

Hari Pratap Singh, Ph.D.

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SIGNIFICANT RESEARCH CONTRIBUTIONS

- Developed genomics tools to serve as an effective means to explore poorly known genetic make up of crops plants (orphan crops) from diverse range of species of critical nutritional and economic importance.
- Developed cross-species molecular markers to foster comparative genomics studies enabling Markers Assisted Selection (MAS) for breeding stress resilient crops.
- Designed and tested successfully 124 unique primers (Conserved Intron Scanning Primer-CISP) which will provide DNA markers suitable for comparative and translational genomics in orphan crops, as well as for applications in conservation biology, ecology, invasion biology, population biology, systematic biology, and related fields.
- Successfully used CISP approach for developing pan-taxon comparative genomics resources for both well studied models and resource poor taxa in the monocot lineage.
- Contributed to the publicly available bioinformatics database by depositing 1613 unique genomic sequences for cereal crops to GenBank.
- Devised protocol for the understanding and characterizing the effect of environmental factors on survival of plants under flooding stress.
- Identified important characteristics for rice crop explaining differential survival responses under complete anoxia.
- Elaborated the mechanism of hormonal regulation of underwater leaf elongation of rice plants under flooding.
- Furthered understanding of cross tolerance for rice under flooding and drought (water limited) stress conditions.

CURRENT RESEARCH INTERESTS

- Use of biotechnology and genomics approaches to develop rapid micropropagation and genetic transformation protocols in plants of medicinal and nutraceutical importance.
- *In vitro* plant regeneration and genetic transformation of Alfalfa (*Medicago sativa*) to develop edible vaccines.
- Exploring the ability of heavy metal stress tolerance in *Arundo donax* and its potential use in phytoremediation through the use of genetic transformation.
- Developing research methodologies and characterizing biomass for enhanced biofuel production.

EXPERIENCE

- July 2005 – present **Research Professional**, College of Agriculture, Home Economics & Allied Programs, Fort Valley State University, Fort Valley, GA, United States.
Adjunct Faculty Biology, College of Arts & Sciences, Fort Valley State University, Fort, Valley, GA, United States (Fall Semester 2007).
- Jan, 2003 – April, 2005 **Post Doctoral Research Associate**, Plant Genome Mapping Laboratory, Center for Applied Genetic Technologies, College of Agril. & Environmental Sci., Univ. of Georgia, Athens, Ga, United States.
- March 2002 – Jan 2003 **Assistant Professor**, Department of Agronomy/ Center for Advanced Studies in Plant Physiology & Department of Crop Physiology, N.D. Univ. of Agril. & Tech. Faizabad, India.
- Nov 1999 – March 2002 **Senior Research Associate**, Center for Advanced Studies in Plant Physiology, N.D. Univ. of Agril. & Technology, U.P, India.
- June 1998 – Nov 1999 **Post Doctoral Research Associate**, Integrated Approach to Crop Research (ICAR), Long Ashton Research Station, Department of Agricultural Sciences, University of Bristol, Long Ashton, Bristol, United Kingdom (U.K.)

UNIVERSITY TEACHING EXPERIENCE:

Fort Valley State University, July 2005 – present

- Undergraduate courses in Plant Biotechnology and Biology.

N.D. University of Agriculture & Technology, Faizabad, India, March 2002 – Jan 2003

- Undergraduate/ Graduate courses in Crop Physiology, Agronomy.

UNDERGRADUATE RESEARCH MENTORSHIP

- Research Projects Advised and Mentored for REU's (Research Experiences for Undergraduates) and SRAP (Summer Research Apprenticeship Program) students at Center for Biotechnology, Fort Valley State University, Fort Valley, GA: 16 individual projects.

EDUCATION

PhD (Crop Physiology), 1997

Narendra Deva University of Agriculture & Technology, Faizabad, India.

Dissertation: "*Physiological and biochemical basis of tolerance and susceptibility to submergence in rainfed lowland rice*"

MS (Botany- Plant Physiology), 1993

Maharshi Dayanand Saraswati University, Ajmer (M.D.S. University), Rajasthan, India.

