

Vagner Augusto Benedito, PhD

- Curriculum Vitae -

Vagner Augusto Benedito, PhD

Associate Professor of Biochemical Genetics

Genetics and Developmental Biology Program

Division of Plant & Soil Sciences

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Fields of Expertise and Research

Plant Genetics, Plant Physiology, Plant Molecular Biology and Biochemistry, Symbiotic Nitrogen Fixation, Plant Nutrition, Plant Development, Genomics and Systems Biology

Professional Experience

Associate Professor of Biochemical Genetics (*2014 – present*)

West Virginia University – USA

Plant and Soil Sciences Division – Laboratory of Plant Functional Genetics

Assistant Professor of Biochemical Genetics (*2009 – 2014*)

West Virginia University – USA

Plant and Soil Sciences Division – Laboratory of Plant Functional Genetics

Post-doctoral fellow in Molecular Genetics and Genomics (*2006 –2009*)

The Samuel Roberts Noble Foundation – USA

Plant Biology Division – Laboratory of Legume Biology and Translational Genomics

Post-doctoral fellow in Plant Genetics and Molecular Biology (*2004 – 2006*)

Centre for Nuclear Energy in Agriculture (CENA) / University of Sao Paulo - Brazil

Laboratory of Plant Breeding

Education

Ph.D. in Plant Sciences (*2000 – 2004*)

Wageningen University / Plant Research International - The Netherlands

Plant Genetics and Diversity Business Unit

M.S. in Horticulture (*1997 – 1999*)

University of São Paulo (USP) – Brazil

Department of Horticulture and Crop Sciences

Major in Agronomy (1992 – 1997)
Federal University of Viçosa (UFV) - Brazil
Department of Horticulture and Department of Biochemistry

Technician in Husbandry (1989 – 1991)
Agricultural Technical School of Dracena - Brazil

Language Skills

Mother tongue: Portuguese
Fluency in English and Spanish
Intermediary level of French
Notions of Italian and Dutch

Fellowships, Grants and Research Funding

2015-2016: Herb Society of America – Understanding the regulation of artemisinin biosynthesis in the antimalarial herb *Artemisia annua*: effects of salt stresses (graduate student as PI);
2014-2015: WVU PSCoR Research Grant - “Functional analyses of amino acid transporters of legume nodules involved in symbiotic nitrogen fixation”;
2012-2013: WVU Genome Discovery Grant – “Resequencing the tomato genome for discovering novel developmental genes” internode length”;
2012-2013: WVU ADVANCE Sponsorship Program – “Academic mentorship in legume research: WVU and UMN together in light of the new biology”;
2010-2012: WVU PSCoR Research Grant- “Creating new tools for molecular manipulations of legume genetics”;
2010-2011: Senate Research Grant - “Exploring the genetic component eliciting plant somatic embryogenesis in the model legume *Medicago truncatula*”;
2009-2012: USDA/NIFA Research Grant (co-PI) - “Functional characterization of root nodule transporters involved in symbiotic nitrogen fixation”;
2004-2005: the Brazilian Ministry of Science and Technology’s Research Grant - “Serial Analysis of Gene Expression of Sugarcane Floral Meristems”;
2004-2005: the Brazilian Ministry of Science and Technology’s Post-doctoral Fellowship;
2000-2004: the Brazilian Ministry of Science and Technology’s Overseas Ph.D. Fellowship;
1997-1999: the Brazilian Ministry of Education’s Masters fellowship;
1995-1996: the Brazilian Ministry of Science and Technology’s Scientific Initiation Fellowship in Genetics and Physiology of Citrus;
1994-1995: the Brazilian Ministry of Science and Technology’s Scientific Initiation Fellowship in Plant Molecular Biology of Soybean;
1993-1994: the Brazilian Ministry of Science and Technology’s Scientific Initiation Fellowship in Plant-Microorganism Interactions.

