

Curriculum Vitae



Prasanta K. Subudhi

**Professor
Plant Genetics & Genomics**

ADDRESS

School of Plant, Environmental, and Soil Sciences
215 MB Sturgis Hall
Louisiana State University Agricultural Center
Baton Rouge, LA 70803
Phone 225-578-1303; Fax 225-578-1403
Email psubudhi@agcenter.lsu.edu

EDUCATION

Ph.D. (Genetics), Indian Agricultural Research Institute
M.Sc. (Plant Breeding & Genetics), Orissa University of Agriculture & Technology
B.Sc. (Agriculture), Orissa University of Agriculture & Technology

RESEARCH INTEREST

- Breeding and genetics of abiotic stress tolerance in rice
- Genetics of complex domestication traits in rice
- Genetics of resistance to aflatoxin accumulation in corn
- Genetic improvement of coastal plant species of South Louisiana

CURRENT RESEARCH PROJECTS

- HATCH RESEARCH PROJECT: Genetic improvement of native plant species for coastal restoration in Louisiana
- USDA-NIFA Project: Widening the genetic base of US rice germplasm through introgression of novel abiotic stress tolerance genes from exotic donors
- USDA-NIFA Project: Marker-assisted breeding to enhance disease resistance in corn, rice, and sugarcane
- AMCOE (Aflatoxin Mitigation Center of Excellence) Project: Advancing genome re-sequencing to marker discovery toward *Aspergillus flavus* resistance and aflatoxin reduction in maize

ACADEMIC EXPERIENCE:

- Professor- Louisiana State University Agricultural Center, 2013 - present
- Associate Professor- Louisiana State University Agricultural Center, 2007 - 2013
- Assistant Professor-Research, Louisiana State University Agricultural Center, 2001 - 2007
- Post Doctoral Research Associate, Texas Tech University, 1996-2000
- Project Scientist, International Rice Research Institute, Philippines, 1994-1996
- Assistant Professor, Orissa University of Agriculture and Technology, India, 1991-1994

PROFESSIONAL AND SCHOLARLY ORGANIZATIONS

Life member of Rice Genetics Cooperative (RGC), IRRI, Manila, Philippines
Life member of Association for the promotion of DNA Fingerprinting and other DNA Technologies
Crop Science Society of America
American Society of Agronomy

Sigma Xi Society
Louisiana Association of Agronomists
Who's Who in Agriculture Higher Education (WWAHE)

HONORS AND AWARDS

Rockefeller Foundation rice biotechnology fellowship
Indian Council of Agricultural Research (ICAR) Senior Research Fellowship
Indian Council of Agricultural Research (ICAR) Junior Research Fellowship
National Scholarship of the Government of India
University gold medals and Shyamananda memorial gold medal for securing 1st position in 1st class in both B. Sc. and M. Sc.
Sibananda Panda memorial gold medal for being the best student in Ag. Economics in B.Sc.
V.S. Tilak memorial and Bajamani prize for securing highest aggregate marks in Plant Breeding, Genetics, Plant Physiology, and Agronomy courses in B.Sc.

RESEARCH ACTIVITIES

Authored and coauthored over 60 scientific papers and book chapters. I am currently engaged in research projects for development of salinity and drought tolerant rice cultivars and elucidation of molecular basis of resistance to aflatoxin in corn. Other projects include genetics of domestication traits using red rice as model and genetic improvement of native plant species for coastal restoration. We employ classical breeding, molecular genetics, and genomics technologies. Some significant accomplishments of my laboratory include complete understanding of reproductive biology, germplasm characterization, salinity stress induced gene expression in smooth cordgrass (*Spartina alterniflora*), first molecular characterization of sea oats (*Uniola paniculata*) accessions of the United States, micropropagation and field evaluation of sea oats germplasm, QTL analysis of seed dormancy and seed shattering in US weedy rice, and characterization of several salt stress related genes from *Spartina alterniflora* for their role in salinity tolerance.