BS (Biology), 1991

Maharshi Dayanand Saraswati University, Ajmer (M.D.S. University), Rajasthan, India.

CONTINUING EDUCATION

- 2007 Microsoft Training on Vista, Office 2007 & Learning Essentials. Georgia Center for Continuing Education, University of Georgia, Athens, Georgia, United States, 15th Feb 2007.
- 2006 United States Department of Agriculture (USDA) Eastern Regional Grant Writing Workshop & Northeastern Educational Research Association (NERA) Writing Winning Grants Workshop, Washington DC, United States, 6-7th September, 2006.
- 2006 George Washington Carver Agricultural Experiment Station (GWCAES) Teachers Biotech & Genomics Workshop, Tuskegee University, Tuskegee, AL 36088, United States, May 30th – June 2nd, 2006.
- 2003 PERL programming language, *Center for Tropical & Emerging Global Diseases & Department of Genetics, Biological Sciences, University of Georgia, Athens, Georgia, United States*, 18th Dec to 24 Dec, 2003.
- 1999 Introduction to Molecular Genetics, Department of Biological Sciences, University of Bristol, United Kingdom (U.K.), 1999
- 1999 Statistics & Computing, IACR Long Ashton Research Station, Department of Agricultural Sciences, University of Bristol, U.K., 1999
- 1997 Post Graduate Diploma in Computer Application (PGDCA), Lucknow, India, 1997

PUBLICATIONS

Book Chapters

- A. **H.P. Singh**, H.K.N. Vasanthaiah, M.N. Rao, J.R. Soneji, B. Singh & H.C. Lohithaswa (2008). Molecular mapping and breeding for quality. In: Kole C and Abbott, A.G. (Eds) Principles and practices of plant genomics: Vol II- Molecular Breeding. Science Publishers, Inc., New Hampshire, Jersey, Plymouth (In press).
- B. **H.P. Singh**, Seema Dhir & S.K. Dhir (2008). Stevia rebaudiana: A low calorie sweetener. Transgenics and Molecular Tailoring in Plants, Editors: Chitta R. Kole, Ralph Scorza and Timothy C. Hall Publisher: Blackwell Publishing (In Press).
- C. S.K. Dhir, **H.P. Singh** & Seema Dhir (2008). Sweet Potato Transgenics and Molecular Tailoring in Plants, Editors: Chitta R. Kole, Ralph Scorza and Timothy C. Hall Publisher: Blackwell Publishing (In Press).
- D. **H.P. Singh** (2007). *Luffa aegyptica*. Crop Protection Compendium, CABI International (In press).
- E. **H.P. Singh** (2007). *Dioscorea batatas*. Crop Protection Compendium, CABI International (In press).
- F. **H.P. Singh** (2007). *Bennincasa hispida*. Crop Protection Compendium, CABI International (In press).
- G. **H.P. Singh**, Lohithaswa HC (2006) Sorghum. In: Kole C (Ed) Genome Mapping & Molecular Breeding in Plants. Springer- Verlag Berlin, Heidelberg, pp 257-302.
- H. **H.P. Singh** (2001). Molecular Biology techniques. In: P.C. Ram, A.K. Singh, R.K. Lal, Uma Singh, G.S. Chaturvedi, H.P. Singh, "Practical Plant Physiology", IACR-NDUAT Publication, India, pp 115.

Books

- A. P.C. Ram, A.K. Singh, R.K. Lal, Uma Singh, G.S. Chaturvedi, **H.P. Singh** (2001). Practical Plant Physiology, IACR-NDUAT Publication, India, pp 115.
- B. P.C. Ram, R.K. Lal and **H.P. Singh** (1998). Laboratory Techniques in Stress Physiology. IACR-NDUAT Publication, India, pp 100

