

BRENDAN CHOAT

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EDUCATION

Ph.D. James Cook University (JCU), Townsville, Australia and Research School of Biological Sciences (RSBS), Australian National University, Canberra, Australia (2003).

Dissertation: Hydraulic architecture and seasonal water-use in dry rainforest trees of contrasting leaf phenology. Supervisors: Dr Joe Holtum (JCU), Dr Jon Luly (JCU), Dr Marilyn Ball (RSBS).

B.Sc. (Hons), Plant Biology, James Cook University (1997)

APPOINTMENTS

Research fellow: Research School of Biological Sciences, Australian National University, (2008 to present) Functional Ecology Group, Prof Marilyn Ball.

Postdoctoral fellow: Viticulture and Enology, University of California, Davis (2005 to 2008) Laboratory of Dr Mark Matthews

Postdoctoral fellow: Organismic and Evolutionary Biology, Harvard University (2003 to 2005) Laboratory of Dr Michele Holbrook

ACADEMIC EXCELLENCE AWARDS AND SCHOLARSHIPS

- Collaborative Research Scholarship, Research School of Biological Sciences, Australian National University, Canberra (1999)
- Australian Society of Plant Physiologists Student Poster Prize, Combio Conference (1999)
- Australian Postgraduate Award Scholarship, James Cook University (1998)
- P.F. Brownell Medal for Plant Physiology (1998), JCU.

RESEARCH GRANTS (*co-author of grant proposal. I could not be formally listed on these grants because of my status as a postdoctoral fellow)

*Matthews MA, McElrone AJ, Phillips R, Shackel KA (2008-2011) “The role of systems level properties in the transport function of the xylem network” NSF, Integrative Organismal Systems Program, Funded \$412,711, University of California, Davis.

*Jansen S (2006-2008) “Structure and function of pit membranes in water conduction pathways of plants” Natural Environmental Research Council (NERC) new investigators proposal, Funded £69,513, Royal Botanical Gardens, Kew.

*Matthews MA, Shackel KA (2006-2008) “Solute accumulation and apparent hydraulic isolation of fleshy fruit” USDA, National Research Initiative, Environmental Stress Program. Funded \$175,495. University of California, Davis.

Choat B, Jansen S (2005) “Functional studies of pit membrane thickenings in angiosperms” Lennox Boyd Memorial Trust Fund Award, Funded £2,000

Choat B (2003) “The effects of seasonal drought on hydraulic architecture and vulnerability to embolism in *Cordia*” Mellon Exploration Grant, Smithsonian Tropical Research Institute and Organisation of Tropical Studies, Funded \$6000

PUBLICATIONS (*publication co-authored with student)

Jansen S, **Choat B**, Pletsers A. (accepted, Oct 2008) Morphological variation of intervessel pit membranes and implications to xylem function in angiosperms. *American Journal of Botany*

Choat B, Cobb AR, Jansen S (2008) Tansley Review: Structure and function of bordered pits: new discoveries and impacts on whole plant hydraulic function. *New Phytologist* 177: 608-625

Choat B, Sack L, Holbrook NM. (2007). Diversity of hydraulic traits in nine *Cordia* species growing in tropical rainforests with contrasting precipitation. *New Phytologist* 175: 686-698

*Cobb AR, **Choat B**, Holbrook NM. (2007). Dynamics of freeze-thaw embolism in *Smilax rotundifolia* (Smilacaceae) *American Journal of Botany* 94: 640–649

Jansen S, Sano Y, **Choat B**, Rabaey D, Lens F, Dute RR. (2007). Pit membranes in tracheary elements of *Rosaceae* and related families: new records of tori and pseudo-tori. *American Journal of Botany* 94: 503–514

*Stuart SA, **Choat B**, Martin K, Holbrook NM and Ball MC. (2007). The role of freezing in defining the latitudinal limits of mangrove forests. *New Phytologist* 173: 576-583

***Choat B**, Brodie TW, Cobb AR, Zwieniecki MA, Holbrook NM. (2006). Direct measurements of intervessel pit membrane hydraulic resistance in two angiosperm tree species. *American Journal of Botany* 93: 993-1000

Choat B, Ball MC, Luly JG, Donnelly C, Holtum JAM. (2006). Seasonal patterns of leaf gas exchange and water relations in dry rainforest trees of contrasting leaf phenology. *Tree Physiology* 26: 657-664