As a faculty member of the LSU Graduate School, I am also actively engaged in supervising graduate students. Before joining the LSU AgCenter, I have extensively researched on two model grass species, sorghum and rice. At the International Rice Research Institute, Manila, Philippines, I researched on genetic and physical mapping, DNA fingerprinting, and marker-assisted selection of agronomically important genes to improve rice productivity. Most notable accomplishments are first AFLP linkage map in rice, mapping and marker-assisted selection tool for two thermosensitive genetic male sterility genes, QTL analysis of submergence tolerance, DNA fingerprinting of cytoplasmic genetic male sterile lines, development of a simple and quick DNA isolation (miniscale) protocol, and successful marker-assisted introgression of Tungro virus and BPH (brown plant hopper) resistance to new plant type of rice. The research conducted in sorghum biotechnology at Texas Tech University resulted in identification of several quantitative loci for 'stay green', which is considered an important component trait for post-flowering drought tolerance. Near-isogenic lines for those QTL were developed to pursue physical mapping and map-based cloning.

LIST of PUBLICATIONS

2014

Subudhi PK, Singh PK, Deleon T, Parco A, Karan R, Biradar H, Cohn MA, Sasaki T (2014) Mapping of seed shattering loci provides insights into origin of weedy rice and rice domestication. *J Heredity* doi:10.1093/jhered/est089 (advance online).
Karan R, Subudhi PK (2014) Overexpression of an adenosine diphosphate-ribosylation factor gene from the halophytic grass *Spartina alterniflora* confers salinity and drought tolerance in transgenic Arabidopsis. *Plant Cell Rep* 33:373-384 (DOI 10.1007/s00299-013-1537-8).

2013

Subudhi PK, Magpantay GB, Karan R (2013) A retrotransposon-based probe for fingerprinting and evolutionary studies in rice (*Oryza sativa*). *Genetic Resources and Evolution* 60:1263-1273. DOI : 10.1007/s10722-012-9917-4.

Knott C, Materne MD, Utomo H, Subudhi PK, Baisakh N, Harrison SA (2013) Registration of 'St. Bernard', 'Las Palomas' and 'Lafourche' smooth cordgrass cultivars. *J Plant Registrations* 7:12-17. doi: 10.3198/jpr2012.04.0259crc.

2012

- Karan R, Subudhi PK (2012a) A stress inducible SUMO conjugating enzyme gene of a grass halophyte *Spartina alterniflora* (SaSce9) enhances salinity and drought stress tolerance in Arabidopsis. *BMC Plant Biol* 12:187. DOI: 10.1186/1471-2229-12-187.
- Knott C, Materne MD, Subudhi PK, Baisakh N, Utomo HS, Harrison SA (2012) Registration of sea oats cultivars 'LA12-201', 'LA12-202', and 'LA12-203'. *Journal of Plant Registrations* 6: 289-293. doi: 10.3198/jpr2012.02.0113crc.
- Karan R, Subudhi PK (2012b) Overexpression of a nascent polypeptide associated complex gene (*SaβNAC*) of *Spartina alterniflora* improves tolerance to salinity and drought in transgenic Arabidopsis. *Biochem Biophys Res Comm* 424:747-752.
- Subudhi PK, Parco A, Singh PK, DeLeon T, Karan R, Biradar H, Cohn MA, Brar DS, Sasaki T (2012) Genetic architecture of seed dormancy in us weedy rice in different genetic backgrounds. *Crop Sci* 52:2564-2575.
- Karan R, DeLeon T, Biradar H, Subudhi PK (2012) Salt stress induced variation in DNA methylation pattern and its influence on gene expression in contrasting rice genotypes. *PLoS ONE* 7(6):e40203.
- Knott C, Materne MD, Utomo HS, Subudhi PK, Baisakh N, Harrison SA (2012) Registration of smooth cordgrass cultivars 'LA11-101', 'LA11-102', and 'LA11-103'. *J Plant Registrations* 6: 252–258. doi: 10.3198/jpr2011.12.0666crc.
- Baisakh N, RamanaRao MV, Rajasekaran K, Subudhi P, Janda J, Galbraith D, Vanier C, Pereira A (2012) Enhanced salt stress tolerance of rice plants expressing a vacuolar H⁺-ATPase subunit c1 (*SaVHAc1*) gene from the halophyte grass *Spartina alterniflora* Loisel. *Plant Biotech J* 10:453-464.
- Bertrand SE, Knott C, Baisakh N, Subudhi PK, Harrison SA, Materne MD, Utomo HS (2012) Selection of genetically diverse sea oats lines with improved performance for coastal restoration in the northern Gulf of Mexico. *Euphytica* 185:103-117.
- Knott CA, Utomo H, Subudhi PK (2012) LSU AgCenter first in the nation to patent native plant varieties for coastal restoration. 55 (4).