Refereed Journal Articles

- A. F.A. Feltus/**H.P. Singh**, H.C. Lohithaswa, S.R. Schulze, T. Silva, and A.H. Paterson (2006). A Comparative Genomics Mechanism for Sampling Diversity and Conservation in Orphan Crops. *Plant Physiology* 140: 1183-1191.
- B. H.C. Lohithaswa, F.A. Feltus, **H.P. Singh**, C.D. Bacon, C.D. Bailey and A.H. Paterson (2007). Leveraging the rice genome sequence for monocot comparative and translational genomics. *Theoretical and Applied Genetics* 115:237-243.
- C. M. K. Singh, G.S. Chaturvedi, **H.P. Singh**, M.P. Singh & B.B. Singh (2004). Modification of morpho-physiological traits through plant growth regulators in pointed gourd. *Annals of Plant Physiology*. 18(1): 17-20.
- D. P.C.Ram, B.B.Singh, A.K.Singh, Parashu Ram, P.N.Singh, **H.P.Singh**, Iulia Boamfa, Frans Harren, J.Reuss, M.B.Jackson, T.L.Setter, L.J.Wade and V.Pal Singh (2002).Physiological basis of submergence tolerance in rainfed lowland rice: Prospects for germplasm improvement through marker aided breeding. *Field Crop Research*. 76:131-152.
- E. **H.P. Singh**, B.B. Singh and P.C. Ram (2001). Submergence tolerance of rainfed lowland rice: Search for physiological marker traits. *Journal of Plant Physiology*. 158 (7), 883-889.
- F. P.C. Ram, A.K. Singh, B.B. Singh, V.K. Singh, **H.P. Singh**, T.L. Setter, V.P. Singh and R.K. Singh (1999). Environmental characterization of floodwater in Eastern India: Relevance to submergence tolerance of lowland rice. *Experimental Agriculture*, 35: 141-152.
- G. Amit Chaturvedi, G.C.Pandey, R.P.Saxena, G.S.Chaturvedi and **H.P. Singh** (2001). Phytotoxic effect of endosulfan on gram (*Cicer arietinum* L.) root callus. *Bio. Memoirs*, 26(2): 52-55.
- H. **H.P. Singh**, S.P. Singh, M. Singh and B.B. Singh (1997). Growth and biochemical behavior of root and nodules of pea to hormonal application under sodic conditions. *Physiology and Molecular Biology of Plants*, 3:151-156.
- I. S.K. Singh, Room Singh and **H.P. Singh** (1994). Effect of sulphur on growth and yield of summer moong (*Vigna radiata* L. Wiczek). *Legume Research*, 17 (1): 53-56.

Journal Articles under Preparation/Submitted For Publication

- A. **H.P. Singh**, S.K. Dhir (2008). Differential responses of growth regulators on callus induction and somatic embryogenesis of *Jatropha curcas*: A biofuel plant. *In Vitro Cellular and Developmental Biology – Plant* (under prep.)
- B. **H.P. Singh** (2008). Single Nucleotide Polymorphisms discovery, usage and future prospects in crop improvement. *Critical Reviews in Plant Sciences*. (under prep.)
- C. **H.P. Singh**, and S.K. Dhir (2008) Somatic embryogenesis and high frequency plantlet recovery in Alfalfa (*Medicago sativa*). *In Vitro Cellular and Developmental Biology – Plant*. (under prep.)
- D. S.P. Singh and **H.P. Singh** (2007) Biochemical basis of adaptation and identification of consensus cross tolerance traits of rainfed lowland rice to submergence and drought. *Journal of Plant Physiology*. (submitted for publication).