Selected Courses

Quality Matters Program (Peer review of online courses), 2012, online, 1 week;
Quality Matters Program (Applying the QM Rubric to online courses), 2012, online, 2 weeks;
NSF National Academies Summer Institute @ WVU, Morgantown, WV, 2012, 1 week;
NSF Grant Proposal Writing, EPSCoR/Oklahoma State University, Stillwater-OK, 2008, 6 hours;
Food Security, FAO/ABRANDH, online, 80 hours;
Molecular Phylogenetics, CBAB/Unesp – Rio Claro, Brazil, 2004, 120 hours;

RNA Structure and Function, UN/ICGEB – Trieste, Italy, 2002, 22 hours;
Bioinformatics, Wageningen University – The Netherlands, 2001, 72 hours;
Practical Course on *in situ* hybridization, Nijmegen University – The Netherlands, 2001, 120 hours;
AFLP markers in plant systematics and breeding, Key Gene Co. – The Netherlands, 2001, 24 hours;
Critical Reflection on Science and Technology, Values and Sustainability, Wageningen University – The Netherlands, 2000, 40 hours;
Use of Molecular Markers in Agriculture, CENARGEN-Embrapa – Brasilia, Brazil, 1995, 80 hours

Teaching Activities

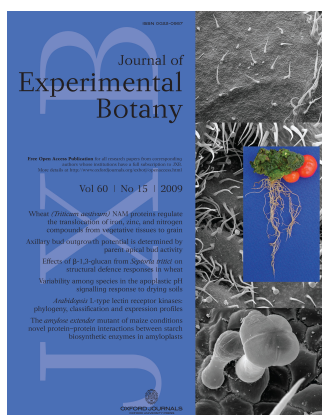
HORT692A - Directed Study: Plant Stress Physiology – graduate level
GEN593A – Special Topics: Perl for Bioinformatics – graduate level
GEN593B – Special Topics: Gene & Gene Regulation – graduate level
GEN691A – Special Topics: Molecular Genetics – graduate level
GEN692 – Directed Study: Mechanisms of Molecular Biology – graduate level
GEN726 – Advanced Biochemical Genetics – graduate level
GEN792 – Directed Study in Molecular Genetics and Plant Development – graduate level
GEN796 – Seminars in Genetics and Developmental Biology (coordinator) – graduate level
PLSC593A – Perl Programming for Bioinformatics – graduate level
PLSC593B – Plant Biochemistry – graduate level
PLSC693C – Genes and Gene Regulation – graduate level
PLSC550 – Grants and Grantsmanship – graduate level
PLSC493D – Crop Physiology (team-taught course, 20% responsibility: Stress Physiology, Secondary Metabolism, Symbioses) – undergraduate level
PLSC692A – Directed Study: Plant Sciences – graduate level
PLSC693 – Crop Physiology (team-taught, 50% responsibility) – graduate level
PLSC795 – Independent Study: Integrative Plant Biochemistry – graduate level
HFN692 – Directed Study: Data Analysis (team-taught course, 20% responsibility: Fundamentals of Statistics and Experimental Design) – graduate level

Scientific Publications (peer reviewed)

45. **Medeiros ALM, Furtado CM, Leite FS, Souto VS, Setta N, van Sluys M-A, Katajima JP, Costa APP, Benedito VA, Scortecci K** (2016) Molecular genetic dissection of sugarcane flowering under equatorial field conditions. *Tropical Plant Biology* (*in press*)
44. **Kryvoruchko IS, Sinharoy S, Torres-Jerez I, Sosso D, Pislariu CI, Guan D, Murray JD, Benedito VA, Frommer WB, Udvardi MK** (2016) MtSWEET11, a nodule-specific sucrose transporter of *Medicago truncatula* root nodules. *Plant Physiology* 171: 554-565
43. **Breullin-Sessoms F, Floss DS, Gomez SK, Pumpin N, Ding Y, Levesque-Tremblay V, Noar RD, Daniels DA, Bravo A, Eaglesham JB, Benedito VA, Udvardi MK, Harrison MJ** (2015) Suppression of arbuscule degeneration in *Medicago truncatula phosphate transporter4* mutants is dependent on the ammonium transporter 2 family protein AMT2;3. *Plant Cell* 27: 1352-1366
42. **Maditz KH, Benedito VA, Oldaker C, Nanda N, Lateef SS, Livengood R, Tou JC** (2015) Feeding soy protein isolate and n-3 PUFA affects polycystic liver disease progression in a PCK rat model of autosomal polycystic kidney disease. *Nutrition Research* 34: 526-534