2011

- Subudhi PK, Baisakh N (2011) *Spartina alterniflora* Loisel., a halophyte grass model to dissect salt stress tolerance. *In Vitro Cell Dev Biol – Plant* 47:441-457.
- Karan R, Subudhi PK (2011) Approaches to increasing salt tolerance in crop plants. In: *Abiotic stress responses in plants: metabolism to productivity*, Parvaiz Ahmad & M.N.V. Prasad (eds.), ISBN 978-1-4614-0633-4, Springer Science+Business Media, LLC, 233 Spring Street, New York, NY 10013, USA, pp 63-88.
- Subudhi PK (2011) Omics Approaches for Abiotic Stress Tolerance in Plants. In: E-book "Omics and Plant Abiotic Stress Tolerance" (eISBN: 978-1-60805-058-1), N. Tuteja, S.S. Gill and R. Tuteja (eds.). Bentham Science Publishers Ltd. doi: 10.2174/97816080505811110101, pp10-38.

2010

- Dwivedi S, Upadhyaya H, Subudhi P, Gehring C, Bajic V, Ortiz R (2010) Enhancing abiotic stress tolerance in cereals through breeding and transgenic interventions. *Plant Breeding Review* 33:31-114.
- Subudhi P, Sha X (2010) Potential for development of salt-and drought-tolerant rice lines. *Rice Research Station News, LSU Agricultural Center Louisiana Agriculture* 7 (3).

2009

- Baisakh N, Subudhi PK, Arumuganathan K, Parco AP, Harrison SA, Knott CA, Materne MD (2009) Development and interspecific transferability of genic microsatellite markers in *Spartina* spp with different genome size. *Aquatic Bot* 91:262-266.
- Baisakh N, PK Subudhi (2009) Heat stress alters the expression of salt stress induced genes in smooth cordgrass (*Spartina alterniflora* L.) *Plant Physiol Biochem* 47:232-235.

2008

- Subudhi PK, Parami NP, Materne MD, Harrison SA (2008) Genetic diversity in *Spartina alterniflora* (Loisel.) from brown marsh areas of Louisiana. *J Aquatic Plant Management* 46:60-67.
- Baisakh N, Subudhi PK, Bhardwaj P (2008) Primary responses to salt stress in a halophyte, smooth cordgrass (*Spartina alterniflora* Loisel. *Funct Integr Genomics* 8:287-300.

