

Michael V. Mickelbart

Associate Professor
Department of Botany and Plant Pathology
Purdue University
West Lafayette, IN 47907-1165

Professional experience

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| 2011-present | Associate Professor, Purdue University (60% research, 40% teaching) |
| 2005-2011 | Assistant Professor, Purdue University (60% extension, 30% research, 10% teaching) |
| 2001-2005 | Lecturer, Lincoln University, New Zealand |
| 2000-2001 | Post Doctoral Associate, University of California, Riverside |

Education

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| Ph.D., Horticulture (Plant Physiology) | Purdue University | 2000 |
| B.S., Botany | University of California, Riverside | 1995 |

Membership in professional organizations

American Society of Plant Biologists

Honors and special appointments

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| 2015 | Benjamin Meeker Visiting Professor, University of Bristol, Bristol, UK |
| 2012 | Fulbright Visiting Scientist Fellowship, Universidad ICESI, Cali, Colombia |
| 2011 | Borlaug Fellowship Visiting Scientist, National Research Center on Plant Biotechnology, New Delhi, India |
| 2011- | Editorial Board, Frontiers in Plant Physiology |
| 2010- | Steering Committee, Conference on Biotechnology Research and Applications in Palestine |
| 2008 | Chair, ASHS Environmental Stress Working Group |
| 2006 | President, Purdue Young Faculty Association |
| 2006-10 | Editorial Board, PLoS One |

Description of research, scholarly activity, and creative endeavors

Research in the Mickelbart lab is focused on three areas: 1) water use efficiency (WUE), 2) plant nutrition, and 3) horticultural and crop physiology. Descriptions of current research projects follow:

Plant water use efficiency (WUE). Water is an increasingly limited resource in all areas of the world. The Mickelbart lab uses a number of approaches to understand the genetic basis of WUE, utilizing model C3 broadleaf (*Arabidopsis*, *Eutrema*, and *Populus*) and C4 grass (*Zea mays*) species. Work to date has established that WUE can be improved through slight reductions in transpiration without a concomitant reduction in carbon fixation (Yoo et al., 2009). Furthermore, the lower transpiration appears to be related to a reduction in stomatal density (Yoo et al., 2011). Identification of a transcriptional regulator of stomatal development, GTL1, has led to a better understanding of stomatal development, transpiration, and WUE in *Arabidopsis* (Yoo et al., 2010). Importantly, the function of GTL1 is conserved in poplar (Weng et al., 2012), demonstrating that the negative regulatory pathway of stomatal development identified in *Arabidopsis* is also present in a model and economically important woody species. To better understand the role of stomata in water use efficiency and adaptation to the environment, genome-wide association mapping was used to identify candidate genes in *Arabidopsis* (manuscripts in preparation). Work in maize has demonstrated genetic diversity for WUE among maize genotypes, particularly with respect to transpirational response to vapor pressure deficit (manuscripts in preparation). Genetic regions associated with WUE have been identified in *Thellungiella salsuginea*, a model halophyte plant and candidate genes are currently being characterized.

Plant nutrition. In the past decade or so, nursery production in the Midwest has increasingly moved from highly-buffered field production to more dynamic container production systems. Previous research in the Mickelbart lab was focused on developing fertilizer programs for container nurseries that allow for reduced nutrient input while maintaining adequate growth and salability of plants. Studies conducted thus far have established that fertilizer rates can be substantially reduced in species such as *Pyrus calleryana* (callery pear), saving growers money and reducing environmental damage due to leached nutrients. Another aspect of nutrient management is the potential negative effects of over fertilizing. In conjunction with the Sadof lab, it was determined that leaf traits related to genotype appear to be more important than leaf nitrogen concentration with respect to incidence of leafhoppers and spider mite (both major nursery pests). The role of differential cultivar response to fertilizer is also being evaluated to guide growers in their decision making. In a trial established in 2007 at the Purdue Meigs farm, it was established that there was no relationship between fertilizer type or rate on bark splitting. Bark splitting accounts for approximately 5% of nursery losses (\$6.6 million) in the Midwest. A manuscript describing this data is in preparation.

Crop physiology. Recently, the ability to identify genetic regions responsible for phenotypic variation has increased at an exponential rate. However, the ability to quantify the effects of the environment on phenotype often requires careful measurements of whole-plant physiology. Dr. Mickelbart has a long history of work in the area of environmental crop physiology (pre-2005 publications), and has applied this expertise to better understand nursery and landscape production (HortSci 2012, J Env Hort 2011, HortSci 2010 [2], HortTech 2010 [2]), fruit and crop production (Sci Hort 2012 [2], Plant Phys 2011, Phytochem 2010, J Hort Sci Biotech 2007, J Pl Nut 2007, Eur J Agry 2007), as well as model species (J Exp Bot 2010, PLoS Gen 2009). The Mickelbart lab is continuing work in this area in his lab as well as through collaborations with colleagues in multiple departments at Purdue and other universities.

Publications and presentations

Book chapters

1. **Mickelbart, M.V.**, P.M. Hasegawa, and D.E. Salt. 2010. Responses and Adaptations to Abiotic Stress. In: L. Taiz and E. Zeiger (eds.). *Plant Physiology*, 5th Ed. Sinauer Associates, Inc., Sunderland, Massachusetts.
2. Schaffer, B., P.M. Gil, **M.V. Mickelbart**, and A.W. Whaley. 2013. Ecophysiology. In: B. Schaffer, B.N. Wolstenholme, and A.W. Whaley (eds.). *The Avocado: Botany Production and Uses, 2nd Edition*. CAB International Press, Wallingford, UK 416 pp.

Refereed papers (*Corresponding author): (IF denotes Journal Impact Factor assigned by ISI, Thomson Reuters)

1. Yoo, C.Y., A. Finkler, H. Weng, A.S.N. Reddy, B.W. Poovaiah, H. Fromm, P.M. Hasegawa, and **M.V. Mickelbart***. 20___. Hyperosmotic stress-induced Ca²⁺/calmodulin activates *SDD1* by allosteric inhibition of the GTL1 transrepressor DNA-binding activity. Submitted to PNAS.
2. Gosney, M.J. and **M.V. Mickelbart***. 201_. Curve fitting and parameter estimations for gravimetric quantification of plant water loss. Submitted to *Frontiers in Plant Science*.
3. Yin, J., A. Regier, S.J. Emrich, M.J. Gosney, B.P. Dilkes*, and **M.V. Mickelbart***. 201_. Transcriptomic and metabolic profiling of two *Thellungiella salsuginea* ecotypes with contrasting water use efficiency. To be submitted to *BMC Genomics*.
4. Prado, J., C. Quesada, M. Gosney, **M.V. Mickelbart**, and C. Sadof*. 2015. Effects of nitrogen fertilization on potato leafhopper (Hemiptera: Cicadellidae) and maple spider mite (Acari: Tetranychidae) on nursery-grown maples. *Journal of Economic Entomology* (in press).
5. **Mickelbart, M.V.**, P.M. Hasegawa, and J. Bailey-Serres*. 2015. Abiotic stress tolerance: Genetic mechanisms of abiotic stress tolerance that translate to crop yield stability. *Nature Reviews Genetics* 16:237–251.
6. Bumgarner, M.L., K.F. Salifu, **M.V. Mickelbart**, and D.F. Jacobs*. 2015. Effects of fertilization on media chemistry and *Quercus rubra* seedling development under subirrigation. *HortScience* 50:454–460.
7. Brown, C., **M.V. Mickelbart**, and D.F. Jacobs*. 2014. Leaf physiology and biomass allocation of American chestnut (*Castanea dentata*) seedlings in response to light and water availability. *Tree Physiology* 34:1362–1375.
8. Stanton, K.M. and **M.V. Mickelbart***. 2014. Maintenance of water uptake and reduced water loss contribute to water stress tolerance of *Spiraea alba* Du Roi and *Spiraea tomentosa* L. *Horticulture Research* 1, 14033 doi:10.1038/hortres.2014.33.
9. Baxter, I.*, G. Ziegler, B. Lahner, **M.V. Mickelbart**, R. Foley, J. Danku, P. Armstrong, D. Salt, and O. Hoekenga. 2014. Single kernel ionic profiles are highly heritable indicators of genetic and environmental influences on elemental accumulation in maize grain (*Zea mays*). *PLoS One* 9(1): e87628. doi:10.1371/journal.pone.0087628.
10. Stanton, K.M. and **M.V. Mickelbart***. 2014. Growth and foliar nutrition of *Spiraea alba* Du Roi and *Spiraea tomentosa* L. in response to root zone pH. *Scientia Horticulturae* 165:23–28.
11. **Mickelbart, M.V.***, M.J. Gosney, and K.M. Stanton. 2013. Evaluation of accessions of *Spiraea alba* and *S. tomentosa* in Indiana. *Native Plants Journal* 14:17–23.
12. **Mickelbart, M.V.***, P.W. Robinson, G. Witney, and M.L. Arpaia. 2012. ‘Hass’ Avocado tree growth in California. I. Yield and flowering. *Scientia Horticulturae* 143:184–188.
13. **Mickelbart, M.V.***, P.W. Robinson, G. Witney, and M.L. Arpaia. 2012. ‘Hass’ Avocado tree growth in California. II. Shoot and root growth. *Scientia Horticulturae* 143:205–210.
14. **Mickelbart, M.V.***, M.J. Gosney, J. Camberato, and K.M. Stanton. 2012. Soil pH effects on growth and foliar nutrient concentrations of *Spiraea alba* Du Roi and *Spiraea tomentosa* L. *HortScience* 47:902–906.