2007

- A. Jackson MB, Bhekasut P, Harren FJM, **Singh HP** (2007). Submergence-induced injury to rice in tolerant and susceptible lines. 9th Conference of the International Society for Plant Anaerobiosis (ISPA) "Molecular, Physiological and Ecological Adaptations to Flooded Conditions by Crops and Native Plants", November 18-23, 2007, Matsushima, Sendai, Japan.
- B. Tanisha White & **Hari P. Singh** (2007). Inducing Somatic Embryogenesis in Alfalfa (*Medicago sativa*) through the use of plant growth regulators HBCU-UP National Research Conference, October 4-7, 2007, Grand Hyatt Hotel Washington, DC.
- C. Hussein Salifu, **Hari P. Singh** & Sarwan K Dhir (2007). Developing artificial seeds by encapsulation of valerian embryos. HBCU-UP National Research Conference, October 4-7, 2007, Grand Hyatt Hotel Washington, DC.
- D. Alexander K. Little, **Hari P. Singh** & Sarwan K. Dhir (2007). Somatic Embryogenesis in *Jatropha curcas*: A Biofuel Plant. HBCU-UP National Research Conference, October 4-7, 2007, Grand Hyatt Hotel Washington, DC.
- E. Jackson M.B., Bhekasut P, Harren FJM, **Singh HP** (2007). Submergence tolerance in rice: involvement of ethylene, roots, carbohydrates and free radicals. 7th International Conference on "Eco-physiological Aspects of Plant Responses to Stress Factors", September 19-22, 2007, Cracow, Poland.
- F. White T, **Hari P. Singh**, and Sarwan K. Dhir (2007). Effect of growth regulators on somatic embryogenesis of Alfalfa. Poster presentation at NIS/Beta Kappa Chi Scientific Honor Society Conference, Greensboro, NC March 12-15. Awarded 3rd place.
- G. Singh, B.P., **HP. Singh**, and S.K.Gulia (2007). Opportunities and obstacles for phytomedicines outside of modern allopathy. International Symposium on Medicinal and Nutraceutical Plants, March 19-23, 2007. Macon G.A. U.S.A. p. 23. (Published online on 8 November 2007 in The Acta Horticulturae volume # 756 www.ishs.org).
- H. Chen, Lianghong, **H.P. Singh** and B.P. Singh (2007). Health driven market demand for sweet potato and weed management for yield optimization. International Symposium on Medicinal and Nutraceutical Plants, March 19-23, 2007. Macon G.A. U.S.A. p. 29.

2006

- I. **H.P. Singh**, Kaye Knowles, Seema Dhir and Sarwan Dhir. Efficient Recovery of Transgenic Plants of Alfalfa (*Medicago sativa*) through high frequency shoots organogenesis from leaf derived callus. 2006 In Vitro Biology meeting at Minneapolis, Minnesota June 3 - 7, 2006.
- J. **H.P. Singh**, Janet Mims, Kaye Knowles and Sarwan Dhir. Somatic Embryogenesis and Plant Regeneration from Valerian (*Valeriana officinalis*): A Medicinal Plant. 14th Biennial ARD Research Symposium, April 1- 5th, 2006, Atlanta, Georgia, Assoc Res. Dir. Abs pp 167.

2005

- K. **H.P. Singh**, Feltus FA, HC Lohithaswa, SR Schulze, T Silva, and AH Paterson. Conserved intron-spanning primers (CISPs): PCR tools for sampling DNA diversity in grasses. Plant and Animal Genome XIII Conference, San Diego, California, January 15-19, 2005, pp 129.
- L. H.C. Lohithaswa, Feltus FA, **H.P. Singh**, Schulze SR, and AH Paterson. Conserved PCR Primers Designed from Rice-Banana and Rice-Onion Alignments. Plant and Animal Genome XIII Conference, San Diego, California, January 15-19, 2005, pp 128.

- M. FA Feltus, H.C. Lohithaswa, **H.P. Singh**, SR Schulze, and AH Paterson. Leveraging musa EST data: Conserved PCR primers designed from Banana- Rice genome alignments. Plant and Animal Genome XIII Conference, San Diego, California, January 15-19, 2005. pp 55.