Lovelock CE, Ball MC, **Choat B**, Holbrook NM, Feller IC. (2006). Linking physiological processes with patterns in mangrove forest structure: Phosphorus deficiency limits canopy development, hydraulic conductivity and photosynthetic carbon gain in dwarf *Rhizophora mangle*. *Plant, Cell and Environment* 29: 793-802

***Choat B**, Lahr E, Melcher PJ, Zwieniecki MA, Holbrook NM. (2005). The spatial pattern of air seeding thresholds in mature sugar maple trees. *Plant, Cell and Environment* 28: 1082–1089

Choat B, Ball MC, Luly JG, Holtum JAM. (2005). Hydraulic architecture of deciduous and evergreen dry rainforest tree species from north-eastern Australia. *Trees – Structure and Function* 19: 305–311

Choat B, Jansen S, Zwieniecki MA, Smets E, Holbrook NM. (2004). Changes in pit membrane porosity due to deflection and stretching: the role of vested pits. *Journal of Experimental Botany* 55: 1569 - 1575

Jansen S, **Choat B**, Vinckier S, Lens F, Schols P, Smets E. (2004). Intervascular pit membranes with a torus in the wood of *Ulmus* (Ulmaceae) and related genera. *New Phytologist* 163: 51-59

Choat B, Ball M, Luly J, Holtum J. (2003). Pit membrane porosity and water stress-induced cavitation in four co-existing dry rainforest tree species. *Plant Physiology* 131: 41-48

SYNERGISTIC ACTIVITIES

- Invited seminars and symposium contributions: Department of Biology, Sonoma State University (2007); Australian Vegetation Network *Wood Anatomy and Wood Density* Working Group, NESCent headquarters, Duke University, (2007); Rancho Santa Ana Botanical Gardens, Claremont, USA (2006); Duke University (2005); Royal Botanical Gardens, Kew (2004); Research School of Biological Sciences at Australian National University (2004); Smithsonian Tropical Research Institute (2004); Harvard University Herbaria (2003); *Long Distance Transport Processes in Plants Symposium* at Harvard Forest (2002).

TEACHING EXPERIENCE

- Mentor, Masters Program, Department of Viticulture and Enology, UC Davis (2006). Assistance with development of hypotheses and research proposal, construction of equipment and experimental design, data analysis and preparation of results for publication.
- Mentor, Research Experience for Undergraduates (REU) program, Harvard Forest (2003, 2005). One-on-one mentoring of undergraduate students for experimental design, data acquisition and analysis, oral and written presentation of results.
- Mentor, Research Science Institute program, Massachusetts Institute of Technology (2004) Mentoring of high school students in developing research project, conducting experiments, written and oral presentation of results.
- Guest Lecture, “Plant Physiology” Harvard Forest (2003) Covered physiology of water transport in plants to 30 undergraduate students in REU program.
- Guest Lecture, “Tropical Plant Ecology” Harvard University, Dr Michele Holbrook (2003) Discussed the historical biogeography of Australia flora.
- Teaching Assistant, “Plant Ecophysiology” James Cook University, Dr Joe Holtum (2000). Instructed undergraduate students in ecophysiological measurements including leaf gas exchange, chlorophyll fluorescence and plant water status.
- Lab Teaching Assistant, “Marine Botany” James Cook University, Dr Joe Holtum (1999-2000). Instructed 10 students in laboratory and field components including sampling techniques and electron microscopy.
- Lab Teaching Assistant, “Introduction to Botany” James Cook University, Prof. Betsy Jackes (1997, 1999). Instructed laboratory component of course on topics of plant identification, anatomy, diversity and evolutionary relationships.

EDITORIAL AND PROFESSIONAL SERVICE

Referee for *American Journal of Botany*, *Australian Journal of Botany*, *Ecology*, *International Association of Wood Anatomists Journal*, *Journal of Tropical Forest Science*, *Microscopy and Microanalysis*, *New Phytologist*, *Oecologia*, *Plant Biology*, *Plant Cell and Environment*, *Plant Physiology*, *Tree Physiology*, *Trees - Structure and Function*.

PROFESSIONAL SOCIETIES

Botanical Society of America, Ecological Society of America, International Association of Wood Anatomists.