15. Weng, H., C.Y. Yul, M.J. Gosney, P.M. Hasegawa, and **M.V. Mickelbart***. 2012. Poplar GTL1 is a Ca²⁺/calmodulin-binding transcription factor that functions in plant water use efficiency and drought tolerance. *PLoS One* 7:e32925.
16. Nambeesan, S., S. AbuQamar, K. Laluk, A.K. Mattoo, **M.V. Mickelbart**, M.G. Ferruzzi, T. Mengiste, and A.K. Handa*. 2011. Polyamines attenuate ethylene-mediated defense responses to abrogate resistance to *Botrytis cinerea* in tomato. *Plant Physiology* 158:1034–1045.
17. Yoo, C.Y., P.M. Hasegawa, and **M.V. Mickelbart***. 2011. Regulation of stomatal density by the GTL1 transcription factor for improving water use efficiency. *Plant Signaling & Behavior* 6:1069–1071.
18. **Mickelbart, M.V.*** 2011. Cyclanilide differentially affects branching in red maple cultivars and hybrids. *Journal of Environmental Horticulture* 29:35–38.
19. Yoo, C.Y., H.E. Pence, J.B. Jin, K. Miura, M.J. Gosney, P.M. Hasegawa, and **M.V. Mickelbart***. 2010. The *Arabidopsis* GTL1 transcription factor regulates water use efficiency and drought tolerance. *The Plant Cell* 22:4128–4141.
20. Stanton, K.M., S. Weeks, M.N. Dana, and **M.V. Mickelbart***. 2010. Effect of light level on growth of *Spiraea alba* and *Spiraea tomentosa*. *HortScience* 45:1912–1916.
21. Orsini, F., M.P. D’Urzo, G. Inan, S. Serra, D.-H. Oh, **M.V. Mickelbart**, F. Consiglio, X. Li, J.C. Jeong, D.-J. Yun, H.J. Bohnert, R.A. Bressan, and A. Maggio*. 2010. A comparative study of salt tolerance parameters in eleven wild relatives of *Arabidopsis thaliana*. *Journal of Experimental Botany* 61:3787–3798.
22. Stanton, K.M., S. Weeks, M.N. Dana, and **M.V. Mickelbart***. 2010. Pruning of meadowsweet and hardhack. *HortTechnology* 20:700–704.
23. Torres, A.P., **M.V. Mickelbart***, and R.G. Lopez. 2010. Leachate volume effects on pH and electrical conductivity measurements in containers obtained using the pour through method. *HortTechnology* 20:608–611.
24. **Mickelbart, M.V.*** 2010. Variation in leaf nutrient concentrations due to leaf position and petiole inclusion. *HortScience* 45:428–431.
25. Peel, G.J., **M.V. Mickelbart***, and D. Rhodes. 2010. Choline metabolism in glycinebetaine accumulating and non-accumulating near-isogenic lines of *Zea mays* and *Sorghum bicolor*. *Phytochemistry* 71:404–414.
26. Yoo, C.Y., H.E. Pence, P.M. Hasegawa, and **M.V. Mickelbart***. 2009. Regulation of transpiration to improve crop water use. *Critical Reviews in Plant Science* 28:410–431.
27. Baxter, I.R., P.S. Hosmani, A. Rus, B. Lahner, J. Borevitz, B. Muthukumar, **M.V. Mickelbart**, L. Schreiber, R.B. Franke, and D.E. Salt*. 2009. Root suberin regulates water relations and mineral nutrition in *Arabidopsis*. *PLoS Genetics* 5(5):e1000492.
28. AbuQamar S., H. Luo, K. Laluk, **M.V. Mickelbart** and T. Mengiste*. 2009. Crosstalk between biotic and abiotic stress responses in tomato is mediated by the AIM1 transcription factor. *The Plant Journal* 58:347–360.
29. **Mickelbart, M.V.***, G.S. Bender, G.W. Witney, C. Adams, and M.L. Arpaia. 2007. Effect of clonal rootstocks on ‘Hass’ avocado yield components, alternate bearing, and nutrition. *Journal of Horticultural Science and Biotechnology* 82:460–466.
30. **Mickelbart, M.V.***, S. Melser, and M.L. Arpaia. 2007. Salinity-induced changes in ion concentrations of ‘Hass’ avocado trees on three rootstocks. *Journal of Plant Nutrition* 30:105–122.
31. Teixeira, E.I.* , D.J. Moot, and **M.V. Mickelbart**. 2007. Seasonal patterns of root C and N reserves of lucerne crops (*Medicago sativa* L.) grown in a temperate climate were affected by defoliation regime. *European Journal of Agronomy* 26:10–20.
32. **Mickelbart, M.V.***, P. Chapman, and L. Collier-Christian. 2006. Endogenous levels and exogenous application of glycinebetaine to grapevines. *Scientia Horticulturae* 111:7–16.
33. **Mickelbart, M.V.*** and D. James. 2003. Development of a dry matter test for olive. *New Zealand Journal of Crop and Horticultural Science* 31(3):269–276.
34. **Mickelbart, M.V.***, G. Peel, R.J. Joly, D. Rhodes, G. Ejeta, and P.B. Goldsbrough. 2003. Development and characterization of near-isogenic lines of sorghum segregating for glycinebetaine accumulation. *Physiologia Plantarum* 118:253–261.
35. Yang, W.-J., P.J. Rich, J.D. Axtell, K.V. Wood, C.C. Bonham, G. Ejeta, **M.V. Mickelbart***, and D. Rhodes. 2003. Genotypic variation for glycinebetaine in *Sorghum bicolor*. *Crop Science* 43(1):162–169.

36. **Mickelbart, M.V.*** and M.L. Arpaia. 2002. Rootstock influences changes in ion concentrations, growth, and photosynthesis of 'Hass' avocado trees in response to salinity. *Journal of the American Society for Horticultural Science* 127(4):649–655.
37. **Mickelbart, M.V.*** and T.E. Marler. 1998. Growth, gas exchange, and mineral relations of black sapote (*Diospyros digyna* Jacq.) as influenced by salinity. *Scientia Horticulturae* 72:103–110.
38. Marler, T.E.* and **M.V. Mickelbart**. 1998. Drought, leaf gas exchange, and chlorophyll fluorescence of field-grown papaya plants. *Journal of the American Society for Horticultural Science* 123(4):714–718.
39. **Mickelbart, M.V.*** and T.E. Marler. 1996. Root-zone sodium chloride influences photosynthesis, water relations, and mineral content of sapodilla foliage. *HortScience* 31(2):230–233.
40. Marler, T.E.* and **M.V. Mickelbart**. 1994. Growth and chlorophyll fluorescence of *Spondias purpurea* L. as influenced by salinity. *Tropical Agriculture* 70(3):245–247.
41. Marler, T.E.* **M.V. Mickelbart**, and R. Quitigua. 1993. Papaya ringspot virus influences leaf physiology of papaya plants. *HortScience* 28(4):322–324.
42. Marler, T.E.* and **M.V. Mickelbart**. 1992. Application of GA₄₊₇ to stem enhances carambola seedling growth. *HortScience* 27(2):122–123.
43. Marler, T.E.* and **M.V. Mickelbart**. 1992. Repeated mechanical stress from leaf cuvette influences leaf gas exchange. *HortScience* 27(5):432–434.

Non-refereed papers

1. Yoo, C.Y., P.M. Hasegawa, and **M.V. Mickelbart**. 2011. Regulation of stomatal density by GTL1 transcription factor for improved water use efficiency. ISB News Report April 2011, pp. 5–6.
2. Tuinstra, M.*, M. Popelka, K. Krothapalli, G. Johal, **M.V. Mickelbart**, S. Larsson, and E. Buckler. 2011. Mining genes for late-season drought tolerance in maize. Proceedings of the Crop Improvement, Ideotyping, and Modelling for Africa Cropping Systems Under Climate Change – CIMAC International Conference, Hohenheim, Germany, 7-9 February 2011, pp. 21–24.
3. **Mickelbart, M.V.*** and M.L. Arpaia. 2006. Salinity tolerance of avocado rootstocks. In: M.L. Arpaia and R. Hofshi (eds.), Proc. Of Avocado Brainstorming 2003, Oct. 31-Nov. 1, 2003, Ventura, California, 9 pp. avocadosource.com/journals/brainstorming_2003/brainstorming_2003_toc.htm
4. Moot, D.J., E.I. Teixeira*, and **M.V. Mickelbart**. 2006. Changes in total biomass and N content of taproots of alfalfa crops under contrasting defoliation frequencies. The North American Alfalfa Improvement Conf. naaic.org/Meetings/National/2006meeting/proceedings/Moot.PDF
5. Teixeira, E.*, D.J. Moot, H.E. Brown, and **M. Mickelbart**. 2006. Seasonal changes in root dry matter and N content of lucerne. 13th Aust. Soc. of Agr. Cong., Perth, WA.
6. Teixeira, E., D.J. Moot*, H.E. Brown, and **M. Mickelbart**. 2005. Seasonal variation of taproot biomass and N. content of lucerne crops under contrasting grazing frequencies. 20th Intl. Grasslands Cong., Dublin, Ireland.
7. **Mickelbart, M.V.***, R. Miller, S. Parry, M.L. Arpaia, and R. Heath. 2002. Avocado leaf surface morphology. California Avocado Society Yearbook 84:139–150.
8. Liu, X., **M.V. Mickelbart***, P.W. Robinson, R. Hofshi, and M.L. Arpaia. 2002. Photosynthetic characteristics of avocado leaves. *Acta Horticulturae* 575:865–874.
9. Robinson, P.W., **M.V. Mickelbart***, X. Liu, G.W. Witney, and M.L. Arpaia. 2002. Development of a phenological model of avocado tree growth for California. *Acta Horticulturae* 575:859–864.
10. **Mickelbart, M.V.** 2001. Plant compounds involved with cold tolerance. New Zealand Olive Association National Frost Workshop Proceedings, 8 pp.
11. **Mickelbart, M.V.*** and M.L. Arpaia. 2001. Branch position affects nutrient analysis results of cherimoya leaves. *Subtropical Fruit News* 8(1-2):29–30.
12. **Mickelbart, M.V.***, G. Ejeta, D. Rhodes, R.J. Joly, and P.B. Goldsbrough. 1999. Assessing the contribution of glycinebetaine to environmental stress tolerance in sorghum. Molecular Approaches for the Genetic Improvement for Cereals for Stable Production in Water-Limited Environments. An International Workshop held at the International Maize and Wheat Improvement Center (CIMMYT), El Batan, Mexico, June 21-25, 1999. 10 pp.

13. **Mickelbart, M.V.** 1997. Sapodilla: A potential crop for subtropical climates. In: J. Janick (ed.), *Progress in New Crops*, pp. 439-446. ASHS Publications, Alexandria, VA.
14. Arpaia, M.L., P.W. Robinson, X. Liu, **M.V. Mickelbart***, and G.W. Witney. 1996. Development of a phenological model for California 'Hass' avocado. *Proc. Calif. Avocado Res. Symp.*, Apr. 1, 1996, Orange, CA. pp. 23–30.
15. **Mickelbart, M.V.*** and M.L. Arpaia. 1996. Choice of clonal rootstock affects salt tolerance of 'Hass' avocado. *Subtropical Fruit News* 4(2):6–9.
16. **Mickelbart, M.V.*** and M.L. Arpaia. 1995. Effects of salinity on growth and photosynthesis of 'Hass' avocado on three rootstocks. *Proc. Calif. Avocado Res. Symp.*, 1995. pp. 21–32.
17. Arpaia, M.L., G. Witney, P.W. Robinson, and **M.V. Mickelbart***. 1995. Development of a phenological model for California 'Hass' avocado. *Proc. Calif. Avocado Res. Symp.*, Mar. 25, 1995, Riverside, CA. pp. 15–19.
18. **Mickelbart, M.V.** 1994. Sapodilla - A possible crop for Southern California? *Fruit Gardener* 20(3):3, 17, 27.
19. **Mickelbart, M.V.** 1990. Current status of the mango in California. *Tropical Fruit World* 1(3):87.

Invited seminars

1. "Alteration of stomatal density as an adaptive trait," Keynote speaker, The 9th Botanical Conference of Thailand, Bangkok, Thailand, June 3, 2015. Invited by Supachitra Chadchawan, Associate Professor, Chulalongkorn University, Thailand.
2. "Modifying stomatal development as an adaptive response to drought," University of Bristol, Bristol, UK, March 2, 2015. Invited by Alistair Hetherington, Director of Research, Department of Biological Sciences, University of Bristol.
3. "The molecular genetic and physiological basis of water use efficiency," Keystone Symposia on Molecular and Cellular Biology: Plant Abiotic Stress and Sustainable Agriculture: Translating Basic Understanding to Food Production. Taos, New Mexico, Jan. 17-22, 2013. Invited by Julia Bailey-Serres and Mike Hasegawa, conference organizers.
4. "Stomatal development and its role in water use efficiency in plants," Universidad ICESI, Cali, Colombia, Nov. 13, 2012. Invited by Zaida Lentini, Dean of Facultad de Ciencias Naturales.
5. "Regulation of water loss for improvement of crop water use efficiency," CIAT: International Center for Tropical Agriculture, Cali, Colombia, Nov. 15, 2012. Invited by Joseph Tohme, Agrobiodiversity Research Area Director.
6. "The physiological and genetic determinants of water use efficiency in maize," China Agricultural University, Beijing, China, Sept. 24, 2012, Invited by Dr. Kashchandra Raghothama, Associate Director, International Programs in Agriculture.
7. "Genetic basis of water use efficiency in maize" National Research Center on Plant Biotechnology, New Delhi, India, Feb. 18, 2012. Invited by Dr. Vandna Rai, Senior Scientist, National Research Center on Plant Biotechnology.
8. "Genetic basis of crop water use efficiency" Second Conference on Biotechnology Research and Applications in Palestine, An-Najah University, Nablus, Palestine, Sept. 26, 2010. Invited by Dr. Raed Alkowni, An-Najah University.
9. "GTL1 regulates water use efficiency in Arabidopsis" Bethlehem University, Bethlehem, Palestine, Sept. 25, 2010. Invited by Dr. Naim Iraki, Director of the UNESCO Biotechnology Educational and Training Center, Bethlehem University, Palestine.
10. "Crop traits regulating water use efficiency" Hebron University, Hebron, Palestine, Sept. 22, 2010. Invited by Dr. Rezaq Basheer-Salimia, Dean of Agriculture, Hebron University.
11. "Improving water use efficiency in plants" Bethlehem University, Bethlehem, Palestine, Mar. 20, 2010. Invited by Dr. Naim Iraki, Director of the UNESCO Biotechnology Educational and Training Center, Bethlehem University, Palestine.
12. "The genetic potential for improving water use efficiency in crop plants" Al Balqa University, Amman, Jordan, Mar. 14, 2010. Invited by Dr. Abed Gera, Director of the Plant Protection Unit, Volcani Center, Israel.
13. "Water use efficiency: The role of stomatal traits on crop performance" The Volcani Center, Rehovet, Israel, Nov. 9, 2008. Invited by Nirit Bernstein, Volcani Center, Israel.
14. "Plant water use efficiency" Hebron University, Hebron, Palestine, Nov. 8, 2008. Invited by Professor Radwan Barakat, Dean of Academic Research, Hebron University.
15. "Transpiration and water use efficiency in crop plants" Ministry of Agriculture Research Scientific Symposium, Amman, Jordan, Nov. 5, 2008. Invited by Dr. Arie Altman, The Hebrew University of Jerusalem, Israel, and Mike Hasegawa, Purdue University.