2007

- Kang MS, Subudhi PK, Baisakh N, Priyadarshan PM (2007) Crop Breeding Methodologies: Classic and Modern. *In: Breeding Food Staples*, M.S. Kang and P.M. Priyadarshan (ed.), Blackwell Publishing (in Press).
- Ryan AB, Venuto BC, Subudhi PK, Harrison SA, Shadow RA, Fang X, Materne M, Utomo H (2007) Identification and genetic characterization of smooth cordgrass for coastal wetland restoration. *J Aquatic Plant Management* 45:90-99.
- Harris K, Subudhi PK, Borrell A, Jordan D, Rosenow D, Nguyen H, Klein P, Klein R, Mullet J (2007) Sorghum stay-green QTL individually reduce post-flowering drought-induced leaf senescence. *J Exp Bot* 58:327-338.
- Harrison SA, Baisakh N, Materne MD, Knott C, Subudhi PK, Utomo H (2007) Breeding native coastal plants for use in coastal wetland reclamation and preservation. *Louisiana Agriculture* 50 (2):18-19.
- Subudhi PK, Baisakh N, Sahoo DM, Harrison SA, Materne MD, Utomo H (2007) Sea oats: micropropagation aids in coastal restoration. *Louisiana Agriculture* 50 (2):20.
- Subudhi PK, Baisakh N, Harrison SA, Materne MD, Utomo H (2007) Plant genetic diversity: Essential for a dynamic Louisiana coast. *Louisiana Agriculture* 50 (2):21.
- Utomo HS, Materne MD, Harrison SA, Subudhi PK, Baisakh N (2007) Improved marsh plants and seed-based propagation. *Louisiana Agriculture* 50 (2):22-23.

2006

- Subudhi PK, Sasaki T, Khush GS (2006) Rice, pp 1-78, *In: Genome Mapping and Molecular Breeding in Plants*, Kole CR (ed), Springer-Verlag GMBH, Tiergartenstr. 17, 69121 Heidelberg, Germany.
- Baisakh N, Subudhi PK, Parami NP (2006) cDNA-AFLP analysis reveals differential gene expression in response to salinity in a halophyte *Spartina alterniflora* Loisel. *Plant Sci* 170:1141-1149.

2005

- Subudhi PK, Parami NP, Harrison SA, Materne MD, Murphy JP, Nash D (2005) An AFLP-based genetic survey of sea oats (*Uniola paniculata*) accessions of the United States. *Theor Appl Genet* 111: 1632-1641.

2004

- Fang X, Subudhi PK, Venuto BC, Harrison SA (2004) Mode of pollination, pollen germination, and seed set in smooth cordgrass (*Spartina alterniflora*, Poaceae). *Intl J Plant Sci* 165:395-401.
- Fang X, Subudhi PK, Harrison SA, Venuto BC, Ryan A (2004) Influence of flowering phenology on seed production in smooth cordgrass (*Spartina alterniflora* Loisel.). *Aquatic Bot* 80:139-151.
- Subudhi PK, Nguyen HT (2004) Genome mapping and genomic strategies for crop improvement. pp 403-451. *In: Physiology and Biotechnology Integration for Plant Breeding*, Henry T. Nguyen and Abraham Blum (eds.), Marcel Dekker, Inc., New York.
- Pathan MS, Subudhi PK, Courtois B, Nguyen HT (2004) Molecular dissection of abiotic stress tolerance in sorghum and rice: A case study, pp 525-569. *In: Physiology and Biotechnology Integration for Plant Breeding*, Nguyen HT and Blum A (eds), Marcel Dekker, Inc., New York.

2003

- Subudhi PK, Parami N, Ryan A, Harrison S (2003) Rescuing the coast with biotechnology. *Louisiana Agriculture* 46 (4):42-44.

2002

- Sanchez AC, Subudhi PK, Rosenow DT, Nguyen HT (2002) Mapping QTLs associated with drought resistance in sorghum (*Sorghum bicolor* L. Moench). *Plant Mol Biol* 48:713-726.

Subudhi PK, Nguyen HT, Gilbert ML, Rosenow DT (2002) Sorghum Improvement: past achievements and future prospects, pp 109-159. *In: Crop improvement, Challenges in the twenty-first century*, Kang MS (ed), Food Products Press, 10 Alice Street, Binghamton, New York.

2001

Kebede H, Subudhi PK, Rosenow DT, Nguyen HT (2001) Quantitative trait loci influencing drought tolerance in sorghum (*Sorghum bicolor* L. Moench). *Theor Appl Genet* 103:266-276.