- 41. Morton JB, Benedito VA, Panccione DG, Jenks MA** (2014) Potential for industrial application of microbes in symbioses that influence plant productivity and sustainability in agricultural, natural, or restored ecosystems. *Industrial Biotechnology* 10: 347-353
- 40. Maditz KH, Oldaker C, Nanda N, Benedito VA, Livengood R, Tou JC** (2014) Dietary n-3 polyunsaturated fatty acids or soy protein isolate did not attenuate disease progression in a female rat model of autosomal recessive polycystic kidney disease. *Nutrition Research* 34: 526-534
- 39. Sestari I, Zsögön A, Rehder GG, Teixeira LL, Hassimotto NMA, Purgatto E, Benedito VA, Peres LEP** (2014) Near-isogenic lines enhancing ascorbic acid, anthocyanin and carotenoid content in tomato (*Solanum lycopersicum* L. cv Micro-Tom) as a tool to produce nutrient-rich fruits. *Scientia Horticulturae* 175: 111-120
- 38. Sinharoy S, Torres-Jerez I, Kereszt A, Pislariu CI, Nakashima J, Benedito VA, Kondorosi E, Udvardi MK** (2013) The C₂H₂ transcription factor REGULATOR OF SYMBIOSE DIFFERENTIATION represses transcription of the secretory pathway gene *MtVAMP721a* and promotes symbiosome development in *Medicago truncatula*. *Plant Cell* 25: 3584-3601
- 37. Scotton DC, Benedito VA, Molfetta JB, Rodrigues BIF, Tulmann-Neto A, Figueira A** (2013) Response of root explants to in vitro cultivation of marketable garlic cultivars. *Horticultura Brasileira* 31: 80-85
- 36. Wang M, Verdier J, Benedito VA, Tang Y, Murray JD, Ge Y, Becker JD, Carvalho H, Rogers C, Udvardi M, He J** (2013) LegumeGRN: A gene regulatory network prediction server for functional and comparative studies. *PLOS One* 8: e67434
- 35. Gigliotti JC, Benedito VA, Livengood R, Oldaker C, Nanda N, Tou JC** (2013) Feeding different omega-3 polyunsaturated fatty acid sources influences renal fatty acid composition, inflammation, and occurrence of nephrocalcinosis in female Sprague-Dawley rats. *Food and Nutrition Sciences* 4(9A): 125-136
- 34. Mortimer L, Le Roux M, Perez-Fernandez M, Benedito VA, Kleinert A, Valentine A** (2013) The dual symbiosis between arbuscular mycorrhiza and nitrogen fixing bacteria benefits the growth and nutrition of the woody invasive legume *Acacia Cyclops* under nutrient limiting conditions. *Plant and Soil* 366: 229-41
- 33. Pislariu CI, Murray JD, Wen J, Cosson V, Muni RR, Wang M, Benedito VA, Andriankaja A, Cheng X, Jerez IT, Mondy S, Zhang S, Taylor ME, Tadege M, Ratet P, Mysore KS, Chen R, Udvardi MK** (2012) A *Medicago truncatula* tobacco retrotransposon insertion mutant collection with defects in nodule development and symbiotic nitrogen fixation. *Plant Physiology* 159: 1686-1699
- 32. Barreto HG, Lazzari F, Ságio SA, Chalfun-Junior A, Paiva LV, Benedito VA** (2012) *In silico* and quantitative analyses of the putative FLC-like homologue in coffee (*Coffea arabica* L.) *Plant Molecular Biology Reporter* 30: 29-35
- 31. Young ND, Debellé F, Oldroyd G, Geurts R, Cannon SB, Udvardi MK, Benedito VA et al.** (2011) The *Medicago* genome provides insight into the evolution of rhizobial symbiosis. *Nature* 480: 520-524
- 30. Tou JC, Altman SN, Gigliotti JC, Benedito VA, Cordonier EL** (2011) Different sources of omega-3 polyunsaturated fatty acids affects apparent digestibility, tissue deposition, and tissue oxidative stability in growing female rats. *Lipids Health Dis* 10: 179
- 29. Fess TL, Kotcon JB, Benedito VA** (2011) Crop breeding for low input agriculture: the solution for feeding a growing world population. *Sustainability* 3: 1742-1772