16. “Woody plant nutrition & bark cracking” Vineland Research & Innovation Centre Nursery/University of Guelph and Landscape Ontario Horticultural Trades Association Nursery & Landscape Research Day, Oct. 7, 2008. Invited by Hannah Mathers, The Ohio State University.
17. “Woody plant nutrition & bark cracking” OSU/ONLA Nursery & Landscape Research Day, Columbus, OH Sept., 25, 2008. Invited by Hannah Mathers, The Ohio State University.
18. “Challenges in making gas exchange measurements,” ASHS Annual Conference, Orlando, FL. July 21-24, 2008.

Meeting abstracts (*Presenter):

1. Croft, M.*, M.V. Mickelbart, and S. Weller. 2015. Drought resistance in amaranth. ASHS Annual Meeting 2015. Available at ____.
2. Yin, J.*, M. Gribscov, J. Thimapuram, B.P. Dilkes, and M.V. Mickelbart, 2015. Transcriptomic differences between two *Eutrema salsugineum* accessions and quantitative trait loci identified from bulk segregant analysis of an F2 population. Plant and Animal Genome XXIII. Available at <https://pag.confex.com/pag/xxiii/webprogram/Paper17854.html>.
3. Smith, C.J., L. Wang, and M.V. Mickelbart. 2014. Identifying candidate genes that affect epidermal development. Summer Undergraduate Research Fellowship Symposium, 7 August, 2014. Available at: <http://docs.lib.purdue.edu/surf/2014/presentations/1/>.
4. Raimann, S., G.* Michalski, and **M.V. Mickelbart**. 2014. Using stable isotopes to quantify nitrogen fates in container plants. Summer Undergraduate Research Fellowship Symposium, 7 August, 2014. Available at: <http://docs.lib.purdue.edu/surf/2014/presentations/60/>.
5. Currey, C.J., M.V. Mickelbart, and R.G. Lopez. 2014. Total Crop Management improves students’ understanding of greenhouse crop production. ASHS Annual Meeting 2014. Available at <https://ashs.confex.com/ashs/2014/webprogram/Paper19654.html>.
6. Anwar, R.*, A. Raghothama, P. Jairam, S. Fatima, M. Gosney, M.V. Mickelbart, and A.K. Handa. 2014. Characterization of drought response of transgenic tomato plants expressing spermidine synthase under constitutive or fruit-specific promoters. ASHS Annual Meeting 2015. Available at: <https://ashs.confex.com/ashs/2014/webprogram/Paper19594.html>.
7. Yin, J.*, B.P. Dilkes, M. Gribscov, J. Thimmapuram, and M.V. Mickelbart. 2014. Candidate genes associated with water use efficiency (WUE) identified from quantitative trait loci (QTL) mapping in *Eutrema salsugineum*” ASPB Midwest Section Meeting 2014.
8. Yin, J.*, B.P. Dilkes, M. Gribscov, J. Thimmapuram, and M.V. Mickelbart. 2013. Candidate genes associated with water use efficiency (WUE) identified from a combination of quantitative trait loci (QTL) mapping and transcriptome profiling in *Thellungiella salsuginea*. Plant Physiology, Plant Biology 2013, Abstract #P05005
9. **Mickelbart, M.V.***. 2013. *Physiological and Molecular Genetic Basis of Water Use Efficiency*. Proceedings of the Keystone Symposia on Molecular and Cellular Biology: Plant Abiotic Stress and Sustainable Agriculture: Translating Basic Understanding to Food Production. Taos, New Mexico, Jan. 17-22, p. 32.
10. Werayawarangura, W., K. Riha, M.J. Gosney, G. Michalski, and **M.V. Mickelbart***. 2012. Using stable isotopes to quantify nitrogen fates in container plants. *HortScience* 47:S160.
11. Foley, R.C.*, M.R. Tuinstra, B. Dilkes, B.A. Craig, and **M.V. Mickelbart**. 2012. Genetic diversity of water use efficiency and carbon isotope discrimination in maize. Proceedings of the 54th Annual Maize Genetics Conference, Portland, Oregon, March 15-18, 2012, p. 140.
12. Foley, R.C., M.R. Tuinstra, B. Dilkes, B.A. Craig, and **M.V. Mickelbart***. 2012. Genetic diversity of water use efficiency and carbon isotope discrimination in maize. Proceedings of the International Conference on Plant Biotechnology for Food Security: New Frontiers, New Delhi, India, February 21-24, 2012, p. 93.
13. Werayawarangura, W.*, K. Riha, M.J. Gosney, G. Michalski, and **M.V. Mickelbart**. 2011. Quantification of nitrogen fate in container plants. Summer Undergraduate Research Fellowship Symposium.
14. **Mickelbart, M.V.**, C.Y. Yoo, and P.M. Hasegawa. 2010. Improving water-use efficiency by regulating stomatal density. Proceedings of the 2010 In Vitro Biology Meeting and IAPB World Congress, St. Louis, Missouri. In Vitro Cellular & Developmental Biology – Animal 46:S142.
15. **Mickelbart, M.V.*** 2010. The genetic basis of plant water use efficiency. Proceedings of the Second Conference on Biotechnology Research and Applications in Palestine, p. 19. Available online: najah.edu/file/conferences/biotech2/Biotech2%20Proceedings.pdf

16. Torres, A.P.*, **M.V. Mickelbart**, and R.G. Lopez. 2010. Leachate volume effects on pH and electrical conductivity measurements in containers obtained using the pour-through method. *HortScience* 45:S163.
17. Bailey, S.*, H. Pence, M. Gosney, and **M.V. Mickelbart**. 2009. Analysis of water usage in diverse maize lines. Summer Undergraduate Research Fellowship Symposium.
18. Zheng, L.*, H. Pence, M. Gosney, and **M.V. Mickelbart**. 2009. Physiological analysis of maize wilted mutants. Summer Undergraduate Research Fellowship Symposium.
19. **Mickelbart, M.V.***, J. Prado, M.J. Gosney, and C. Sadof. 2009. Differential effects of controlled released fertilizer rates on growth and leaf nutrient concentrations of containerized tree species. *HortScience* 44:1130-1131.
20. Yoo, C.Y.*, Jin, J.B., Miura, K., Gosney, M., Jin, Y., **M.V. Mickelbart**, Hasegawa, P.M. 2009. AtGTL1 transcription factor regulates drought tolerance and water use efficiency. 20th International Conference on Arabidopsis Research, Edinburgh, Scotland, United Kingdom, June 30 – July 4. Program abstracts, p. 68.
21. AbuQamar, S.F.*, H. Luo, K. Laluk, **M.V. Mickelbart**, T. Mengiste. 2009. Tomato defense responses to *Botrytis cinerea* and interaction with other response pathways. Plant Pathogen Interactions, Plant Biology '09, Abstract # P48011.
22. Hosmani, P.S.*, I.R. Baxter, A. Rus, B. Lahner, J. Borevitz, B. Muthukumar, **M.V. Mickelbart**, L. Schreiber, R.B. Franke, and D.E. Salt. 2009. Root suberin forms an extracellular barrier that regulates water relations and mineral nutrition in Arabidopsis. Plant Physiology, Plant Biology '09, Abstract #P40003.
23. **Mickelbart, M.V.***, C.Y. Yoo, and H.E. Pence. 2008. Water use efficiency: The role of stomatal traits on crop performance. Multinational Agricultural Research and Development (MARD) Scientific Symposium: Frontiers in Agriculture – Abiotic Stress in Plants. Nov. 3-7. Amman, Jordan. p. 43.
24. Smith, N.*, M. Gosney, and **M.V. Mickelbart**. 2009. Genetic variation for nighttime water loss in crop species. Summer Undergraduate Research Fellowship Symposium.
25. Yoo, C.Y.*, J.B. Jin, K. Miura, M. Gosney, Y. Jin, **M.V. Mickelbart**, and P.M. Hasegawa. 2008. AtGTL1 transcription factor regulates water use efficiency and drought adaptation through Ca²⁺/Calmodulin signaling. 19th International Conference on Arabidopsis Research, Montreal, Canada, July 23-27, 2008. Program abstracts p. 51.
26. **Mickelbart, M.V.***, S. Larsen, R. Heath, and M.L. Arpaia. 2007. Changes in photosynthesis during flush development in avocado (*Persea americana* Mill.). *HortScience* 42(4):992.
27. **Mickelbart, M.V.***, N. Wasmer, S. Revankar, and L. Collier-Christian. 2007. Effects of supplemental sulfur on growth of three woody ornamental species. *HortScience* 42(4):994.
28. Yoo, C.Y.*, J.B. Jin, K. Miura, Y. Hua, M. Gosney, **M.V. Mickelbart**, R.A. Bressan, and P.M. Hasegawa. 2007. Ca²⁺/CaM signaling through AtGTL1 mediates drought stress adaptation. Plant Biology '07 Abstracts, p. 108.
29. Gosney, M.J. and **M.V. Mickelbart***. 2006. Measuring water loss in *Thellungiella halophila*. The Biology of Transpiration: From Guard Cells to Globe, Oct. 10-14, 2006, Snowbird, Utah.
30. Moot, D.J.*, E. Teixeira, H.E. Brown, and **M.V. Mickelbart**. 2006. Changes in total biomass and N content of taproots of alfalfa crops under contrasting defoliation frequencies. 40th North American Alfalfa Improvement Conference and 19th Trifolium Conference, July 16-19, 2006. Ramada Inn Airport at Mall of America in Bloomington, Minnesota, USA. naaic.org/meetings/national/2006meeting/proceedings/clovers&medicago.htm
31. Heath, R.L., **M.V. Mickelbart***, M.L. Arpaia, C. Fassio, and R. Miller. 2006. Water relations of avocado in response to changes in relative humidity. *HortScience* 41(4):1058.
32. Teixeira, E.I., D.J. Moot*, H.E. Brown, and **M.V. Mickelbart**. 2005. Seasonal variation of taproot biomass and N content of lucerne crops under contrasting grazing frequencies. Proceedings of the XX International Grasslands Conference, University College, Dublin, Ireland.
33. **Mickelbart, M.V.*** and R.L. Heath. 2004. Avocado leaf development. Harnessing the Potential of Horticulture in the Asian-Pacific Region. Proceedings of the Joint Australia/New Zealand Society for Horticultural Science/New Zealand Society of Plant Physiologists Meeting, 1-3 Sept. 2004, p. 124.
34. **Mickelbart, M.V.***, P.W. Robinson, C. Adams, G.W. Witney, and M.L. Arpaia. 2001. Avocado tree phenology in California. *HortScience* 36(3):527.
35. Robinson, P., X. Liu, **M.V. Mickelbart***, and M.L. Arpaia. 2000. Development of a phenological model of avocado tree growth in California. International Symposium on Tropical and Subtropical Fruits, Cairns, Australia, Symposium Booklet and Abstracts, pp. 33-34.

