

# Profile of Scientist



**1. Name of the Scientist:** Dr. Amaresh Chandra

**2. Personal Biodata:**

**a) Position/Designation:** Principal Scientist

**b) Contact Details:**

- i. ICAR Email ID:** amaresh.chandra@icar.gov.in
- ii. Personal Email ID:** amaresh\_chandra@rediffmail.com
- iii. Mobile No.:** 9450041285

**c) Joining date in:**

- i. ICAR:** 09-10-1990
- ii. IISR:**

**d) Discipline and Specialization:** Plant Bio-chemistry (Plant Molecular Biology and Biotechnology)

**f) Training / advance exposure in the area of work:**

- Worked on SSR based map enrichment, QTLs identification, capillary based electrophoregrams (CE) for variety/ genotype testing and development of molecular disease diagnostic tool (LAMP) in sugarcane at Sugarcane Research Unit, USDA-ARS, Houma, Louisiana, **USA** from May 6, 2013 to February 23, 2014.
- Worked on linkage mapping and sequencing of clover species at IBERS, Aberystwyth University, Wales **UK** in February 2009.
- Received training on mapping and QTLs identification for anthracnose disease and drought tolerance in *Stylosanthes* at CSIRO, Brisbane, **Australia** from July 1998 to January 1999.

**3. Contribution to the scientific advancement:**

- Involved in achieving improved physiological efficiency of sugarcane in terms of early and high germination by seed priming and phasic applications of plant growth regulators leading to increased cane yield (+25% over control).
- Contributed in functional genomics work in sugarcane and addressed the source-sink dynamics in sugarcane by perturbing source-sink communication, expression analysis of

some pivotal genes including identifying ~3000 differentially expressing transcripts based on transcriptomic study and their validation through real-time PCR.

- Developed and reported first time 3425 novel CISP markers in sugarcane based on >2.5 lacs EST sequences
- Reported first SAI gene sequence of *S. spontaneum*
- Involved in improvising/ refining and commercializing the bud chip technology for rapid and quality multiplication of sugarcane seed
- Reported *L. lactis* as the prime bacteria responsible for post-harvest sucrose losses and molecular investigation confirming role of SAI in it and commercializing the chemical formulation (BKC+SMS) developed in managing post-harvest sucrose losses in sugarcane
- Developed LAMP, a molecular technique to diagnose red rot, brown rust and mosaic diseases of sugarcane
- Enriched sugarcane linkage map with SSR markers and identified 24 QTLs associated with sucrose content in sugarcane
- Developed and used a set 21 SSR markers to identify/ decipher sugarcane varieties/ genotypes based on capillary electrophoregrams
- Developed first genomic SSR markers (~500) in berseem and *Stylosanthes*, QTLs for drought and anthracnose diseases in stylo, QTL based association among drought associated physiological traits in stylo, SCAR marker and novel genetic stock in *Cenchrus*, DNA fingerprints of major tropical grasses, nine new *S. seabrana* lines and third progenitor of *S. erecta* based on STS markers and involved as co-associate in development and release of first stable tetraploid berseem variety

**4. Current area of research:** Genomics of sugarcane for improving physiological efficiency (cane and sugar yield), multiple stress tolerance and post-harvest management of sucrose losses in sugarcane

#### **5. Publications:**

1. Chandra A, Keizerweerd AT and Grisham MP (2016). Detection of the sugarcane disease orange rust caused by *Puccinia kuehnii* with a loop-mediated isothermal amplification (LAMP) based assay. *Molecular Biotechnology*, DOI 10.1007/s12033-016-9914-5.
2. Liu P., Chandra A., Que Y., Chen P-H., Grisham MP., White WH., Dalley CD., Tew TL. and Pan Y-B (2015) Identification of quantitative trait loci controlling sucrose content based on an enriched genetic linkage map of sugarcane (*Saccharum* spp. hybrids) cultivar 'LCP 85-384'. *Euphytica*, DOI 10.1007/s10681-015-1538-5.
3. Chandra A, Keizerweerd AT, Que Y and Grisham MP (2015). Loop-mediated isothermal amplification (LAMP) based detection of *Colletotrichum falcatum* causing red rot in sugarcane. *Molecular Biology Reports*, 42: 1309-1316.
4. Jain R, Verma R. S., Singh A., Chandra A, and Solomon S (2015). Differential expression of metallothionein gene and physiological characteristics of sugarcane influenced by selenium. *Plant Growth Regulation* DOI 10.1007/s10725-015-0042-1.
5. Chandra A, Verma PK, Islam MN, Grisham MP, Jain R, Sharma A, Roopendra K, Singh K, Singh P, Verma I and Solomon S (2015). Expression analysis of genes associated with sucrose accumulation in sugarcane (*Saccharum* spp. hybrids) varieties differing in content and time of peak sucrose storage. *Plant Biology*, 17: 608-617.

