Satya Swathi Nadakuduti

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RESEARCH INTERESTS

Our lab is interested in understanding plant specialized metabolism, identifying compounds that have potential for applications in agriculture and have pharmaceutical value. Our program integrates multi-disciplinary approaches such as biochemistry, genomics, gene discovery and functional characterization to understand the molecular mechanisms underlying the biosynthesis of these compounds. We are also interested in targeted genome modifications using gene-editing technology including CRISPR/Cas9 for agriculture crop improvement and functional genomics.

PROFESSIONAL APPOINTMENTS

Assistant Professor (Jan 2020 – present) **Research 50%; Teaching 50%**
Dept. of Environmental Horticulture, IFAS, University of Florida, USA

Postdoctoral Research Associate (June 2015 – Dec 2019)
Department of Plant Soil and Microbial Sciences, Michigan State University (MSU), USA
Advisors: Dr. David S. Douches and Dr. C. Robin Buell

Postdoctoral Research Associate, (June 2014 – May 2015)
Department of Horticulture, MSU, USA. Advisor: Dr. Cornelius S. Barry

Research Assistant, Leibniz Universität Hannover, Germany (2007-2008)
Advisor: Dr. Ralf Uptmoor

EDUCATION

Ph.D. Plant Breeding, Genetics and Biotechnology (Jan 2009 – May 2014)
Department of Horticulture, Michigan State University (MSU), USA

Dissertation: *Forward genetics to unravel novel genes and their functions in tomato fruit development*. Advisor: Dr. Cornelius S. Barry

M.Sc. Plant Breeding and Genetics (*Summa Cum Laude*) (2005 – 2008)
Institute of Horticultural Production Systems, Leibniz Universität Hannover, Germany

Thesis: *Combining AB-QTL analysis and eco-physiological modeling to evaluate the effects of drought stress on leaf development in malting barley*.
Advisors: Dr. Ralf Uptmoor and Dr. Hartmut Stützel

B.Sc. Horticulture (*Gold Medalist*) (2001 – 2005)
Acharya N. G. Ranga Agricultural University, Hyderabad, India

PEER REVIEWED PUBLICATIONS

Satya Swathi Nadakuduti†**,** Colby Starker, Dae Kwan Ko, Thilani B. Jayakody*****, C. Robin Buell, Daniel F. Voytas and David S. Douches (2019) Evaluation of methods to assess *in vivo* activity of engineered genome-editing nucleases in protoplasts. **Frontiers in Plant Science, 10: 110** ***†Corresponding author***

Satya Swathi Nadakuduti†**,** Colby Starker, C. Robin Buell, Daniel F. Voytas and David S. Douches (2019) "Genome editing in potato with CRISPR/Cas9", Plant Genome Editing with CRISPR Systems: Methods and protocols**, Methods in Molecular Biology, Springer Nature 1917: 183-201** ***(Book chapter) †Corresponding author***

Felix Enciso-Rodriguez**, Norma Manrique-Carpintero, **Satya Swathi Nadakuduti**, Daniel Zarka, C. Robin Buell and David S. Douches (2019) Overcoming self-incompatibility in diploid potato using genome editing. **Frontiers in Plant Science, 10:376**

Satya Swathi Nadakuduti†**,** C. Robin Buell, Colby Starker, Daniel F. Voytas and David S. Douches† (2018) Genome editing for crop improvement - applications in clonally propagated polyploids with a focus on potato (*Solanum tuberosum* L.). **Frontiers in Plant Science 9:1607** ***†Corresponding author***

Dae Kwan Ko, **Satya Swathi Nadakuduti,** David S. Douches and C. Robin Buell (2018) Transcriptome profiling of transgenic potato plants provides insights into variability caused by plant transformation. **PLoS One 13(11): e0206055**

Satya Swathi Nadakuduti, Joseph B. Uebler*****, Xiaoxiao Liu, A. Daniel Jones and Cornelius S. Barry (2017) Characterization of trichome-expressed BAHD acyltransferases in *Petunia axillaris* reveals distinct acylsugar assembly mechanisms within Solanaceae. **Plant Physiology 175:36-50**