36. Liu, X., **M.V. Mickelbart***, P. Robinson, R. Hofshi, W.C. Arteberry, and M.L. Arpaia. 2000. Photosynthetic efficiency of avocado leaves. International Symposium on Tropical and Subtropical Fruits, Cairns, Australia, Symposium Booklet and Abstracts, p. 34.
37. **Mickelbart, M.V.***, R.J. Joly, D. Rhodes, G. Ejeta, and P.B. Goldsbrough. 1999. Development of near-isogenic lines of sorghum accumulating different concentrations of glycinebetaine. *Plant Biology '99 Abstracts*, p.120.
38. Ejeta, G., P. Goldsbrough, M. Tuinstra, E. Grote, and **M.V. Mickelbart***. 1999. Drought tolerance in sorghum: Mapping of QTL and analysis of near-isogenic lines. *Agronomy Abstracts, ASA, Madison, Wisconsin*, p. 242.
39. **Mickelbart, M.V.***, D.T. Hahn, D. Rhodes, R.J. Joly, G. Ejeta, and P.B. Goldsbrough. 1998. Analysis of glycinebetaine-deficiency in sorghum: gene mapping. *Plant Biology '98 Abstracts*, p.103.
40. **Mickelbart, M.V.*** and M.L. Arpaia. 1995. The effect of salinity on growth and physiology of 'Hass' avocado on three rootstocks. *HortScience* 30(4):780.
41. Robinson, P.W., **M.V. Mickelbart***, and M.L. Arpaia. 1994. 'Hass' avocado phenology in California - Preliminary results. *HortScience* 29(5):517.
42. **Mickelbart, M.V.*** 1994. Planting density effects on characteristics of sun and shade leaves of *Eucalyptus nitens* and *Eucalyptus ovata*. *HortScience* 29(5):569.
43. Marler, T.E.* and **M.V. Mickelbart**. 1993. Drought, leaf gas-exchange, and water relations of papaya. *HortScience* 28(5):167.
44. **Mickelbart, M.V.*** 1993. Leaf gas-exchange, water relations, and ionic responses of sapodilla to salinity. *HortScience* 28(5):451.

Media releases

1. "Chinese student finds educational home at Purdue," by Erica Quinlan, 23 May 2014, <http://agrinews-pubs.com/Content/Default/Homepage-Rotating-Story/Article/Chinese-student-finds-educational-home-at-Purdue-/3/23/10438>.
2. "Wild native shrub suitable for home landscape plantings," press release by Brian Walheimer, Purdue Ag. Communications; 20 August 2012, <http://www.purdue.edu/newsroom/releases/2012/Q3/wild-native-shrub-suitable-for-home-landscape-plantings.html>.
3. "New seeds may be solution for drought plagued farmers," news story by Ann Thompson, WVXU/Cincinnati Public Radio, original broadcast July 30, 2012, http://www.wvxu.org/news/wvxunews_article.asp?ID=10249.
4. "Engineering drought tolerant crops," Finnish Broadcasting Company, original broadcast July 27, 2012, <http://areena.yle.fi/tv/1624834>.
5. "Purdue researchers helping plants survive drought conditions," news story by Kevin Camp, July 22, 2012, <http://wbaa.org/post/purdue-researchers-helping-plants-survive-drought-conditions>.
6. "Purdue scientists working to make drought-resistant crops," press release by Brian Walheimer, Purdue Ag. Communications; 18 July 2012, <http://www.purdue.edu/newsroom/research/2012/120718TuinstraResearch.html>.
7. "Seeking a better seed," article by Eric Weddle, Journal & Courier - Lafayette, Ind, Jul 22, 2012, <http://www.jconline.com/article/20120728/NEWS/307220064/Purdue-University-seed-research>.
8. "Gene helps plants use less water without biomass loss," press release by Brian Walheimer, Purdue Ag. Communications; 11 Jan 2011, <http://www.purdue.edu/newsroom/research/2011/110111MickelbartGene.html>.

Student advising

Major professor

1. Kelly Stanton (MS), Evaluation of *Spiraea alba* and *S. tomentosa* (Aug. 2007 - Dec. 2009).
2. Heather Pence (MS), Water use efficiency and flowering time (Aug. 2008 - May 2011).
3. Jie Yin (PhD), Genetic basis of water use efficiency in *Thellungiella halophila* (Aug. 2009 -).
4. Rachel Robinson (MS), Water use efficiency in maize (Aug. 2010 - 2012).
5. Sufang Wang (PhD), Genetic basis of stomatal development (Aug. 2011 – Aug 2013); moved to Gribscov lab (BIOL).
6. Longfei Wang (PhD), Genetic basis of stomatal development and effects on water use efficiency (Aug. 2011 -).

Committee member

1. Mindy Bumgarner (MS, FNR), 2005-2007

2. Chan Yul Yoo (PhD, HLA), 2006-2011
3. Julia Prado (PhD, ENTM), 2007-2013
4. Kehua Wang (MS, AGRY), 2006-2007
5. Dena Fiacchino (PhD, HLA), 2007-
6. Michael Popelka (PhD, AGRY), 2007-2012
7. Prashant Hosmani, (PhD, HLA), 2007-2012
8. Keija Peng (PhD, FNR), 2008-2014
9. Mathew Caldwell (MS, FNR), 2010-2012
10. Raheel Anwar (PhD, HLA), 2010-2014
11. Christopher Zellers (PhD, FNR), 2010-
12. Caleb Brown (MS, FNR), 2010-2012
13. Jenae Skelton (PhD, AGRY), 2010-2014
14. Shaylyn Wiarda (PhD, AGRY), 2012-2013 (replaced on committee after change in project focus)
15. Mokhles Ahmed Mokh Elsysy (HLA), 2011-
16. Alex Rinaud (PhD, AGRY), 2012-2015
17. Kate Zellers (PhD, FNR) 2012-
18. Ryan Gibson (PhD, AGRY) 2012-
19. Weiran Li (PhD, BTNY), 2012-
20. Benjamin Hall (MS, AGRY), 2013-2015
21. Kyle Earnshaw (PhD, FNR), 2013-
22. Ross Zhan (PhD, BTNY), 2013-
23. Frank Suarez (MS, BTNY), 2014-

Undergraduate student mentor

1. Maria Montoya, 2015, undergraduate researcher, Universidad Nationale, Bogota, Colombia
2. Jhon Pineda, 2015, undergraduate researcher, Universidad Nationale, Bogota, Colombia
3. Luis Ramos, 2015, undergraduate researcher, ICESI University, Cali, Colombia
4. Mark Slater, 2015, undergraduate researcher, Purdue
5. Gabriella Collins, 2015, undergraduate researcher, Purdue
6. Uday Mitsuyasu, 2014, summer undergraduate research volunteer, Purdue
7. Christina Smith, 2014, Summer Undergraduate Research Fellowship (SURF) student, Purdue
8. Sam Raimann, 2014, Summer Undergraduate Research Fellowship (SURF) student, Purdue (co-advised w/ G Michalski)
9. Javier Borbon, 2014, undergraduate researcher, Universidad Nationale, Bogota, Colombia
10. Lina Montoya Pizarro, 2014, summer undergraduate researcher, ICESI University, Cali, Colombia
11. Vanessa Reyes Loaiza, 2014, summer undergraduate researcher, ICESI University, Cali, Colombia
12. Allen Chen, 2013, undergraduate researcher, Purdue
13. Brianna Powell, 2012-2013, undergraduate lab assistant, Purdue
14. Juliana Chaura, 2013, summer undergraduate researcher, ICESI University, Cali, Colombia
15. Luis Ramos, 2013, summer undergraduate researcher, ICESI University, Cali, Colombia
16. Stefania Belalcazar, 2013, summer undergraduate researcher, ICESI University, Cali, Colombia
17. Siying Long, 2012, undergraduate researcher, Purdue
18. Siwen Deng, 2012-2014, undergraduate researcher, Purdue
19. Woradee Werayawarangura, 2011-2012, undergraduate researcher, Purdue (co-advised w/ G Michalski)
20. Lifeng Zheng, 2009, Summer Undergraduate Research Fellowship (SURF) student, Purdue
21. Scott Bailey, 2009, Summer Undergraduate Research Fellowship (SURF) student, Purdue
22. Nick Smith, 2008, Summer Undergraduate Research Fellowship (SURF) student, Purdue
23. Nick Hardebeck, 2008, undergraduate lab assistant, Purdue
24. Jennifer Faulkner, 2007, undergraduate lab assistant, Purdue
25. Todd Moulton, 2007, undergraduate researcher, Purdue
26. Jenny Mead, 2007, undergraduate lab assistant, Purdue
27. Nick Wasmer, 2007, summer undergraduate researcher, Kalamazoo College, Kalamazoo, MI

High school student mentor

1. Lilly Griffin-Duncan, 2014, High School Summer Student, West Lafayette High School
2. Allen Chen, 2011 and 2012, High School Summer Student, West Lafayette High School
3. Krithika Subramaniam, 2011 and 2012, High School Summer Student, West Lafayette High School
4. David Rokhinson, 2009, High School Summer Student, West Lafayette High School
5. Mei Li, 2008, High School Summer Student, West Lafayette High School
6. Vinya Sagi, 2007, High School Summer Student, West Lafayette High School

7. Jimmy Xu, 2006, High School Summer Student, West Lafayette High School
8. Bhaswati Ghosh, 2006, High School Summer Student, West Lafayette High School
9. Sachit Revankar, 2006, High School Summer Student, West Lafayette High School

International visitors

1. Nutwadee Chintakovid, 2013-2014, visiting PhD student, Chulalongkorn University, Bangkok, Thailand
2. Vincent Awe Ezin, 2012, visiting scientist, University of Abomey-Calavi, Cotonou, Benin, co-advised with Prof. Avtar Handa
3. Dr. Vandna Rai, 2011, visiting scientist, National Research Center on Plant Biotechnology, New Delhi, India
4. Dr. Mame Codou Gueye, 2009, visiting scientist, CERAAS, Senegal
5. Zahoor Sajid, 2008, visiting scholar, University of the Punjab, Lahore, Pakistan

Research grants

Total direct support at Purdue to date: \$690,720

Total in kind support at Purdue to date: \$17,250

Direct support (funded)

Current

BARD PI: \$285,000 “Controlling water use efficiency and drought tolerance through the GTL1-SDD1 stomatal density switch,” Hillel Fromm, Tel Aviv University, Israel (Mickelbart Co-P.I., \$120, 507)

Purdue PRF \$8000 summer support, 2014.

Indiana Nursery and Landscape Association: \$20,000 “Determination of nitrogen fates in container plants.” PI: M.V. Mickelbart, 2011-2013.

Howard G. Buffet Foundation: \$1,576,491 “Developing climate resilient maize production systems.” PI: M. Tuinstra (20% M. Mickelbart).

Past

USDA-AFRI: \$497,672 “Partnership for Research & Education in Plant Breeding & Genetics at Purdue Univ.” PI: H. Ohm (17% M. Mickelbart).

USDA-AFRI: \$348,000 “Staygreen in Maize.” PI: M. Tuinstra (33% M. Mickelbart, 33% G. Johal).

MonoSol LLC: \$5000 “Effect of polyvinyl film on growth, water retention, and nutrient leaching in potted plants.” PI: M. Mickelbart, 2011.

Purdue Agricultural Research Programs: \$16,795 “Genetic basis of plant water use efficiency.” PI: M. Mickelbart, 2010-2011.

Knox Fertilizer Company: \$8,500 “New formulation of controlled release fertilizer on plant growth and nutrient loss.” PI: M. Mickelbart, 2011.

Indiana Nursery and Landscape Association: \$22,000 “Unrestricted program support.” PI: M. Mickelbart, 2005, 2006, 2007, 2009.

USDA/Interregional Research Project No. 4: \$37,500 “Herbicide label expansion.” PI: M. Mickelbart, 2008, 2009, 2010, 2011.

Dow AgroSciences: \$23,000 “Dimension, Lontrel, and Showcase: weed control in container plants.” PI: M. Mickelbart, 2005, 2010, 2011.

BASE: \$5,000 “Phytotoxicity assessment/Freehand label expansion for ornamentals.” PI: M. Mickelbart, 2009-2010.

Plant Development Services, Inc.: \$5,000 “Evaluation of southern azaleas for use in Midwest landscapes.” PI: M. Mickelbart, 2008-2009.

