaped rays in xylem of B. pendula. Populus tremula xylem was not significantly altered by the experiment; the xylem anatomy was more seriously affected by wounding than by sucrose. In B. pendula and A. incana the wood formed during the experiment was similar to figured wood of these species. The decrease in the number and size of vessels in the xylem formed during the experiment possibly suggests that high concentrations of sucrose lead to a decline in the level of physiologically active auxin. Changes in the orientation of xylem elements points to a disruption of basipetal auxin transport. Further biochemical and physiological studies are needed to provide more comprehensive understanding of the relationship between sucrose and auxin during the development of figure in wood. |
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| **Author(s):** | Rena T. Schott and Anita Roth-Nebelsick |
| **Title:** | **SIce nucleation in stems of trees and shrubs with different frost resistance** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 177–190 |
| **Keywords:** | Betula albosinensis; temperature; ice nucleation activity; bark; Wood; Castanea sativa; Betula nana; intercellular spaces |
| **Abstract:** | In this study, the ice nucleation activity (INA) and ice nucleation temperature (INT) as well as extracellular ice formation within the bark were determined for three woody species with different degrees of frost resistance, Betula nana, Betula albosinensis and Castanea sativa. Current-year stems and at least 2-year old stems of B. nana and C. sativa as well as current-year stems of B. albosinensis were compared, during summer (non-acclimated state) and winter (acclimated state), to evaluate possible ontogenetic and seasonal differences. Acclimated plant parts of the selected species revealed nearly similar results, with an INT from -7.52 to -8.43°C. The current-year stems of B. nana had a somewhat higher INT than the older stems. Microscopic analysis showed that extra-cellular ice formation occurred in the intercellular spaces within the bark of stems of B. nana, B. albosinensis and C. sativa. Size of the intercellular spaces of the bark were species-specific, and B. nana showed the largest intercellular space volume. While freezing behavior and extracellular ice formation thus followed principally the same pattern in all considered species, B. nana is obviously capable of dealing with large masses of extracellular ice which accumulate over extended periods of frost, making B. nana capable of protecting living tissue in colder regions from freezing damage. |
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| **Author(s):** | Anna B. Wilczek; Muhammad Iqbal; Wieslaw Wloch and Marcin Klisz |
| **Title:** | **Geometric analysis of intrusive growth of wood fibres in *Robinia pseudoacacia*** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 191–208 |
| **Keywords:** | symplastic cell growth; intrusive cell growth; radial stem growth; vascular cambium; Circular-symmetrical increment; wood fibres |
| **Abstract:** | All cell types of the secondary xylem arise from the meristematic cells (initials) of the vascular cambium and grow under mechanical constraints emerging from the circular-symmetrical geometry that characterises many tree trunks. The course of intrusive growth of cambial initials has been elucidated, but is yet to be described in the case of xylem fibres. This study explains the geometry of intrusive growth of the secondary xylem fibres in the trunk of Robinia pseudoacacia. Long series of serial semi-thin sections of the vascular cambium and the differentiating secondary xylem were analysed. Since fibres grow in close vicinity to expanding cells of the derivatives of the vascular cambium, we assumed that they have similar growth conditions. Dealing with the cylindrical tissue of the vascular cambium in a previous study, we used a circularly symmetrical equation for describing the growth mechanism of cambial initials. Like the cambial initials, some of the cambial derivatives differentiating into the various cell types composing the secondary xylem also exhibit intrusive growth between the tangential walls of adjacent cells. As seen in cross sections of the cambium, intrusively growing initials form slanted walls by a gradual transformation of tangential (periclinal) walls into radial (anticlinal) walls. Similarly, the intrusive growth of xylem fibres manifests initially as slants, which are formed due to axial growth of the growing cell tips along the tangential walls of adjacent cells. During this process, the tangential walls of adjacent cells are partly separated and dislocated from the tangential plane. The final shape of xylem fibres, or that of vessel elements and axial parenchyma cells, depends upon the ratio of their intrusive versus symplastic growths in the axial, circumferential and radial directions. |
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| **Author(s):** | Oscar Troncoso and Alina Greslebin |
| **Title:** | **Trabeculae in Patagonian mountain cypress (*Austrocedrus chilensis*) associated with *Phytophthora austrocedri* infection** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 209–220 |
| **Keywords:** | Forest disease; wood anatomy; softwood; root pathogens; stress response; Patagonia |
| **Abstract:** | Phytophthora austrocedri is a straminipilous (heterokonta) organism that causes mortality of Austrocedrus chilensis, an endemic Cupressaceae from the Patagonian Andes forest in temperate South America. This soil pathogen colonizes and kills the roots and extends up to the stem causing necrosis of cambium, phloem and xylem ray parenchyma. An anatomical study of affected tissues was conducted in order to better understand the process of pathogen colonization and tree response. It was found that tracheids of the xylem of affected trees showed large numbers of trabeculae, both rod- and plate-shaped. The occurrence of these structures was clearly associated with the necrotic lesion area, since the trabeculae were rare in healthy tissues above the necrotic lesion. Trabeculae occurred in a variety of arrangements: solitary or in long files, single, double or triple. Our results could indicate that trabeculae proliferation in tracheids of A. chilensis trees is induced by the stress generated by the P. austrocedri invasion. Whether this is triggered by a nonspecific stress response or in direct response to the pathogen remains to be tested. |