Harrison SA, Croughan TP, Materne MD, Venuto BC, Breitenbeck GA, Cohn MA, Fang X, Ryan A, Schneider RW, Shadow RA, Subudhi P, Utomo H (2001) Improving native plants to protect and preserve Louisiana's coastal marshes. *Louisiana Agriculture* 44 (3):4-6.

2000

Dong NV, Subudhi PK, Luong PN, Quang VD, Quy TD, Zheng HG, Wang B, Nguyen HT (2000) Molecular mapping of a rice thermosensitive genetic male sterility gene using AFLP, RFLP and SSR techniques. *Theor Appl Genet* 100:727-734.

Subudhi PK, Nguyen HT (2000) Linkage group alignment of sorghum RFLP maps using a RIL mapping population. *Genome* 43:240-249.

Xu W, Subudhi PK, Crasta OR, Rosenow DT, Mullet JE, Nguyen HT (2000) Molecular mapping of QTLs conferring stay-green in grain sorghum. *Genome* 43:461-469.

Subudhi PK, Rosenow DT, Nguyen HT (2000) Quantitative trait loci for the stay-green trait in sorghum (*Sorghum bicolor* L. Moench): consistency across genetic backgrounds and environments. *Theor Appl Genet* 101:733-741.

Subudhi PK, Nguyen HT (2000) Biotechnology-New Horizons, pp. 349-397, *In: Sorghum: Origin, History, Technology, and Production*, Wayne Smith C and Frederiksen RA (eds), John Wiley and Sons, New York, NY.

1999

Subudhi PK, Huang N (1999) RAPD mapping in a doubled haploid population of rice (*Oryza sativa* L.). *Hereditas* 130:41-49.

Lang NT, Subudhi PK, Virmani SS, Brar DS, Khush GS, Li Z, Huang N (1999) Development of PCR-based markers for thermosensitive genetic male sterility *tms3(t)* in rice. *Hereditas* 131:121-127.

Subudhi PK, Magpantay G, Rosenow DT, Nguyen HT (1999) Mapping and marker-assisted selection to improve stay green trait in sorghum for drought tolerance, pp. 183-191. *In: Genetic improvement of rice for water-limited environments*, Hardy B, Ito O, and O'Toole JC (eds), International Rice Research Institute, Los Banos, Philippines.

1998

Subudhi PK, Virmani SS, Huang N (1998) A TGMS linked nuclear DNA marker as originated from the mitochondrial genome in rice (*Oryza sativa* L.). *Heredity* 80:285-292.

Subudhi PK, Nandi S, Casal C, Virmani SS, Huang N (1998) Classification of rice germplasm: III. High resolution fingerprinting of cytoplasmic genetic male sterile (CMS) lines with AFLP. *Theor Appl Genet* 96:941-949.

1997

Maheswaran M, Subudhi PK, Nandi S, Xu JC, Parco A, Yang D, Huang N (1997) Polymorphism, distribution and segregation of AFLP markers in a doubled haploid rice population. *Theor Appl Genet* 94:39-45.

Subudhi PK, Borkakati RP, Virmani SS, Huang N (1997) Molecular mapping of thermosensitive genetic male sterility (TGMS) gene in rice by bulk segregant analysis. *Genome* 40:188-194.

Huang N, Parco A, Mew T, Magpantay G, McCouch SR, Guiderdoni E, Xu J, Subudhi PK, Angeles ER, Khush GS (1997) RFLP mapping of Isozymes, RAPD, QTLs for grain shape and brown plant hopper resistance in a doubled haploid rice population. *Mol Breeding* 3:105-112.

Nandi S, Subudhi PK, Senadhira D, Manigbas N, Sen-Mandi S, Huang N (1997) Mapping QTLs for submergence tolerance in rice by AFLP and selective genotyping. *Mol Gen Genet* 255:1-8.