- 28. Carvalho R, Campos ML, Pino LE, Crestana SL, Zsögön A, Lima JE, Benedito VA, Peres LEP** (2011) Convergence of developmental mutants into a single tomato model system: 'Micro-Tom' as an effective toolkit for plant development research. *Plant Methods* **7**: 18
- 27. Ward CL, Kleinert A, Scortecci KC, Benedito VA, Valentine AJ** (2011) Phosphorus-deficiency reduces aluminium toxicity by altering uptake and metabolism of root zone carbon dioxide. *Journal of Plant Physiology* **168**: 459-465
- 26. Benedito VA, Li H, Dai X, Wandrey M, He J, Kaundal R, Torres-Jerez I, Gomez SK, Harrison MJ, Tang Y, Zhao PX, Udvardi MK** (2010) Genomic inventory and transcriptional analysis of *Medicago truncatula* transporters. *Plant Physiology* **152**: 1716-1730
- 25. Wang M, Benedito VA, Zhao PX, Udvardi MK** (2010) Inferring large-scale gene regulatory networks using a novel low-order constraint-based algorithm. *Molecular BioSystems* **6**: 988-998
- 24. Campos ML, Carvalho RF, Benedito VA, Peres LE** (2010) Small and remarkable: The Micro-Tom model system as a tool to discover novel hormonal functions and interactions. *Plant & Signaling Behavior* **5**
- 23. He J*, Benedito VA*, Wang M, Murray JD, Zhao PX, Tang Y, Udvardi MK** (2009) MtGEA: the *Medicago truncatula* Gene Expression Atlas database. *BMC Bioinformatics* **10**: 441
- 22. Li H, Benedito VA, Udvardi MK, Zhao PX** (2009) TransportTP: A two-phase classification approach for membrane transporter prediction and characterization. *BMC Bioinformatics* **10**: 418
- 21. Libault M, Joshi T, Benedito VA, Xu D, Udvardi MK, Stacey G** (2009) Legume transcription factor genes; what makes legumes so special? *Plant Physiology* **151**: 991-1001



20. Campos ML, Almeida M, Rossi ML, Martinelli AP, Litholdo-Junior CG, Figueira, A, Rampelotti-Ferreira FT, Vendramim JD, Benedito VA, Peres LEP (2009) Brassinosteroids interact negatively with jasmonates in the formation of anti-herbivory traits in tomato. *Journal of Experimental Botany* **60**: 4347-4361 (cover)

19. Lima JE, Benedito VA, Figueira A, Peres LE (2009) Callus, shoot and hairy root formation in vitro as affected by the sensitivity to auxin and ethylene in tomato mutants. *Plant Cell Reports* **28**: 1169-1177

18. Coelho CMM, Benedito VA (2008) Seed development and reserve compound accumulation in common bean (*Phaseolus vulgaris* L.) *Seed Science and Biotechnology* **2**: 45-52

- 17. Benedito VA, Torres-Jerez I, Murray J, Andriankaja A, Allen S, Kakar K, Wandrey M, Gallardo K, Thompson R, Ott T, Moreau S, Niebel A, He J, Dai X, Zhao PX, Tang Y, Udvardi MK** (2008) A gene expression atlas of the model legume, *Medicago truncatula*. *Plant J* **55**: 504-513 (cover)
- 16. Zsögön A, Lambais MR, Benedito VA, Figueira AVO, Peres LEP** (2008) Reduced arbuscular mycorrhizal colonization in tomato ethylene mutants. *Scientia Agricola* **65**: 259-267
- 15. Frickey T, Benedito VA, Udvardi M, Weiller G** (2008) AffyTrees: facilitating comparative analysis of Affymetrix plant microarray chips. *Plant Physiology* **146**: 377-386