Monsanto Co.: \$10,000 “Showcase container ornamental efficacy and phytotoxicity awareness trials.” PI: M. Mickelbart, 2005-2006.

Purdue Agricultural Research Programs: \$12,000 “Deer fencing for ornamental plots at Meigs PAC.” PI: M. Mickelbart, 2008.

Bayer: \$10,000 “Analysis of induced branching using cyclanillide.” PI: M. Mickelbart, 2007-2009.

Syngenta: \$19,700 “Herbicide phytotoxicity assessments.” PI: M. Mickelbart, 2006, 2007.

HRI: \$3,000 “Role of fertility and Round-up in bark cracking.” PI: M. Mickelbart, 2007.

Purdue Agricultural Research Programs: **\$34,000** “Genetic basis of plant water use efficiency.” PI: M. Mickelbart, 2007-2009.

California Avocado Commission: **\$15,000** “Avocado leaf developmental physiology.” PI: M. Mickelbart, 2007.

Tree Fund: **\$7,500** “Optimized sulphur nutrition for woody plant species.” PI: M. Mickelbart, 2007.

California Avocado Commission: \$20,000 “Development of a program for calculating plastochron index.” PI: M. Mickelbart, 2006.

Michael Huff: **\$500** “Propagation of dwarf spruce.” PI: M. Mickelbart, 2005.

In-kind support

Raker’s Acres/Annual flats (2009, 2010) **Commercial value** \$400

Brehob Nursery/Various woody perennials (2006, 2009, 2010) **Commercial value** \$3,250

Scotts/fertilizer (2006, 2007) **Commercial value** \$1,000

JFNew/plants (2006, 2007) **Commercial value** \$500

Possibility Place Nursery/plants (2006, 2007) **Commercial value** \$400

Greendell Mulch/mulch (2006, 2007) **Commercial value** \$800

LaPorte County Nursery/Red maple trees (2006, 2007) **Commercial value** \$5,600

Bailey Nurseries/Various woody perennials (2006, 2007, 2008, 2009, 2010) **Commercial value** \$3,500

Hobbs Nursery/Various woody perennials (2006) **Commercial value**: \$1,800

Funding obtained for students

Ross Fellowship/Purdue Agricultural Research Programs, 2009-2010, **\$16,795**, Heather Pence

Ross Fellowship/Purdue Agricultural Research Programs, 2009-2010, **\$16,795**, Jie Yin

Ross Fellowship/Purdue Agricultural Research Programs, 2008-2009, **\$16,795**, Heather Pence

Evidence of regional or national recognition

Reviewer for professional journals (2005-)

African Journal of Agricultural Research (1), American Journal of Botany (1), Archives of Agronomy (1), Archives of Agronomy and Soil Science (1), Horticultural Reviews (1), HortScience (4), HortTechnology (2), Journal of Plant Growth Regulation (1), Journal of Plant Physiology (1), Journal of the American Society for Horticultural Science (1), New Phytologist (4), Physiologia Plantarum (1), Plant Cell Reports (1), Plant Journal (2), Plant Physiology (7), Plant Science (1), Plant, Cell & Environment (1), PLoS One (11), Scientia Horticulturae (3)

Editorial boards

2011- Frontiers in Plant Physiology
2006-10 Editorial Board, PLoS One

Reviewer for competitive grants

2011 Binational Agricultural Research & Development Fund
2007 Calif. Dept. Food and Agriculture Fertilizer Research and Education Program

Collaborative and interdisciplinary work

Purdue - current

Greg Michalski (EAS), Use of stable isotopes to determine fate of nitrogen in container growing systems. This project has involved one undergraduate student and we have obtained matching funds for a PhD student from the Indiana Nursery and Landscape Association.

Tim Filley (EAS), Use of $\delta^{13}\text{C}$ to screen for water use efficiency in maize. This collaboration has resulted in several presentations at national and international meetings, several publications in preparation, and preliminary data for a proposal to the Howard Buffet Foundation.

Tony Vyn (AGRY), Understanding the relationship between maize CO_2 assimilation, yield, and carbon isotope discrimination. This collaboration has resulted in one publication in preparation.

Dan Szymanski (AGRY), The role of actin in stomatal dynamics. the Mickelbart lab is currently conducting experiments with the Szymanski lab. The expected outcome is one peer-reviewed publication and preliminary data for future grant proposals.

Bruce Craig (STAT), Water use efficiency in maize. Dr. Craig is a committee member for Rachel Foley and is a co-author on several national and international presentations and several manuscripts in preparation.

Honhyo Chun (STAT), QTL for stomatal density in Arabidopsis. Dr. Chun is a committee member for Sufang Wang and will be a co-author on the manuscript describing genome-wide association mapping for stomatal density in Arabidopsis.

Brian Dilkes (HLA), Genetic basis of water use efficiency in *Thellungiella halophila* and *Zea mays*. This collaboration has resulted in several manuscripts in preparation.

Mitch Tuinstra (AGRY), Genetic basis of water use efficiency, environmental stress tolerance, and productivity of maize. This collaboration has resulted in one USDA-funded proposal, one pending grant proposal, several presentations, and several papers in preparation.

Mike Hasegawa (HLA), Role of GTL in water use efficiency. This collaboration has resulted in four manuscripts to date and discussions with several companies regarding practical horticultural applications.

Purdue - past

Cliff Sadof (ENTM), Determination of fertilizer effects on leafhopper and mite infestation of red maple.

Roberto Lopez (HLA), Evaluation of the pour-through method for measuring pH and EC in large nursery containers. This collaboration has resulted in one refereed publication, an extension bulletin, and a trade magazine publication.

Tesfaye Mengiste (BTNY), Crosstalk between biotic and abiotic stress responses in tomato is mediated by the AIM1 transcription factor. This collaboration has resulted in one paper published in *The Plant Journal*.

Avtar Handa (HLA), Effects of polyamines on water stress tolerance in tomato. This collaboration has resulted in one publication.

David Salt (HLA), Ion accumulation in *Thellungiella halophila* ecotypes under salinity. This collaboration has resulted in two papers in preparation.

Nationally

Robert Heath and Mary Lu Arpaia, University of California, Riverside, Developmental physiology of avocado (*Persea americana*). This collaboration has resulted in several presentations and publications.

Jim Owen, Virginia Tech University, Monitoring and managing the fate of nutrients in container plants. Dr. Owen is a national expert in container plant management and will collaborate on an SCRI grant proposal in 2012 with Drs. Mickelbart, Michalski, and Altland.

James Altland, Application Technology Research Unit, USDA, Monitoring and managing the fate of nutrients in container plants. Dr. Altland is a national expert in container plant nutrition and will collaborate on an SCRI grant proposal in 2012 with Drs. Mickelbart, Michalski, and Owen.

Michael Evans, University of Arkansas, Developing a national coordinated vision for specialty crops root substrates research and education. Dr. Evans is the PI on a USDA-SCRI planning grant on which Dr. Mickelbart is a Co-PI.

Hannah Mathers, The Ohio State University, Determination of factors resulting in bark cracking of ornamental woody species. The data generated thus far from this project has been presented at regional, national, and international meetings. A refereed publication is being prepared.

Hans Bohnert, University of Illinois, Metabolic profiles of *Thellungiella halophila* ecotypes in response to salinity. This collaboration has resulted in two papers in prep.

Ivan Baxter, The Danforth Center, New tools for water use efficiency screening in maize. This collaboration has resulted in one paper in preparation.

Internationally

Alistair Hetherington, University of Bristol, Stomatal development and function.

Naim Iraki, Bethlehem University, Plant water use efficiency.

Workshops Attended

Genomics in Education Workshop: The iPlant Collaborative, Purdue University, West Lafayette, IN, March 27-28, 2012, presented by the DNA Learning Center, Cold Spring Harbor Laboratory.

Scholarship of Engagement: Making the Case for Promotion, Purdue University, West Lafayette, IN Mar. 18, 2008.

USDA Cooperative State Research, Education, and Extension Service, Grantsmanship Workshop, Arlington, VA. Sept. 30, 2008.

Learning

Approaches

Ornamental Plant Production (HORT 420; 3 credits) is a senior-level class. The desired outcomes of the course within the undergraduate horticulture curriculum are to provide students with an understanding of ornamental plant production, including bedding plants, perennials, and container and field production of trees and shrubs. Students in horticultural production courses are very likely to rely on education opportunities such as presentations, bulletins, and trade magazine articles upon entering the industry. Enhancing students' ability to read and evaluate secondary sources of information will help them make management and operational decisions, regardless of the specific sector of the industry they join. Furthermore, a clear understanding of how production information is generated and disseminated in the industry enables students to take advantage of additional learning opportunities after they complete their formal education. Based on this premise, Drs. Roberto Lopez and Mickelbart developed a framework for an ornamental production class that incorporates discussions and exercises designed to expose students to how information in the green industry is generated, compiled, and disseminated. Furthermore, the involvement of industry personnel in student projects allows students to interact with future employers and/or colleagues. Overall, teaching scores were lower in spring 2009 because of some issues with implementing the new format, but scores increased again in the fall during the second semester of the new format.

Courses taught at Purdue (primary or co-instructor):

| Course | Listing | Credit hours | Years | Total students |
|-----------------------------|----------|--------------|---------|----------------|
| Plant Physiology | HORT 301 | 3 | 2013 | 51 |
| Ornamental Plant Production | HORT 420 | 3 | 2009-12 | 92 |
| Nursery Crops | HORT 411 | 1 | 2005-08 | 76 |
| Senior Capstone Project | HORT 445 | 3 | 2011-12 | 5 |
| Undergraduate Research | HORT 491 | 3 | 2011-12 | 2 |

Guest lectures at Purdue

| Course | Listing | Lecture | Years |
|------------------------------|----------|-------------------------------------|---------|
| Plant Physiology | HORT 301 | "Plant Water Use Efficiency" | 2007-11 |
| Fundamentals of Horticulture | HORT 102 | "Ornamental Trees & Shrubs" | 2008 |
| Agriculture in Honduras | AGRY 493 | "Plant Water Relations" | 2007 |
| Landscape Contr. Mgmt. | HORT 317 | "Plant Nutrition and Fertilization" | 2007 |
| Introduction to Horticulture | HORT 101 | "Tropical Horticulture" | 2006 |
| Planning/Presenting Research | HORT 601 | "Extension in the HLA Department" | 2006 |

Guest lectures at other institutions:

- 2012 Developmental Biology, Icesi University, Cali, Colombia, "Environmental regulation of stomatal development"
- 2012 Plant Ecophysiology, Icesi University, Cali, Colombia, "Plant adaptation to salinity stress"
- 2010 BIOL 244, Plant Physiology, Bethlehem University, Palestine, "Plant adaptation to salinity stress"

Teaching symposiums attended:

- "Effective Teaching: A Workshop," Presented by Richard Felder and Rebecca Brent, Purdue University, Nov 20-21, 2013.
- "Expanding Your Teaching Toolkit: Teaching Problem Solving," Sponsored by Teaching and Learning Services, Purdue University. Sept 7, 2006.
- "Outcomes-Based Teaching," presentation by Kevin Kirby. Offices of Agricultural Research Programs and Academic Programs Orientation, Sept 30, 2005.
- Graduate Mentoring Workshop, Sept 20, 2005.
- "Lecturing Techniques," Fall 2005 College Teaching Workshop Series 1: Basics of Teaching, Sept 27, 2005.

“Subjective Tests and Assigning Grades,” Fall 2005 College Teaching Workshop Series 1: Basics of Teaching, Nov 1, 2005.

Teaching effectiveness:

Panel participant, Truman Fellowship

Active role on the HLA Curriculum Committee, particularly with regard to surveying industry needs.

Estudiantes de Biología realizaron pasantías de verano en la Universidad de Purdue-Indiana

<http://www.icesi.edu.co/unicesi/estudiantes-de-biologia-realizaron-pasantias-de-verano-en-la-universidad-de-purdue-indiana/>

Hayes, Zoe. “Students conduct summer research in SURF program.” *The Exponent* 1 June 2009: Pg. 2. Highlighted undergraduate training through the Purdue SURF program in the Mickelbart lab.