Jonathon R. Kohrt******, Christy L. Sprague, **Satya Swathi Nadakuduti** and David S. Douches (2017) Confirmation of a three-way (Glyphosate, ALS, and Atrazine) herbicide-resistant population of Palmer amaranth (*Amaranthus palmeri*) in Michigan. **Weed Science 65(3):327-38**

Satya Swathi Nadakuduti, William L. Holdsworth*, Chelsey L. Klein* and Cornelius S. Barry (2014) *KNOX* genes influence a gradient of fruit chloroplast development through regulation of *GOLDEN2-LIKE* expression in tomato. **Plant Journal 78(6):1022-33**

Satya Swathi Nadakuduti, Mike Pollard, Dylan K. Kosma, Charles Allen Jr.*, John B. Ohlrogge and Cornelius S. Barry (2012) Pleiotropic phenotypes of the *sticky peel* (*pe*) mutant provide new insight into the role of *CUTIN DEFICIENT2* in epidermal cell function in tomato. **Plant Physiology 159:945-60**

Mohamed El Soda[1], **Satya Swathi Nadakuduti**[1], Klaus Pillen and Ralf Uptmoor (2010) Stability parameter and genotype mean estimates for drought stress effects on root and shoot growth of wild barley pre-introgression lines. **Molecular Breeding 26(4):583-93;**
[1] **Equal contribution to this work**

***** *Undergraduate co-authors mentored;* ******** *Ph.D. student co-author mentored*

FUNDING, HONORS AND AWARDS

***PI,* Support for Emerging Enterprise Development Integration Teams (SEEDIT), University of Florida, Institute of Food and Agriculture Sciences** (2020 - 2022)
"*Scutellaria*, a Florida native ornamental with potential anti-cancer properties - an emerging enterprise". Co-PIs: Dr. Brian Pearson, Dr. Jeongim Kim, Dr. Celina Gomez, Dr. Ying Zhang, Dr. Tom Yeager, Dr. Sandra Wilson, Dr. Deah Lieurance, Dr. Bob Hochmuth, Dr. Tatiana Sanchez, Dr. Lance Osborne, Dr. Kevin Begcy, Dr. Amy Simone, Dr. Chris McCurdy, Dr. Chris Xing.

***Co-PD*, USDA-National Institute of Food and Agriculture** (2018 – 2021)
Biotechnology Risk Assessment Research Grants Program
"Genome wide evaluation of off-targets from gene editing reagents in seed vs. vegetatively propagated crop species"
PD: Dr. David S. Douches; Co-PD: Dr. C. Robin Buell; Collaborator: Dr. Daniel F. Voytas

Co-PI, **Project GREEEN, Michigan State University** (2019 – 2020)
"Over-coming self-incompatibility in diploid potatoes by CRISPR/Cas9".
PI: Dr. David S. Douches

***PI*, Visiting Fellowship, Indo-U.S. Genome Engineering/Editing Technology Initiative (*GETin*) Program** (2018), Department of Biotechnology, Government of India (awarded but unable to pursue) "Gene-editing via CRISPR/Cas9 for durable broad-spectrum resistance to bacterial blight in rice". Collaborator: Dr. Appa Rao Podile

Co-PI, **Project GREEEN, Michigan State University** (2018 – 2019) PI: Dr. David S. Douches
Generating Research and Extension to meet Economic and Environmental Needs
"Genome-editing using CRISPR/cas9 for improving commercial traits in diploid potato".

Plant Breeding, Genetics and Biotechnology Graduate Fellowship (2009 – 2011), MSU

Award for oral presentation in annual Plant Science Graduate Student Research Symposium (2010), MSU

Summa Cum Laude for M.Sc. thesis (2007), Awarded distinction and "Best student of the year 2007" for overall curriculum. Leibniz Universität Hannover, Germany

Dr. L. Venkataratnam Honorary Gold Medal for "Outstanding undergraduate student of the year" (2005). Awarded by the State Governor in "The 39th Annual Convocation of Acharya N G Ranga Agricultural University" held in 2006 at Hyderabad, India

TEACHING

Co-instructor: Biotechnology for plant breeding (2018, 2019), MSU. Involved lectures, hands-on lab activity.