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| **Author(s):** | Ekaterina L. Kotina; Patricia M. Tilney; Abraham E. van Wyk; Alexei A. Oskolski and Ben-Erik van Wyk |
| **Title:** | **“Hairy” bark in *Lannea schweinfurthii* (Anacardiaceae): hyperhydric-like tissue formed under arid conditions** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 221–233 |
| **Keywords:** | [periderm](http://booksandjournals.brillonline.com/search?value1=periderm&option1=fulltext); [phelloid “hairs”](http://booksandjournals.brillonline.com/search?value1=phelloid+%E2%80%9Chairs%E2%80%9D&option1=fulltext); [lenticels](http://booksandjournals.brillonline.com/search?value1=lenticels&option1=fulltext); [Aerenchymatous phellem](http://booksandjournals.brillonline.com/search?value1=Aerenchymatous+phellem&option1=fulltext);[root bark](http://booksandjournals.brillonline.com/search?value1=root+bark&option1=fulltext); [stem bark](http://booksandjournals.brillonline.com/search?value1=stem+bark&option1=fulltext) |
| **Abstract:** | remarkable, almost fur-like “indumentum” of velvety “hairs” (sometimes referred to as “fungi”) occurs on the roots (and to a lesser extent also on the trunk) of Lannea schweinfurthii var. stuhlmannii and is known as vhulivhadza in the Venda language (Tshivenḓa). The hairs are traditionally used by the Venda people (Vhavenḓa) of the Limpopo Province of South Africa, for various biocultural purposes. A detailed anatomical study of the origin, structure and development of these unusual “hairs” showed that they are of peridermal origin and develop from dense clusters of phelloid cells which are scattered within the stratified phellem. These cells are capable of considerable radial elongation thus forming hair-like radial files of elongated phelloid cells. The “hairy” patches on the bark may also develop from lenticels which become hypertrophied. These clusters of phelloid cells resemble the hyperhydric tissue which is reportedly formed in periderm of stems exposed to a water-saturated environment in some plant species. The formation of hyperhydric-like tissue in roots and stems of L. schweinfurthii var. stuhlmannii occurs, however, under relatively arid conditions. Since this tissue contains large intercellular spaces, it may also be regarded as a specialized type of aerenchymatous phellem. The adaptive significance, if any, of the phelloid “hairs” remains unknown. |
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| **Author(s):** | Vladimír Račko; Ol’ga Mišíková; Jaroslava Štefková and Igor Čunderlík |
| **Title:** | **A fast method to prepare microslides of wood in advanced stages of decay** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 234–243 |
| **Keywords:** | decayed wood; nail polish gel; Micropreparation; embedding; sectioning |
| **Abstract:** | Biologically degraded wood in advanced stages of decay has a very soft and brittle structure that causes many problems during sectioning. Embedding wood specimens in different kinds of media ensures preparation of good quality microsections, but the preparation time is very long. The proposed method does not only have a reduced preparation time but also minimizes costs and consumption of chemicals while improving stabilization of the specimen and enhancing the quality of sections. The crux of the method is application of a reinforcing layer of transparent nail polish gel on a dry specimen that has been only stabilized (not embedded) with PEG 1500 medium. The gel is applied on a specimen in two layers just before sectioning. The first layer infiltrates the specimen sufficiently deep to fill the lumens and cell walls and allows preparation of thin sections from decayed wood. The second layer reinforces the section and allows better handling. Subsequently, the reinforcing and embedding layers are removed using pure acetone. This innovative method has so far been successfully tested on specimens that were degraded by the fungus Pleurotus ostreatus (mass loss 55% and 83%) and the fungus Phaeolus schweinitzii (mass loss 45%), taken from Fagus sylvatica and Pinus sylvestris species, a hardwood and softwood respectively with contrasting wide vessels and narrow tracheids. |
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| **Author(s):** | Pieter Baas |
| **Title:** | **Stem anatomy of Dalbergia and Diospyros species from Madagascar – with a special focus on wood identification. Bako Harisoa Ravaomanalina, Alan Crivellaro & Fritz Hans Schweingruber. ix + 119 pp, colour illus., 2017. Springer International, ISBN 978-3-319-5114-0, DOI 10.1007/978-3-319-51147-4. Price USD 179.99 (hardback; also available as e-book at USD 139.00).** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
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| **Abstract:** |  |
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| **Author(s):** | Pieter Baas |
| **Title:** | **Atlante dei principali legni presenti in Italia (Atlas of the principal Italian woods – in Italian). Flavio Ruffinatto, Corrado Cremonini & Roberto Zanuttini. iv + 96 + ii pp., colour illus., 2017. Regione Piemonte - Direzione OO.PP., Difesa del suolo, Montagna Foreste, Protezione Civile, Trasporti Logistica. Settore Foreste, Torino, Italy. ISBN: 978-88-96046-06-7. Published on internet, free of charge.** |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 245–246 |
| **Keywords:** |  |
| **Abstract:** |  |
| **DOI:** | 10.1163/22941932-03902009 |

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| **Author(s):** | Pieter Baas |
| **Title:** | Houtvademecum 11 th edition (Wood Vademecum – in Dutch). R.K.W.M. Klaassen (editor-in-chief), 832 pp., colour illus., 2018. Centrum Hout Almere and Vakbladen.com & Smartwave, Zwolle, The Netherlands. ISBN 978-90-828-172-94. Price: EUR 125.96 (hard cover). |
| **Source:** | IAWA Journal, Volume 39, Issue 2 |
| **Publication Year:** | 2018 |
| **Pages:** | 246-247 |
| **Keywords:** | Biology |
| **Abstract:** |  |
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