Hayes, Zoe. “Engineers examine water efficiency in plant growth.” *The Exponent* 22 June 2009: Pg. 2. Story describing engineering students working in the Mickelbart lab.

Student counseling and advising

| | |
|------|-------------|
| 2009 | 14 students |
| 2008 | 23 students |
| 2007 | 23 students |
| 2006 | 17 students |

Teaching publications

Refereed Publications

Snyder, L.J., **M.V. Mickelbart***, and V. Eylands. 2012. Students Experiential Learning of Hydroponics and Local Markets on the Island of Roatán, Honduras. *Journal of International Agricultural and Extension Education* 19:54-63.

Abstracts

Currey, C.J.*, **M.V. Mickelbart**, and R.G. Lopez. 2014. Total Crop Management improves students’ understanding of greenhouse crop production. *HortScience* 49: in press.

Currey, C.J.*, **M.V. Mickelbart**, and R.G. Lopez. 2011. Growing student skills: An undergraduate ornamental crop production course integrating crop monitoring, data collection, and team-based decision making. *HortScience* 46:S398-S399.

Non-refereed articles

Currey, C.J., **M.V. Mickelbart**, and R.G. Lopez. 2011. Growing student skills: An undergraduate ornamental crop production course integrating crop monitoring, data collection, and team-based decision making. *Indiana Nursery and Landscape News* 71(6):20-21.

Course evaluations

Following is a summary of all questions used by the Department of Horticulture and Landscape Architecture. The rating scale is 5=strongly agree, 4=agree, 3=undecided, 2=disagree, 1=strongly disagree.

| | HORT 411 2005 n=29 | HORT 411 2006 n=27 | HORT 411 2007 n=16 | HORT 420 S2009 n=20 | HORT 420 F2009 n=14 | HORT 420 F2010 n=28 | HORT 420 F2011 n=20 | HORT 420 F2011 n=19 | HORT 301 F2013 n=51 |
|--|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Instructor expresses ideas clearly | 3.9 | 4.2 | 4.1 | 3.4 | 4.0 | 4.2 | 4.1 | 4.2 | 3.2 |
| Instructor displays thorough knowledge of subject | 3.5 | 4.3 | 4.3 | 4.1 | 4.2 | 4.7 | 4.2 | 4.3 | 4.0 |
| Lectures at suitable pace | 3.9 | 4.2 | 4.0 | 3.9 | 3.8 | 4.3 | 3.9 | 4.1 | 2.9 |
| Course well-organized | 3.7 | 3.9 | 3.9 | 3.7 | 3.5 | 4.4 | 4.0 | 4.0 | 3.7 |
| Instructor well-prepared for class | 3.9 | 4.3 | 4.0 | 4.0 | 4.1 | 4.2 | 4.1 | 4.3 | 3.8 |
| Instructor’s knowledge evident | 4.0 | 4.2 | 4.2 | 4.0 | 4.0 | 4.5 | 4.2 | 4.4 | 3.8 |
| Instructor uses effective methods for difficult material | 3.5 | 3.9 | 3.9 | 3.1 | 3.9 | 4.4 | 3.9 | 4.1 | |
| Course builds on my understanding | 3.6 | 3.9 | 3.9 | 3.9 | 3.8 | 4.4 | 4.0 | 4.1 | 3.7 |
| Course content up-to-date | 3.9 | 4.2 | 4.3 | 4.1 | 4.0 | 4.5 | 4.0 | 4.4 | 4.1 |

| | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Appropriate coverage to different topics | 3.7 | 3.9 | 4.0 | 3.6 | 3.9 | 4.3 | 4.0 | 4.2 | 2.5 |
| Content appropriate for objective | 3.8 | 4.0 | 3.8 | 3.8 | 4.1 | 4.4 | 4.0 | 4.4 | 3.4 |
| Text and materials contributed to learning | 3.4 | 4.0 | 3.9 | 3.7 | 4.0 | 4.4 | 3.9 | 4.1 | 2.4 |
| Teaching methods enabled learning | 3.3 | 3.9 | 4.0 | 2.9 | 3.7 | 4.0 | 3.9 | 4.0 | 3.1 |
| Instructor treats students with respect | 3.6 | 4.3 | 4.2 | 3.8 | 4.3 | 4.3 | 4.1 | 4.3 | 3.5 |
| Stimulated interest | 3.4 | 3.5 | 3.7 | 3.3 | 3.4 | 4.1 | 3.4 | 4.1 | 2.9 |
| Evaluations are fair assessments | 3.1 | 3.9 | 3.7 | 3.6 | 3.9 | 4.0 | 3.7 | 4.0 | 3.4 |
| Assignments/exams returned promptly | 3.7 | 3.6 | 4.0 | 4.0 | 3.7 | 4.0 | 4.0 | 4.0 | 3.9 |
| Instructor is accessible | 3.7 | 3.9 | 3.8 | 3.5 | 3.5 | 4.1 | 4.0 | 3.8 | 3.3 |
| Instructor motivates to do best work | 3.1 | 3.6 | 3.8 | 3.0 | 3.8 | 4.1 | 3.6 | 3.8 | 1.8 |
| Learned a lot | 2.9 | 3.4 | 3.8 | 3.5 | 3.8 | 4.0 | 3.6 | 4.1 | 2.7 |
| Overall rating of course | 3.4 | 3.6 | 3.9 | 3.1 | 3.4 | 4.1 | 3.7 | 3.9 | 2.7 |
| Overall rating of instructor | 3.4 | 3.9 | 4.0 | 3.5 | 3.8 | 4.2 | 3.9 | 3.9 | 2.4 |

Engagement and Service

Engagement program description

Dr. Mickelbart was the nursery and landscape management specialist at Purdue University from July 2005 until March 2012. Ornamental horticulture is the largest horticultural sector in Indiana with a wholesale value of \$101.7 million. In the last decade, this industry has undergone major changes in production practices, driven by new innovations, rising input and energy costs, and an increasing emphasis on environmental stewardship. Dr. Mickelbart used his research and engagement program to lead the industry in adopting these new production practices and to help the industry deal with the repercussions of these changes. Dr. Mickelbart continues to contribute to advances in the nursery industry through an applied and basic research program, partly focused on nutrient management in container crops.

To ensure broad adoption of evidence-based best management practices based on current research, Dr. Mickelbart disseminated information through a diverse and widely-read series of publications, well-attended seminars and workshops, county extension programs, and regular site visits with growers. This dissemination of information will continue through a regular research column in the Indiana Nursery and Landscape News, occasional national trade publications, and seminars at events such as the Indiana Green Expo. Dr. Mickelbart served on the INLA board of directors for five years, and continues to maintain a close relationship with the organization.

Departmental, College, and University service

PYFA

SURF poster session judge (<https://engineering.purdue.edu/Engr/Research/SURF>)

Biology Olympiad session (<http://www.ibo-info.org/countries/usa>)

Truman Fellowship panel participant

(<http://www.purdue.edu/niso/scholarship/majorlist/truman%20.html>)

Engagement written communication

Feature articles in national trade magazine

Since coming to Purdue, Dr. Mickelbart has published articles in American Nurseryman, the primary nationwide nursery and landscape industry periodical, and Greenhouse Product News (GPN), aimed at the greenhouse and floriculture industry.

1. Lopez, R.G., C. Pasian, and **M.V. Mickelbart**. 2010. Alkalinity in soilless substrates. GPN 20:34, 36, 38.
2. Torres, A.P., **M.V. Mickelbart**, and R.G. Lopez. 2010. Measuring pH and EC of large containers. GPN 20:52-55.
3. **Mickelbart, M.V.** and M. Jenks. 2010. Drought tolerant trees and shrubs. American Nurseryman 210(6):30-33.
4. **Mickelbart, M.V.** 2008. Field nutrition. American Nurseryman 208(7):28-31.

5. **Mickelbart, M.V.** 2007. Warm winter consequences for plants. *American Nurseryman* 206(10):20-23.
6. **Mickelbart, M.V.** and J. Beckerman. 2006. What you need to know about *P. ramorum*. *American Nurseryman* 204(10):20-23.

Feature articles in regional trade magazine

The Indiana Nursery and Landscape News (INLN) is a bi-monthly publication of the INLA covering important news and research reports for the nursery and landscape industry in Indiana. It currently has 750 subscribers.

1. **Mickelbart, M.V.** and K.M. Stanton. 2013. Effect of media pH on growth and flowering of *Spiraea alba* and *Spiraea tomentosa*. *INLN* 73(6):16-18.
2. **Mickelbart, M.V.**, J.P. Carstens, Kyle Daniel, and M.J. Gosney. 2013. Evaluation of native U.S. trees at Purdue. *INLN* 73(1):22-25.
3. **Mickelbart, M.V.**, M.J. Gosney, and K.M. Stanton. 2012. Evaluation of the native plants *Spiraea alba* and *S. tomentosa* for use in Indiana landscapes *INLN* 72(6):18-20.
4. **Mickelbart, M.V.**, J.P. Carstens, and M.J. Gosney. 2012. Evaluation of native U.S. shrubs at Purdue. *INLN* 72(5):22-24.
5. **Mickelbart, M.V.** 2012. Sampling leaves from field-grown trees for nutrient analyses. *INLN* 72(2):26, 28.
6. **Mickelbart, M.V.** and M.J. Gosney. 2011. Effects of soil pH on *Spiraea alba* and *Spiraea tomentosa* growth and nutrient accumulation. *INLN* 71(6):28-29.
7. **Mickelbart, M.V.** and M.J. Gosney. 2011. Fertilizer rates for nursery container production. *INLN* 71(4):20-22.
8. Gosney, M.J. and **M.V. Mickelbart**. 2011. Weed control with Snapshot. *INLN* 71(3):22-24.
9. Gosney, M.J. and **M.V. Mickelbart**. 2011. New tools for weed control. *INLN* 71(1):14-16.
10. Caplan, L., R. Ballard, and **M.V. Mickelbart**. 2010. Dealing with landscape soils. *INLN* 70(2):26-28.
11. **Mickelbart, M.V.** 2006. Managing for minimal losses in the event of Sudden Oak Death infestation. *INLN* 66(6):30-31.
12. Dennis, J.H. and **M.V. Mickelbart**. 2006. Risk management principles IV: Financial risk. *INLN* 66(4):26-28.
13. Dennis, J.H. and **M.V. Mickelbart**. 2006. Risk management principles III: Human risk. *INLN* 66(3):34-35.
14. Dennis, J.H., B. Taylor, and **M.V. Mickelbart**. 2006. Risk management principles II: Marketing risk. *INLN* 66(2):32-34.
15. Dennis, J.H., B. Taylor, and **M.V. Mickelbart**. 2006. Risk management principles I: Production risk. *INLN* 66(1):32-33.
16. Dennis, J.H. and **M.V. Mickelbart**. 2006. Decreasing marketing risk. *Ohio Florists Assn Bulletin* Number 896.

Regular column in the Indiana Nursery and Landscape News

In addition to the feature articles in section B, Dr. Mickelbart writes a regular column, Science Review, summarizing research from Purdue and other institutions, explaining how these applied research results relate to best management practices. The column regularly generates e-mails and phone calls from the industry, and the columns have been reprinted in other national publications (e.g., column in volume 69, issue 4 was reprinted in the Minnesota nursery and landscape industry publication).

1. **Mickelbart, M.V.** 2011. Herbicide trials. *INLN* 71(1):17.
2. **Mickelbart, M.V.** 2010. Cultural practices to reduce weed growth in containers. *INLN* 70(5):26.
3. **Mickelbart, M.V.** 2010. Using the pour-through method to check pH and EC in large containers. *INLN* 70(4):22.
4. **Mickelbart, M.V.** 2010. Green waste compost. *INLN* 70(2):35-36.
5. **Mickelbart, M.V.** 2010. Controlled release fertilizers. *INLN* 70(1):25.
6. **Mickelbart, M.V.** 2009. Horticultural science conferences. *INLN* 69(5):32-33.
7. **Mickelbart, M.V.** 2009. Use of commercial arbuscular mycorrhizal fungi in nurseries and landscapes. *INLN* 69(4):34.
8. **Mickelbart, M.V.** 2009. Roots and freezing. *INLN* 69(2):32.
9. **Mickelbart, M.V.** 2008. Use of ABA to delay wilting in ornamentals. *INLN* 68(5):34.
10. **Mickelbart, M.V.** 2008. Container plant nutrition. *INLN* 68(4):30-31.
11. **Mickelbart, M.V.** 2008. Container mulches. *INLN* 68(3):34.