6. Keizerweerd AT, Chandra A, and Grisham MP (2015). Development of an RT-LAMP Assay for the Detection of Sugarcane Mosaic and Sorghum Mosaic viruses in Sugarcane. *J Virological Methods*, 37: 317-323.
7. Chandra A, Grisham MP and Pan YB (2014). Allelic divergence and cultivar-specific SSR alleles revealed by capillary electrophoresis using fluorescence-labeled SSR markers in sugarcane. *Genome* 57: 363-372.
8. Chandra A, Roopendra K, Singh P, Jain R, Prajapati C.P. and Solomon S (2014). Time-course expression of soluble acid invertase (SAI) gene mirroring post-harvest cane quality deterioration: effective treatments cause reduction of SAI gene expression. *Current Science* 107: 184-186.
9. Chandra A., Jain R., Solomon, S., Shrivastava S and Roy AK (2013) Exploiting EST databases for the development and characterization of 3425 gene-tagged CISP markers in biofuel crop sugarcane and their transferability in cereals and orphan tropical grasses. *BMC Research Notes*, 6: 47.
10. Verma P, Chandra A, Roy AK, Malaviya DR, Kaushal P, Pandey D and Bhatia S (2015). Development and characterization of genomic based SSR markers in berseem (*Trifolium alexandrinum* L.), an important multi-cut annual forage legume. *Molecular Breeding*, 35:23 DOI 10.1007/s11032-015-0223-7.
11. Chandra A., Jain R., Rai RK and Solomon S. (2011). Revisiting the source–sink paradigm in sugarcane. *Curr. Sci.*, 100: 978-980.
12. Chandra, A., Tiwari, K.K., Nagaich, D., Dubey, N., Kumar, S. and Roy, A.K. (2011). Development and characterization of microsatellite markers from tropical forage *Stylosanthes* species and analysis of genetic variability and cross-species transferability. *Genome*, 54: 1016-1028.
13. Chandra A. and Dubey A (2010) Effect of ploidy levels on the activities of  $\Delta^1$ -pyrroline-5-carboxylate synthetase, superoxide dismutase and peroxidase in *Cenchrus* species grown under water stress. *Plant Physiol. Biochem.*, 48:27-34.
14. Chandra A (2009). Screening global *Medicago* germplasm for weevil (*Hypera postica* Gyll.) tolerance and estimation of genetic variability using molecular markers. *Euphytica* 169: 363-374.
15. Chandra A. and Kaushal PK (2009). Identification of diploid *Stylosanthes seabra* lines from existing germplasm of *S. scabra* utilizing STS markers and flow-cytometry, and their molecular characterization. *Molecular Biotechnology* 42: 282-291.
16. Tewari S and Chandra A (2008) Genetical assessment of diploid progenitors of *S. scabra* by Isozyme, RAPD and STS markers: a possible strategy for improvement of drought tolerant allo-tetraploid *S. scabra* species. *Euphytica* 162: 39-50.
17. Chandra A and Tewari KK (2010) Isolation and characterization of microsatellite markers from guineagrass (*Panicum maximum* Jacq.) for genetic diversity estimate and cross-species amplification. *Plant Breeding*, 129:120-124.
18. Chandra A, Pathak P.S., Bhatt R.K. and Dubey A. (2004) Variation in drought tolerance behavior of different *Stylosanthes* accessions. *Biol. Plant.*, 48: 457-460.
19. Thumma B R, Naidu B P, Chandra A, Cameron D F, Bahnisch L M and Liu C (2001) Identification of causal relationship among traits related to drought resistance in *Stylosanthes scabra* using QTL analysis. *J. Exp. Bot.*, 52: 203-214.
20. Chandra A, Bhatta R K and Misra L P (1998). Effect of water stress on biochemical and physiological characteristics of oat genotypes. *J. Agr. Crop Science*, 181: 45-48.

## 6. Awards and Fellowship:

- ICAR- Hari Om Ashram Trust Award for the biennium 2012-2013 in year 2015.
- Fellowship UP Academy of Agricultural Science (FUPAAS), UPCAR, Lucknow in 2015.

- DBT-CREST award for the year 2011-12 from Department of Biotechnology (DBT), Government of India
- Fellowship National Academy of Agricultural Sciences (FNAAS), New Delhi (2010)
- ICAR Team Award for outstanding interdisciplinary research 2010 (Indian Council of Agricultural Research, New Delhi)
- Fellow of Range Management Society of India since 2010.
- Fellow Indian Society of Agricultural Biochemist since 2013.
- Member of National Academy of Sciences India (MNASc) Allahabad in 2009
- INSA-Royal Society London International Scientist Exchange award (2009)
- UGC/CSIR/GATE Fellowships qualified during Ph.D. program in 1986/1987

#### **7. Other relevant activities of Scientist:**

- Associate Editor of *Acta Physiologiae Plantarum*
- Consulting Editor of *Sugar Tech*
- Editorial Member of *Suar Tech Newsletter*
- Conducted as Course Director one ICAR sponsored 21 days winter school and one 10 days Model Training Course (MTC)