2004

- N. **H.P. Singh** and B.B. Singh (2004). Dynamics of root and shoot interaction for submergence tolerance of rainfed lowland rice. Plant Biology 2004 (ASPB), Lake Buena Vista, Florida, July 24-28, 2004. pp 160.
- O. **H.P. Singh**, F.A. Feltus, S.R.Schulze, T. Silva, and A.H. Paterson (2004). Search for molecular markers in cereals: An approach by 'Intron scanning' and genome complexity reduction using DOP-PCR. In: Poland, D., M. Sawkins, J-M. Rebaut, and D. Hoisington (eds.). *Resilient Crops for Water-Limited Environments: Proceedings of a workshop Held at Cuernavaca, Mexico, May 24-28, 2004*. Mexico D.F.:CIMMYT. pp 70-71.
- P. **Hari P Singh**, Frank A Feltus, Andrew H Paterson (2004). DOP-PCR SNP analysis of rice and sorghum. Plant & Animal Genome XII Conference, San Diego, California January 10-14.
- Q. Frank A Feltus, **Hari P Singh**, Tara D Silva, Andrew H Paterson (2004). Scanning for DNA polymorphisms in grasses: intron scans & DOP-PCR. Plant & Animal Genome XII Conference, San Diego, California, January 10-14, 2004.
- R. Casey Bethel, Erica Sciara, John Bowers, Stefan Schulze, Alex Feltus, **Hari Singh**, Tara Silva Wayne Hanna, Andrew Paterson (2004). A sequence-tagged-site map reveals transmission genetics and comparative genome organization of bermuda grass (*Cynodon spp.*). Plant & Animal Genome XII Conference, San Diego, California, January 10-14, 2004

2002

- S. B.B. Singh, P. C. Ram, A.K. Singh, Parashu Ram, P.N. Singh, **H.P. Singh**, Uma Singh & Anuradha Singh. Impact of photosynthesis and assimilate storage on the survival of submergence stress in lowland rice (2002). **24th International Rice Research Conference**, 16-19 September, 2002 China International Hi-Tech Convention & Exhibition Centre Beijing, China.
- T. **H.P. Singh**, S.P.Singh, B.B.Singh and P.C.Ram (2002). Genotypic variability for cross tolerance in rainfed lowland rice: Presented as paper in the Rockefeller Foundation supported workshop on "*Progress toward developing resilient crops for drought prone areas*" at *International Rice Research Institute, Philippines*, Manila from May 26-30, 2002.
- U. Manish Singh, **H.P. Singh**, G.S.Chaturvedi, R.K.Lal (2002). Modification of morpho physiological traits in pointed gourd through the use of plant growth regulator. 2nd International Congress of Plant Physiology "Abiotic Stress: Adaptation and Management", Thursday, 9th January, 2002. New Delhi, India.
- V. B. B. Singh, **H.P. Singh** and P.C. Ram (2002). Submergence tolerance of rainfed lowland rice: Physiological marker traits and germplasm improvement through marker aided breeding. *Presented as LeadContributory Papers in 2nd International Congress of Plant Physiology "Abiotic Stress: Adaptation and Management"*, Thursday, 9th January, 2002. New Delhi, India.

2001

- W. Santosh Kumar Singh, **H.P.Singh**, A.K.Singh, G.S.Chaturvedi, R.P.Saxena, Anuradha Singh (2001). Effect of cadmium on growth, quality and yield of tomato (*Lycopersicon esculentum*-Mill). Paper presented in *National Seminar on 'Role of Plant Physiology for Sustaining Quality for Production in Relation to Environment*. University of Agriculture Science, Dharwad from 5-7 December, 2001, India.
- X. **H.P. Singh**, M.B. Jackson, B.B. Singh and P.C. Ram (2001). Physiology of submerged rice roots and its functional links with shoots. Presented as poster paper in 7th Conference of the International Society for Plant Anaerobiosis (ISPA), 12-16, June, 2001. University of Nijmegen Utrecht University, The Netherlands.
- Y. **H.P. Singh**, M.B. Jackson, B.B. Singh and P.C. Ram (2001). Physiology of submerged rice roots and its functional links with shoots. 7 * *Conference of the International Society for Plant Anaerobiosis (ISPA)*, Nijmegen, The Netherlands, June 12-16, 2001.
- Z. P. C. Ram, P. Bhekasut, A. K. Singh, P.Ram, P. N. Singh, **H. P. Singh**, Uma Singh, S. Pongkachoron, Iulia Boamfa, B. B. Singh, Frans Harren, P.Chareonndham, M. B. Jackson(2001). Characterizing the submerged environment: relevance to flooding tolerance research. 7th *Conference of the International Society for Plant Anaerobiosis (ISPA)*, Nijmegen, The Netherlands, June 12-16, 2001.