14. **Benedito VA** (2007) Time to crop: jumping from biological models to crop biotechnology. *Crop Breeding and Applied Biotechnology* **7**: 1-10
13. **Udvardi MK, Kakar K, Wandrey M, Montanari O, Murray J, Andriankaja A, Zhang JY, Benedito VA, Hofer JMI, Chueng F, Town C** (2007) Legume transcription factors: global regulators of plant development and response to the environment. *Plant Physiology* **144**: 538-49
12. **Benedito VA, Faria L, Freitas-Astúa J, Figueira A** (2007) Genetic Machinery for RNA Silencing and Defense against Viruses in Citrus. *Genetics and Molecular Biology* **30**: 991-996
11. **Quecini V, Torres, GAM, Rosa Jr. VE, Gimenes MA, Machado JBM, Figueira A, Benedito V, Targon MLP, Cristofani M** (2007) *In silico* analysis of phytohormone metabolism and communication pathways in citrus transcriptome. *Genetics and Molecular Biology* **30**: 713-33
10. **Coelho CMM, Benedito VA, Figueira A, Vitorello V, Azevedo RA** (2007) Variation in the enzyme activity and gene expression of myo-inositol-3-phosphate synthase (MIPS) and phytate accumulation during seed development in common bean. *Acta Physiologiae Plantarum* **29**: 265-71
9. **Benedito VA, Dai X, He J, Zhao PX, Udvardi MK** (2006) Functional Genomics of Legume Nodule Transporters. *Functional Plant Biology* **33**:731-736
8. **Benedito VA, Angenent G, Krens FA** (2005) Floral homeotic mutants in lily: double flower and *festiva* phenotypes. *Flowering Newsletter* **39**:29-37
7. **Benedito VA, Visser PB, Angenent GC, de Vries SC, Krens FA** (2005) Transformation of *Lilium longiflorum* via particle bombardment and generation of herbicide-resistant plants. *Crop Breeding and Applied Biotechnology* **5**:125-130
6. **Benedito VA, Visser PB, van Tuyl JM, Angenent GC, de Vries SC, Krens FA** (2004) Ectopic expression of *LLAG1*, an *AGAMOUS* homologue from lily (*Lilium longiflorum* Thunb.) causes floral homeotic modifications in Arabidopsis. *Journal of Experimental Botany* **55**:1391-1399
5. **Benedito VA, Visser PB, Angenent GC, Krens FA** (2004) The potential of virus-induced gene silencing (VIGS) for speeding up functional characterization of plant genes. *Genetics and Molecular Research* **3**:323-341
4. **Benedito VA, Krens FA** (2004) *Lilium longiflorum* and its molecular floral development: the ABCDE model. *Acta Horticulturae* **651**:83-89
3. **Mendes BMJ, Mourão Filho FAA, Farias PCM, Benedito VA** (2001) Citrus somatic hybridization with potential for improved blight and CTV resistance. *In Vitro Cellular and Developmental Biology – Plant* **37**:490-495
2. **Benedito VA, Mendes BMJ, Mourão Filho FAA** (2000) Callus induction, somatic embryogenesis and protoplast isolation from sweet orange varieties. *Scientia Agricola* **57**:33-38 (*abstract in English*)
1. **Siqueira DL, Pereira WE, Salomão LCC, Benedito VA** (2000) Physicochemical characteristics of 'Hamlin' sweet orange fruits in relation to the number of leaves and ringing. *Brazilian Journal of Pomology* **22**:106-110 (*abstract in English*)

Scientific Publications (non peer-reviewed)

4. **Benedito VA, Figueira A** (2005) Environmental risk of transgenic plants. *Journal of Biotechnology, Science and Development* **34**:52-62 (*in Portuguese*)

3. **Figueiredo JEF, Rocha WD, Benedito VA, Coelho VTS** (2005) Molecular Modeling by Homology for Functional Genomic Analysis. Embrapa Technical Communication n. 129 (*in Portuguese*)
2. **Benedito VA, Visser PB, Angenent GC, de Vries SC, Krens KA** (2004) Overexpression of a MADS-box gene from *Lilium longiflorum* homologous to *SEPALLATA3* is able to induce early flowering in *Arabidopsis*. *Acta Sinica* P172-180
1. **Calsa Jr T, Benedito VA, Figueira A** (2004) Serial Analysis of Gene Expression in Plant Genomics. *Journal of Biotechnology, Science and Development* **33**:86-98 (*in Portuguese*)