12. **Mickelbart, M.V.** 2008. Interactions between the university and the industry. INLN 68(2):38-39.
13. **Mickelbart, M.V.** 2007. Horticulture and global warming. INLN 67(4):32.
14. **Mickelbart, M.V.** 2007. Is vitamin B1 useful when transplanting? INLN 67(3):34.
15. **Mickelbart, M.V.** 2007. Pruning and tree caliper. INLN 67(2):36.
16. **Mickelbart, M.V.** 2006. Tree planting depth and mulch. INLN 66(4):34.
17. **Mickelbart, M.V.** 2006. Is there enough bark to meet landscape demands? INLN 66(3):36.
18. **Mickelbart, M.V.** 2006. How do plants respond to warm winters? INLN 66(2):38.
19. **Mickelbart, M.V.** 2006. Deer control in nurseries and landscapes. INLN 66(1):34.

Bulletins

Dr. Mickelbart produces bulletins that address topics lacking in existing Purdue or regional bulletins. For example, there is little information available to nursery and landscape professionals on managing soil pH, so Dr. Mickelbart assembled a group of specialists and produced two new publications that will guide growers in the Midwest. Dr. Mickelbart has also collaborated with Dr. Lopez on bulletins designed to assist growers with proper irrigation and substrate management.

1. Lee, B.D, R.E. Durham, and **M.V. Mickelbart**. 2013. Landscaping septic systems with native plants. University of Kentucky Extension Publication HENV-508, www.ca.uk.edu/agc/pubs/HENV/HENV508/HENV508.pdf.
2. **Mickelbart, M.V.** and M. Jenks. 2012. Drought-tolerant plants. Purdue Extension Publication HO-252-W, extension.purdue.edu/extmedia/HO/HO-252-W.pdf.
3. **Mickelbart, M.V.**, B.D. Lee, J. Camberato, and K.M. Stanton. 2012. Soil pH. Purdue Extension Publication HO-240-W, extension.purdue.edu/extmedia/HO/HO-240-W.pdf.
4. **Mickelbart, M.V.**, J. Camberato, S. Hawkins, and K.M. Stanton. 2012. Lowering soil pH for horticultural crops. Purdue Extension Publication HO-241-W, extension.purdue.edu/extmedia/HO/HO-241-W.pdf.
5. Lopez, R.G., **M.V. Mickelbart**, and C. Pasion. 2010. Alkalinity management in soilless substrates. Purdue Extension Publication HO-237-W, extension.purdue.edu/extmedia/HO/HO-242-W.pdf.
6. Lopez, R.G., **M.V. Mickelbart**, and C. Pasion. 2010. Manejo de la alcalinidad en sustratos hidropónicos. Purdue Extension Publication HO-237-W, extension.purdue.edu/extmedia/HO/HO-242-SW.pdf.
7. Camberato, D.M., R.G. Lopez, and **M.V. Mickelbart**. 2009. pH and electrical conductivity measurements in soilless media. Purdue Extension Publication HO-237-W, extension.purdue.edu/extmedia/HO/HO-237-W.pdf.
8. Camberato, D.M., R.G. Lopez, and **M.V. Mickelbart**. 2009. Medición de pH y conductividad eléctrica en sustratos. Purdue Extension Publication HO-237-W, extension.purdue.edu/extmedia/HO/HO-237-SW.pdf.
9. Stanton, K., **M.V. Mickelbart**, B.D. Lee, and D. Jones. 2008. Landscaping over septic systems with native plants. Purdue Extension Publication HENV-15-W, extension.purdue.edu/extmedia/HO/HO-237-W.pdf.
10. De Koff, J.P., B.D. Lee, and **M.V. Mickelbart**. 2008. Household composting: Methods and uses for compost. Purdue Extension Publication HENV-103-W, extension.purdue.edu/extmedia/HENV/HENV-103-W.pdf.
11. De Koff, J.P., B.D. Lee, and **M.V. Mickelbart**. 2008. Household composting with worms. Purdue Extension Publication HENV-104-W, available online at extension.purdue.edu/extmedia/HENV/HENV-104-W.pdf.
12. **Mickelbart, M.V.** and T.E. Marler. 1992. Pruning trees and shrubs in Micronesia. Agricultural Experiment Station Technical Bulletin, University of Guam. 18 pp.

Research or scholarly reports to industry:

A number of projects within Dr. Mickelbart's program from 2005 to 2012 were conducted in direct collaboration with plant development and agricultural chemical companies, including Monsanto, Dow AgroSciences, Syngenta, and BASF. In the nursery and landscape industry, the registration and expansion of labels for commercial herbicides is an important factor in company profitability because growers are constantly looking for cost-effective and sustainable weed management technologies. Because of the very large number of species and cultivars used in the industry, evaluating phytotoxicity responses is critical prior to recommending an herbicide. The evaluation of efficacy and safety of new herbicides allows agricultural chemical companies to expand their labels. The information generated in these trials is not only reported to the company, but is also used in extension seminars, one-on-one interactions with growers and landscape personnel, and in HORT 420 (Ornamental Plant Production).

1. Gosney, M.J. and **M.V. Mickelbart**. 2011. Label expansion for Dimension 2EW and Gallery 75DF. Report to Dow AgroSciences, 13 pp.
2. Gosney, M.J. and **M.V. Mickelbart**. 2011. Crop Safety with over-the-top applications of select herbicide materials. IR-4 Report, 8 pp.
3. **Mickelbart, M.V.** and M.J. Gosney. 2011. Evaluation of polyvinyl film for water stress tolerance and reduced nitrogen leaching in container plants. Report to MonoSol, 20 pp.
4. Gosney, M.J. and **M.V. Mickelbart**. 2010. Gallery and Tower herbicide efficacy. Report to Dow AgroSciences, 13 pp.
5. Gosney, M.J. and **M.V. Mickelbart**. 2010. Snapshot ornamental weed efficacy. Report to Dow AgroSciences, 13 pp.
6. Gosney, M.J. and **M.V. Mickelbart**. 2010. Freehand label expansion for photinia. IR-4 Report, 6 pp.
7. Gosney, M.J. and **M.V. Mickelbart**. 2010. Snapshot label expansion for *Leymus arenarius*. IR-4 Report, 6 pp.
8. Gosney, M.J. and **M.V. Mickelbart**. 2010. Sulfosulfuron tolerance: label expansion for ornamentals. IR-4 Report, 8 pp.
9. Gosney, M.J. and **M.V. Mickelbart**. 2010. Tower tolerance: label expansion for ornamentals. IR-4 Report, 8 pp.
10. **Mickelbart, M.V.** 2009. Evaluation of azalea cultivars for use in Indiana landscapes. Report to Plant Development Services, Inc., 4 pp.
11. **Mickelbart, M.V.** 2009. Water quality and nutrition in ornamentals. 2009 Midwest Regional Turf Foundation Field Day Proceedings, p. 5-9.
12. Gosney, M.J. and **M.V. Mickelbart**. 2009. Freehand efficacy and tolerance: Label expansion for ornamentals. Report to BASF, 16 pp.
13. Gosney, M.J. and **M.V. Mickelbart**. 2009. Phytotoxicity to herbaceous perennial plants with pre-emergent applications of Freehand. IR-4 Report, 5 pp.
14. Gosney, M.J. and **M.V. Mickelbart**. 2009. Phytotoxicity to herbaceous perennial plants with pre-emergent applications of Snapshot. IR-4 Report, 7 pp.
15. Gosney, M.J. and **M.V. Mickelbart**. 2009. Lontrel label expansion: tolerance on grass and non-grass ornamentals. Report to Dow AgroSciences, 11 pp.
16. Gosney, M.J. and **M.V. Mickelbart**. 2009. Dimension 2EW ornamental weed efficacy. Report to Dow AgroSciences, 18 pp.
17. Gosney, M.J. and **M.V. Mickelbart**. 2009. Showcase and Snapshot container ornamental efficacy and phytotoxicity. Report to Dow AgroSciences, 17 pp.
18. Owens, B. and **M.V. Mickelbart**. 2008. Showcase container ornamental efficacy and phytotoxicity awareness trials. Report to Dow AgroSciences, 10 pp.
19. Owens, B. and **M.V. Mickelbart**. 2008. Evaluation of pre-plant Certainty applications in ornamental beds. Report to Monsanto, 4 pp.
20. Owens, B. and **M.V. Mickelbart**. 2008. Showcase container ornamental efficacy and phytotoxicity awareness trials. Report to Monsanto, 15 pp.
21. Owens, B. and **M.V. Mickelbart**. 2008. Crop safety with over-the-top applications of select herbicide materials. IR-4 Report, 12 pp.
22. **Mickelbart, M.V.** 2007. Effects of cyclanilide on branching of field-grown red maple cultivars. Report to Bayer CropScience, 10 pp.
23. Hardebeck, N., K. Stanton, and **M.V. Mickelbart**. 2007. Sensitivities of shrubs and perennials to soil and foliar applications of mesotrione and a mixture of mesotrione and prodiamine. Report to Syngenta, 5 pp.
24. Hardebeck, N., K. Stanton, and **M.V. Mickelbart**. 2007. Sensitivities of shrubs and perennials to mesotrione. Report to Syngenta, 7 pp.
25. Stanton, K. and **M.V. Mickelbart**. 2007. Sensitivities of shrubs and perennials to two new herbicide formulations. Report to Syngenta, 10 pp.
26. Atkinson, B. and **M.V. Mickelbart**. 2007. Safety evaluation of Dimension 2EW as an over-the-top application to container grown ornamental plants compared to commercial standards. Report to Dow AgroSciences, 3 pp.

27. Atkinson, B. and **M.V. Mickelbart**. 2007. Safety evaluation of Showcase as an over-the-top application to container grown ornamental plants compared to commercial standards. Report to Dow AgroSciences, 3 pp.
28. Collier-Christian, L. and **M.V. Mickelbart**. 2006. Effects of cyclanilide application on maple trees. A report to the Bayer Company, 1 pp, with accompanying 19-slide PowerPoint slide set.
29. Collier-Christian, L., T. Kirk, and **M.V. Mickelbart**. 2006. Broadleaf weed control around landscape ornamentals with mesotrione. A report to the Syngenta Company, 1 pp.
30. Collier-Christian, L. and **M.V. Mickelbart**. 2006. Phytotoxicity to herbaceous perennial plants with pre-emergent applications of Pendulum, Pennant Magnum, and Snapshot. IR-4 Report, 1 pp.
31. **Mickelbart, M.V.** 2003. Development of a dry matter test for olives in New Zealand. A report to the New Zealand Olive Association. 15 pp.
32. **Mickelbart, M.V.** 2002. Report to the Jenderal Soedirman University Agronomi Study Program as part of the UNSOED DUE Project. 18 pp.
33. Jordan, B.R. and **M.V. Mickelbart**. 2002. Evaluation of a draft safety assessment report for application A436, Insect Protected Cotton Containing Event 15985. Submitted to Food Standards Australia New Zealand (FSANZ).