Guest lectures: Biotechnology for plant breeding (2016, 2017), MSU
"Genome editing using sequence specific nucleases"; "Quantitative real time PCR – Methods and applications"

Guest lecture - International short course on Agricultural Biotechnology and Biosafety (2015) MSU. "Precision breeding using genome editing tools, CRISPR/cas9 and TALENs"

MENTORING

MSU Graduate students: Jonathon R. Kohrt*, Felix E. Rodriguez*, Thilani B. Jayakody

MSU undergraduate students: Jacob Jensen, Nachiket Deshpande, Thilani B. Jayakody*, Grant Billings, Joseph Uebler*, Chelsey Klein*, Charity Mackie

REU students: Charles Allen Jr*

*****Supervised independent study, Co-authorship on a paper

ORAL PRESENTATIONS

Invited speaker for The Plant and Animal Genome conference XXVII (2019) San Diego, CA Workshop session: Development and Application of Genome Engineering and Transgenic Technology to the Agriculture Workshop. Oral presentation: Engineered Genome-editing nucleases - applications in potato improvement

Invited speaker for seminar series in Department of Plant Sciences, University of Hyderabad (2019), India. “Unraveling plant metabolism using multi-omic strategies and gene-editing”

Invited speaker for fall seminar series (2018) Eastern Michigan University, Ypsilanti, MI. “Impact and Applications of Genome Editing Technologies – case studies in potato”

The Potato Association of America annual meeting (2018) Boise, ID. “DMRH S5-28-5: A Homozygous Diploid Self-Compatible Potato Clone Conducive for Genetics Research”

Invited speaker for Genetics program mini-symposium (2017) MSU. “Impact of genome editing with CRISPR/Cas9 and TALENs on genome wide variability in diploid potato”

The Plant Research Laboratory (2017) MSU. “Genome editing using sequence specific nucleases: Evaluation of genome-wide variability in diploid potato”

The Potato Association of America annual meeting (2016) Grand Rapids, MI. “Genome wide evaluation of the impact of targeted gene editing in diploid potato”

The North Central Potato meeting (2015) Chicago, IL. “Genome wide detection of off-target cleavages introduced by gene editing nucleases”

The Plant Research Laboratory (2014) MSU “Pleiotropic phenotypes of the *sticky peel* (*pe*) mutant provide new insight into the role of *CUTIN DEFICIENT2* in epidermal cell function in tomato”

Plant Science Graduate Student Research Symposium, MSU (2011) "Map based positional cloning of developmental monogenic fruit mutants in tomato"

POSTER PRESENTATIONS

United States Department of Agriculture – Project Directors Meeting (2019) Washington DC

“Genome Engineering: The CRISPR/Cas Revolution” meeting at Cold Spring Harbor Research Laboratory (2017) Cold Spring Harbor, NY

The Plant and Animal Genome conference XXIV (2016) San Diego, CA
American Society of Plant Biologists (ASPB) annual conference (2012) Austin, TX

Plant Science Graduate Student Research Symposium (2012) MSU, MI

SERVICE & OUTREACH

Manuscript Reviewer: Plant Physiology, Plant Biotechnology Journal, Nature Scientific Reports, Journal of the American Society for Horticultural Science, American Journal of Potato Research, PeerJ, MDPI – Plants, Genes, Agronomy, BMC-Plant Methods.

Review Editor: Frontiers in Plant Science - Editorial Board of Genome Editing in Plants (specialty section of Frontiers in Gene Editing).

Grant Panel Reviewer: "Crop Plants for the Future", funding initiative of the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung) within the framework programme "National Research Strategy BioEconomy 2030".

Member, AAAS Science (2016 – present), ASPB (2012, 2015)

Judge: University Undergraduate Research and Arts Forum (UURAF) (2016 – 2017) MSU

"Fascination of Plants Day: From Seed to Fruit" (2017) MSU. Demonstrated the concept of totipotency and genetic transformation in plants to public and organized fun activity for kids to dig potatoes from dirt and learn about the tuber morphology