2000

- AA. Ram, P.C., Singh, B.B., Singh, A.K., Parshu Ram, Singh, P.N., **Singh, H.P.**, Boarnfa, Iulia, Harren, Frans, Santosa, Edi, Jackson, M.B., Setter, T.L., Reuss, Wade, L.J, Pal, V., and Singh, R.K. (2002). Submergence tolerance in rainfed lowland rice: Physiological basis and prospects for cultivars improvement through marker aided breeding. Paper presented Mini-symposium on "Improving Tolerance to Abiotic Stresses in Rainfed Lowland Rice" held at IRRI, Los Banos Laguna from 21-22 October, 2000.
- BB. **H.P. Singh**, Parashu Ram, P.N. Singh, A.K. Singh, P.C. Ram and B.B. Singh (2000). Role of active oxygen scavenging systems in submergence tolerance of rainfed lowland rice. Presented as poster paper in a symposium entitled "*Improving Tolerance to Abiotic Stresses in Rainfed Lowland Rice*" held in association with the 4th *International Rice Genetics Symposium (IRGS)*, 21-22, October, 2000. IRRI, Los Banos, Manila, Philippines.

TRAINING/COURSES:

- 2007 **Bio-energy Workshop 101**, Fort Valley State University, Fort Valley Ga, October 29-30th 2007.
- 2002 **Advance Course on Physiology of Vegetable Crops**, Indian Institute of Vegetable Research (IIVR), Varanasi, INDIA, 4th March to 24th March, 2002
- 2001 **Salt Tolerance in Plants: Physiological and Molecular Approaches**, Centre of Advanced Studies in Plant Physiology, N.D. University of Agriculture & Technology, Kumarganj, Faizabad, INDIA, 19th Nov, - 9th Dec., 2001.
- 2000 **Adaptation of Plants to Waterlogging and Submergence**, Centre of Advanced Studies in Plant Physiology, N.D. University of Agriculture & Technology, Kumarganj, Faizabad, INDIA, 9-19 November, 2000
- 1998 **Response of Plants to Abiotic Stresses: From Genes to Genotypes**, University of Agricultural Sciences, Bangalore, India. Sponsored by Department of Science & Technology (DST), Government of India, 1998

- 1998 **Advance Techniques in Stress Physiology**, Centre of Advanced Studies in Plant Physiology, N.D. University of Agriculture & Technology, Kumarganj, Faizabad, INDIA, 1-10 Februray,1998
- 1996 **Environmental Characterization Measurement of Flood Water and Instrumentation**, Centre of Advanced Studies in Plant Physiology, N.D. University of Agriculture & Technology, Kumarganj, Faizabad, INDIA, 9-18 Sep., 1996

RESEARCH GRANTS/FELLOWSHIPS

- 2007-** Developing Undergraduate Curriculum and Experimental Learning in Plant Genomics at FVSU. Submitted to USDA/CSREES for USD \$198, 947. (Funded).
- 2007-** Consolidated Bioprocessing for Enhanced Ethanol Production. Submitted to USDA/CSREES for USD \$292, 524. (Not funded).
- 2003-** Rockefeller Foundation Postdoctoral Research Grant at University of Georgia, U.S.A., (USD \$100,000).
- 2001-** Research fellowship by Council of Scientific & Industrial Research (CSIR), Pool Scientist, Government of India, 2001.
- 1998-** European Commission Research Fellowship at University of Bristol, United Kingdom (U.K.), 1998.
- 1993-** University Merit Scholarship during Ph.D., Narendra Deva University of Agriculture & Technology, India, 1993.

PROFESSIONAL MEMBERSHIP

- Genome India International (GII) (Founder committee member)
- American Society of Plant Biologists (ASPB)
- GSAS Harvard Biotechnology Club
- American Society of Agronomy (ASA)
- Crop Science Society of America (CSSA)
- Soil Science Society of America (SSSA)
- International Society for Plant Anaerobiosis (ISPA)