Newsletters and Other Reports

1. **M.V. Mickelbart** and S. Weller. 2010. Bethlehem workshop focuses on water and horticulture. Purdue University International Extension Newsletter 2:3.
2. **Mickelbart, M.V.** 2007. Cold damage situation report. Posted on “What’s Hot at the P&PDL” webpage: ppdl.purdue.edu/PPDL/hot07/4-19.html
3. **Mickelbart, M.V.** and M. Dana. 2006. Commodity summary. 2006 Season Review: Ornamentals. ppdl.purdue.edu/PPDL/annual/06commodities/ornamentals.html

Purdue Plant & Pest Diagnostic Laboratory Picture of the Week contributions

ppdl.purdue.edu/PPDL/Weekly_Picture_index.html

The Purdue P&PDL Picture of the Week presents a photo and accompanying text. Dr. Mickelbart used this forum from 2005 to 2012 to disseminate information on landscape management for an audience of professionals and homeowners.

| Year | Date | Title | # of hits* |
|------|---------|--|------------|
| 2011 | Nov 14 | Herbicide phytotoxicity in container ornamental plants | 111 |
| | Mar 28 | Maintenance-free zones around water | 69 |
| | Jan 10 | Boxwood winter color | 210 |
| 2010 | Oct 25 | Tree girdling roots | 103 |
| | Aug 23 | Fertilizer burn | 117 |
| | May 10 | Leaf traits of drought tolerant plants | 220 |
| | Feb 15 | Steeplebush (<i>Spiraea tomentosa</i>) | 70 |
| 2009 | Oct 19 | Root disturbance | 192 |
| | Aug 17 | Holding nursery stock | 179 |
| | June 15 | Micronutrient deficiencies in red maple | 234 |
| 2008 | Feb 9 | Salt spray | 200 |
| | Dec 8 | Deck girdling | 132 |
| | Aug 4 | Lightning damage to trees | 377 |
| 2007 | June 2 | Winter burn of evergreens | 1970 |
| | Sept 24 | Bark splitting | 213 |
| | Mar 26 | Tree topping – Don’t do it! | 816 |
| 2006 | Mar 12 | Chlorosis of pine trees | 552 |
| | Jan. 22 | Salt injury | 660 |
| | Nov. 6 | Smelly ginkgo fruit | 2463 |
| | Sept. 4 | Late summer leaf fall in trees | 524 |
| 2005 | May 15 | Residual Roundup damage | 2887 |
| | May 1 | Mulch volcanoes | 1302 |
| | Feb. 20 | Winter desiccation | 556 |

*as of April 3, 2012

Industry committees

| | |
|---------|--|
| 2008-10 | Certified Landscape Technician Exam Committee |
| 2005-07 | Indiana Nursery and Landscape Association Accredited Horticulturist Program Co-Chair |
| 2005- | Indiana Nursery and Landscape Association Board of Directors |
| 2005- | Indiana Green Expo Education Committee Chair |

Conferences, schools, and workshops:

Indiana Green Expo. The Indiana Green Expo (IGE) is the annual education conference and trade show for the green [nursery and landscape] industry in Indiana, held in early January. Dr. Mickelbart served as the nursery and landscape education organizer for this conference from 2005 to 2012, making all arrangements for the education sessions, including determining topic streams that are most useful to industry members and inviting expert speakers (both in- and out-of-state). Topic streams (typically with 5–8 sessions within a stream) include plant materials, landscape design, landscape installation and maintenance, nursery and greenhouse management, hardscapes, and business. Workshops include sessions where attendees learn specific hands-on practical information or obtain certification. For example, in 2010, 24 people attended the green roof certification workshops that prepared participants for green roof installation certification. A very important development during Dr. Mickelbart’s time as IGE education chair is the coming together of the INLA and the Midwest Regional Turf Foundation (MRTF) joined the IGE and in 2007.

| Year | Attendees | Speakers |
|------|-----------|----------|
| 2012 | 1,805 | 62 |
| 2011 | 1,950 | 64 |
| 2010 | 2,100 | 67 |
| 2009 | 2,300 | 65 |
| 2008 | 2,500 | 64 |
| 2007 | 2,700 | 81 |
| 2006 | 1,700 | 28 |

Green Industry Working Group. February 15, 2008. Purdue University Daniel Turfgrass Center. In collaboration with Dr. Cliff Sadof, Dr. Mickelbart organized a group of industry representatives and university specialists to develop a forum that facilitated the identification of specific industry needs that can be addressed through research and educational programming and media. A major outcome of this initial meeting was the Green Industry Working Group website that was designed by Dr. Janna Beckerman, with input from Drs. Sadof, Lopez, and Mickelbart.

Indiana Nursery & Landscape Association Summer Meeting. Dr. Mickelbart organized the education sessions for the INLA summer meetings each year. In August 2007, the summer meeting was held at Purdue University, so Dr. Mickelbart organized all seminars, as well as residential landscape tours, for that meeting.

Certified Landscape Technician Exam (CLT). The CLT exam is a voluntary national testing program administered locally by the INLA. Certification recognizes those landscape technicians who demonstrate they can meet strict performance and safety standards in installation or maintenance modules. CLT exams were held at the Purdue Daniels Turf Center in September of 2009 and 2010. The exam in 2009 was the first time the exam has been offered in Indiana. Dr. Mickelbart was instrumental in the initial negotiations between Purdue and the INLA to host the certification at Purdue University.

Conferences and workshops attended

1. NC1186: Water management and quality for ornamental crop production and health. July 14-15, 2012, Columbus, Ohio.
2. NC1186: Water management and quality for ornamental crop production and health. Jan. 24-26, 2011, Louisville, Kentucky.
3. NCDC1186: Water management and quality for ornamental crop production and health. Land Grant and Sea Grant National Water Conference, Feb. 21-25, 2010, Hilton Head Island, South Carolina.
4. Michigan Seedling Growers Assn. Annual Meeting, Sept. 9, 2008. Hensler Nursery, Hamlet, IN.
5. Greenhouse Production and Diagnostic Workshop, Mar. 17, 2008. Heartland Growers, Westville, IN.

Invited presentations

Invited presentations at out-of-state meetings

Dr. Mickelbart’s applied research program on fertilizer management has resulted in invitations to several out-of-state meetings of nursery and landscape industry personnel (e.g., Ohio State Nursery Short Course) and researchers (e.g., Controlled Release Fertilizer Conference).

1. “Controlled release fertilizers in nursery production,” Controlled Release Fertilizer Conference, Toledo, OH, Dec. 1, 2008.

2. "Woody plant nutrition and bark cracking," Vineland/University of Guelph Research Day. Vineland Station, Ontario, Canada, Oct. 7, 2008.
3. "Field nutrition," The Ohio State University Nursery Short Course, Columbus, OH, Jan. 21, 2008.
4. "Nutrient leaching," The Ohio State University Nursery Short Course, Columbus, OH, Jan. 21, 2008.
5. "What you need to know about sudden oak death," The American Rhododendron Society Eastern Regional Conference, Eastlake, OH. Oct. 13, 2007

Regional presentations

Dr. Mickelbart made presentations on his applied research program on fertilizer management throughout Indiana. The audiences in these workshops are typically landscape installation and maintenance personnel. Thus, the goal of these sessions was to educate the audience on the proper timing and application of fertilizers in the landscape. In a recent workshop with 56 attendees (Professional Horticulture Seminar in New Albany), 94% of respondents indicated that the information presented was useful, and 88% indicated that they will think more critically about their fertilization programs based on the information presented.

1. "Water use efficiency in maize," 2nd Annual National Association of Plant Breeders Meeting, West Lafayette, In, Aug. 7, 2012.
2. "Using herbicides on container ornamentals," 2011 Indiana Flower Growers Association Conference, West Lafayette, IN, Oct. 12, 2011.
3. "Drought effects on trees and shrubs: What do we do?" 14th Annual Professional Horticulture Seminar, New Albany, IN, Mar. 22, 2011.
4. "Nutrition problems in the landscape," Northwest Indiana Nursery and Landscape Association Annual Meeting, Valpairaso, IN, Feb. 7, 2011.
5. "Drought effects on ornamental plants," Professional Landscape Management School, Evansville, IN, Jan. 27, 2011.
6. "Fertilizing woody plants," Professional Landscape Management School, Evansville, IN, Jan. 27, 2011.
7. "Plant nutrition: container to landscape," Indiana Green Expo, Indianapolis, IN, Jan. 18, 2011.
8. "Fertilization forum," Indiana Green Expo, Indianapolis, IN, Jan. 18, 2011.
9. "Effects of drought on landscape nutrition," Marion County Turf and Ornamental Workshop, Indianapolis, IN, Nov. 18, 2010.
10. "Current issues in landscape fertilization," Midwest Regional Turf Foundation Turf and Ornamental Workshop, West Lafayette, IN, Nov. 9, 2010.
11. "Fertilizing trees and shrubs: when do they need it?" 13th Annual Professional Horticulture Seminar, New Albany, IN, Mar. 1, 2010.
12. "Fertilization of container plants: nursery production and landscape performance," Indiana Green Expo, Indianapolis, IN, Jan. 8, 2010.
13. "Fertilization strategies in landscapes," Midwest Regional Turf Foundation Turf and Ornamental Seminar, West Lafayette, IN, Nov. 10, 2009.
14. "When and how to fertilize trees and shrubs in the landscape," Marion County Turf and Ornamental Workshop, Indianapolis, IN, 2009.
15. "Alkalinity and nutrient deficiencies," MRTF Field Day, West Lafayette, IN, July 21, 2009.
16. "Fertilization research for woody ornamental trees," Northern Nut Growers Association, West Lafayette, IN, July 21, 2009.
17. "Plant nutrition: Keeping plants healthy by recognizing nutritional deficiencies," Northwest Indiana Nursery and Landscape Association Annual Meeting, Valpairaso, IN, Feb. 10, 2009.
18. "Fertilizing container plants," Indiana Green Expo, Indianapolis, IN, Jan. 11-13, 2009.
19. Grower Forum, Indiana Green Expo, Indianapolis, IN, Jan. 11-13, 2009.
20. "Nutrition of trees and shrubs in the field," The 12th Annual Professional Horticulture Seminar, New Albany, IN, Mar. 3, 2008.

21. "Landscape tree and shrub fertilization" Professional Landscape Management School, Evansville, IN, Jan. 25, 2008.
22. Grower Forum, Indiana Green Expo, Indianapolis, IN, Jan. 7-8, 2008.
23. "Optimizing fertilization for woody ornamentals," 2007 Professional Landscape Management School, University of Southern Indiana, Evansville, IN, Jan. 26, 2007.
24. "Strategies for minimizing production time of field-grown trees and shrubs," Indiana Green Expo, Indianapolis, IN, Jan. 11, 2007.
25. "Diagnosis and prevention of nutrient deficiencies," Marion County Annual Turfgrass and Ornamental Pest Control Workshop, Indianapolis, IN, Nov. 28, 2006.
26. "Fertilization for optimum performance of ornamentals," Midwest Regional Turfgrass Foundation Winter Meeting, West Lafayette, IN, Nov. 16, 2006.
27. "Indiana soil properties and their effects on plant growth and establishment," Northwest Indiana Nurseryman's Association, Merrillville, IN, Feb. 7, 2006.
28. "Christmas tree nutrition," Indiana Christmas Tree Growers' Association Annual Meeting, Turkey Run State Park, IN, Jan. 13, 2006.
29. "Diagnosis and prevention of nutritional deficiencies," Indiana Nursery and Landscape Association Annual Meeting, Indianapolis, IN, Jan. 6, 2006.

General contributions

Departmental committees and positions

| | |
|-----------|---|
| 2011-2013 | HLA Seminar Committee chair |
| 2008 | HLA Search Committee for Biochem/Mol Gen position |
| 2006-2010 | HLA Undergraduate Advisor |
| 2007 | HLA Search Committee for Floriculture position |
| 2006-2007 | HLA Search Committee for Department Head position |
| 2005-2008 | HLA Graduate Committee |
| 2005-2007 | HLA Seminar Committee |
| 2005- | HLA Curriculum Committee |

School or University committees and positions

| | |
|---------|--|
| 2014 | CoA Center for Molecular Agriculture Director Search Committee |
| 2011 | AGRY Search Committee for Crop Physiology position |
| 2006-07 | President, Purdue Young Faculty Association |
| 2006-07 | College of Agriculture Outcome Based Improvement Committee |

Community oriented activities

Judge, 2006 National FFA Convention, Nursery/Landscape Career Development Event, IN State Fairgrounds.

Other evidence of general contributions

Judge, Purdue Undergraduate Research Symposium, Apr. 2009, 2011, 2012
Organized 2008 HLA research retreat