Book Chapters

8. **Valentine AJ, Kleinert A, Thuynsma R, Chimphang S, Dames J, Benedito VA** (2016) Physiology and spatio-temporal relations of nutrient acquisition by roots and root symbionts. In: Lüttge U, Cánovas FM, Matyssek R. *Progress in Botany 77*. Springer Berlin Heidelberg, Springer International, 1-67
7. **Sinharoy S, Kryvoruchko IS, Pislariu CI, González-Guerrero M, Benedito VA, Udvardi MK** (2015) Functional Genomics of symbiotic nitrogen fixation in legumes with a focus on transcription factors and membrane transporters. In: FJ de Bruijn (ed.) *Biological Nitrogen Fixation*. John Wiley & Sons. 823-836
6. **Verdier J, Benedito VA, Udvardi MK** (2012) The *Medicago truncatula* gene expression atlas (MtGEA): a tool for legume seed biology and biotechnology. In: Ganesh K. Agrawal & Randeep Rakwal (ed.) *Seed Development: OMICS Technologies toward Improvement of Seed Quality and Crop Yield*. Springer
5. **de Faria AP, de Fátima A, Benedito VA, Modolo LV** (2012) Plant cell culture and transgenic plants: the goldmines for the production of compounds of pharmacological interest. In: Goutam Brahmachari (ed.) *Bioactive Natural Products: Opportunities and Challenges in Medicinal Chemistry*. World Scientific, p.631-653
4. **Muniz DR, Faria RO, Benedito VA, De Fatima A, Modolo LV** (2013) Plants as biofactories of pharmaceuticals and nutraceuticals. In: G. Brahmachari (Ed.) *Chemistry and Pharmacology of Naturally Occurring Bioactive Compounds*. 1st ed. CRC Press Francis & Taylor, p. 529-550
3. **Scortecci KC, Creste S, Calsa Jr T, Xavier MA, Landell MGA, Figueira A, Benedito VA** (2011) Challenges, opportunities and recent advances in sugarcane breeding. In: I. Abdurakhmonov (ed.) *Plant Breeding*, Intech, ISBN 978-953-307-932-5
2. **Valentine AJ, Benedito VA, Kang Y** (2011) Legume nitrogen fixation and soil abiotic stress: from physiology to genomics and beyond. In: Christine Foyer & Hanma Zhang (ed.) *Annual Plant Reviews*, volume 42: *Nitrogen Metabolism in Plants in the Post-genomic Era*. Wiley-Blackwell 207-248
1. **Benedito VA, Figueira A** (2005) Environmental risk of transgenic plants. In: A. Borém (ed.) *Plant Biotechnology*. Viçosa University Press (*in Portuguese*)

Synergistic and Outreaching Activities

1. Peer Reviewer for the journals *Plant Physiology*, *Plant Molecular Biology*, *Molecular Breeding*, *BMC Plant Biology*, *BMC Research Notes*, *Functional Plant Biology*, *Scientia Horticulturae*, *South African Journal of Botany*;

2. Editorial Board member (2007-present) and peer reviewer (since 2004) for the *Crop Breeding and Applied Biotechnology* journal (published by the Brazilian Society of Plant Breeding); and *Plants* (since 2012)
3. Scientific Editor for the *Brazilian Horticulture* journal (published by the Brazilian Society of Horticulture, 2008-present);
4. Peer reviewer for the *Brazilian Journal of Pomology* (published by the Brazilian Society of Pomology, 2005-present); for the *Kentucky Science and Engineering Foundation R&D Excellence Award* (since 2010), and the *National Science Foundation* (since 2010);
5. Member of the American Society of Plant Biologists (2006-2007, 2012-present); formerly of the Brazilian Society of Plant Breeding (2004-2007), and the West Virginia Academy of Sciences (2010);
6. Affiliated Scientist with BecA (Biosciences eastern and central Africa) Hub (since 2010).