Cover Stories:

Major Scientific Publications Featuring NRI-Funded Research

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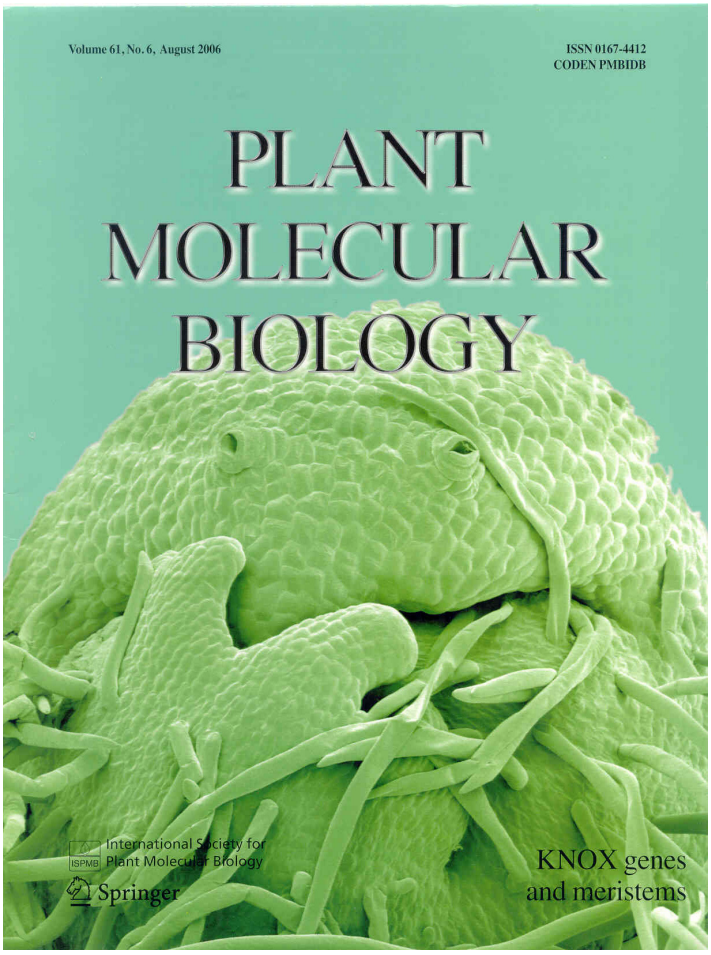
A. T. Groover, S. D. Mansfield, S. P. DiFazio, G. Dupper, J. R. Fontana, R. Millar, and Y. Wang. 2006. The Populus Homeobox Gene ARBORKNOX1 Reveals Overlapping Mechanisms Regulating the Shoot Apical Meristem and the Vascular Cambium. ***Plant Molecular Biology*** 61: 917-932.



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New research indicates that the same genetic pathway regulates tree growth 'up' via shoot tip growth and 'out' by radial growth. Shoot tip growth is supported by dividing meristematic cells that develop into leaves, stems, or flowers. The radial growth of tree trunks is supported by dividing cells in the vascular cambium, which develops into wood or bark. While the genes regulating the growth of shoot tips are relatively well known, the genes and mechanisms regulating the vascular cambium are not well understood. Recently, the use of molecular genetic and genomic tools in the model tree genus Populus are showing that many of the genes regulating the shoot apical meristem also regulate the vascular cambium. This new information provides a road map for understanding the genetic regulation of the vascular cambium and wood formation. The researchers cloned the gene encoding a transcription factor required for shoot apical meristem function from poplar and this gene was shown to also regulate fundamental aspects of vascular cambium function and wood formation. Evidence was also found that the transcription factor regulates genes involved in lignin, a key component of wood, biosynthesis. The ability to manipulate lignin formation will impact applications including paper making and biofuels.

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