Yang D, Parco A, Nandi S, Subudhi PK, Zhu Y, Wang G, Huang N (1997) Construction of a Bacterial Artificial Chromosome (BAC) library and identification of overlapping BAC clones with chromosome 4 specific RFLP markers in rice. *Theor Appl Genet* 95:1147-1154.

Lang NT, Subudhi PK, Virmani SS, Huang N, Brar DS (1997) Development of PCR based markers for thermosensitive genetic male sterility gene, *tms3(t)* in rice. *Rice Genetics Newsletter* 14:102-103.

1996

Subudhi PK, Borkakati RP, Virmani SS, Huang N (1996) Inheritance and molecular mapping of thermosensitive genetic male sterility gene in rice, pp. 601-606. *In: Rice Genetics III, Proceedings of the Third International Rice Genetics Symposium, 16-20 Oct 1995. Manila (Philippines).*

1995

Subudhi PK, Huang N (1995) Identification of genes responsible for segregation distortion in a doubled haploid population of rice by using molecular markers. *Rice Genetics Newsletter* 12:239-241.

Subudhi PK, Borkakati RP, Virmani SS, Huang N (1995) Identification of RAPD markers linked to rice thermosensitive genetic male sterility gene by bulk segregant analysis. *Rice Genetics Newsletter* 12:228-231.

Kangle Z, Subudhi PK, Domingo J, Magpantay G, Huang N (1995) A rapid DNA isolation protocol for marker assisted selection in rice breeding. *Rice Genetics Newsletter* 12:255-258.

Subudhi PK, Panda PK (1995) Mutagen induced stress response and its implication in mutational improvement of rapeseed and mustard. *Madras Agril J* 82(5):357-360.

Subudhi PK, Raut RN (1995) Studies on early generation pollen and seed fertility in interspecific crosses of *Brassica*. *Crop Research* 10(3):291-296.

Mohapatra D, Das BK, Subudhi PK, Mohanty IC (1995) Production of inter-specific hybrids between *Oryza sativa* and *Oryza minuta*. *Current Agril Res* 8 (Supl.):21-23.

1994

Subudhi PK, Raut RN (1994a) White rust resistance and its association with parental species type and leaf waxiness in *Brassica juncea* L. Czern & Coss x *Brassica napus* L. crosses under the action of EDTA and Gamma ray. *Euphytica* 74:1-7.

Subudhi PK, Raut RN (1994b) Genetic analysis of yield and its component traits in Indian mustard (*Brassica juncea*) x Ethiopian mustard (*Brassica carinata*) interspecific crosses. *Indian J Agril Sci* 64(4):171-175.

Subudhi PK, Raut RN (1994c) Variation in resistance to leaf blight caused by *Alternaria brassicae* in interspecific crosses of *Brassica* varieties. *Indian J Agril Sci* 64(7):501-503.

Panda PK, Subudhi PK (1994) A comparative study of chemically induced micromutational variability in M2 generation of rapeseed and mustard. *Indian J. Genet.* 54(3):269-274.

1993

Subudhi PK, Sinha SK (1993a) Mutagenic effect on growth pattern of wheat. *J. Maharashtra Agril Univ* 18(2):243-245.

Subudhi PK, Sinha SK (1993b) Induced micromutation in relation to mutagen induced stress in wheat. *Gujarat Agril Univ Res J* 18(2):9-12.

Subudhi PK, Raut RN (1993) Inheritance of seed coat colors in oilseed *Brassica*. *J Oilseeds Res* 10(2):251-253.

1992

Subudhi PK, Raut RN (1992) A note on inheritance of flower color in *Brassica juncea* x *Brassica carinata* interspecific crosses. *Orissa J. Agril. Res.* 6(3-4):159-161.

1991

Subudhi PK, Mohapatra BK, Sinha SK (1991) Use of pollen traits for early detection of micromutations in wheat. *Indian J Genet* 51(1):107-111.