CONFERENCE PARTICIPATION

- Choat B, Jansen, J and Pittermann, J. Oral Presentation. "The significance of bordered pits to hydraulic efficiency and safety in plants." Ecohydrology and ecophysiology of water-limited environments, University of Western Australia, 15th -19th September, 2008
- Choat B, Gambetta, GA, Shackel, KA, Matthews MA. Poster Presentation. "The role of vascular function in the apparent hydraulic isolation of grape berries." Structure and Function of Plant Hydraulic Systems, March 2008.
- Choat B, Krasnow MA, Shackel, KA, Matthews MA. Oral Presentation. "Water and sugar budget of developing grape berries." MAMapalooza: outreach to grape and wine industry. Napa Valley, California, March 2008.
- Choat B, Jansen, J and Pittermann, J. Oral Presentation. "The significance of bordered pits to hydraulic efficiency and safety in plants." Ecohydrology and ecophysiology of water-limited environments, University of Western Australia, 15th -19th September, 2008.
- Choat B, Sack L, Holbrook NM. Oral presentation. "Diversification of hydraulic traits in nine *Cordia* species growing in tropical rainforests with contrasting precipitation." 92th annual meeting of the Ecological Society of America, San Jose, California, Aug 2007.
- Choat B, Brodie TW, Cobb AR, Zwieniecki MA, Holbrook NM. Oral Presentation. "Direct measurements of intervessel pit membrane hydraulic resistance in two angiosperm tree species." 100th annual meeting of the Botanical Society of America, Chico, California, 28th Jul – 2nd Aug 2006.
- Choat B, Zwieniecki MA, Holbrook NM. Oral presentation. "Spatial variation in cavitation threshold and xylem sap ionic concentration in mature sugar maple trees." 90th annual meeting of the Ecological Society of America, Montreal, Canada, Aug 2005.
- Choat B, Jansen S, Zwieniecki MA, Smets E, Holbrook NM. Oral Presentation. "Changes in pit membrane porosity due to deflection and stretching: the role of vestured pits." International Association of Wood Anatomists Annual Meeting, Montpellier 24th – 29th Oct 2004.
- Choat B, Holbrook NM. Oral presentation. "Variation in hydraulic traits of *Cordia* species occurring across a rainfall gradient" Association of Tropical Biology annual meeting, Miami, Florida 12th - 15th Jul 2004.
- Choat B, Luly J, Ball MC, Holtum JAM. Oral presentation. "Pit membrane porosity and vulnerability to embolism in four seasonally dry rainforest tree species" 87th annual meeting of the Ecological Society of America, Tucson, Arizona 3rd-9th Aug 2002.
- Choat B, Luly J, Ball MC, Holtum JAM. Oral presentation. "Gas exchange and hydraulic architecture of trees of different leaf phenology from a seasonally dry rainforest in Australia" Association of Tropical Biology annual meeting, Panama City, Panama 29th Jul – 2nd Aug 2002.
- Choat B, Luly J, Ball MC, Holtum JAM Oral presentation "Vulnerability to embolism and hydraulic architecture in dry rainforest trees of differing leaf phenology." Combio 2001, 41st Annual meeting of the Australian Society for Plant Physiologists, Canberra, Australian Capital Territory, 1st - 4th Oct 2001.
- Choat B, Luly J, Ball MC, Holtum JAM. Oral presentation. "Vulnerability to embolism and hydraulic architecture of dry rainforest tree species of differing leaf phenology from north Queensland." 85th annual meeting of the Ecological Society of America, Snowbird, Utah, 6th – 10th Aug 2000.

Choat B, Luly J, Ball MC, Holtum JAM. Poster presentation. "Hydraulic architecture in trees of differing leaf phenology in a seasonally dry rainforest." *Combio 99*, 39th Annual meeting of the Australian Society for Plant Physiologists, Gold Coast, Queensland, 27th Sept – 1st Oct 1999. ASPP student poster prize awarded for presentation.

Choat B, Luly J, Hansman D, Holtum JAM. Poster presentation. "Water use strategies of dry rainforest tree species at red falls, north Queensland." *Combio 98*, 38th Annual meeting of the Australian Society for Plant Physiologists, Adelaide, South Australia 28th – 30th Sept 1998.