Curriculum Vitae

Ramesh Kanna Mathivanan

Plant Breeding and Genetics
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[a]Clickable hyperlinks are in blue throughout

Education

MS Plant Breeding and Genetics (Mentor: James Schnable)   2023-present
University of Nebraska,Lincoln,USA.

MSc Plant Breeding and Genetics (Mentor:Nagendra Sarma Barua)   2018-2021
Assam Agricultural University,Assam, India.

BSc Agriculture   2014-2018
Tamil Nadu Agricultural University, India.

Employment

University of Nebraska-Lincoln
Graduate Research Assistant, Plant Breeding and Genetics. (Schnable Lab)   2023-Present
Project: Both Quantitative Genetic And Machine Learning Methods Identify Genes Associated With Metabolite Variation In A Field Grown Maize Diversity Panel.

  1.**Genetic Basis of Metabolite Variation in Maize:** Investigated the genetic factors influencing metabolite diversity in maize using genotyping (26 million SNPs), metabolic profiling (26 metabolites via GC-MS), and transcriptomics. Aimed to establish a direct link between genetic variations and metabolite profiles.
  2.**Combining Quantitative Genetics with Machine Learning:** Utilized RMIP-GWAS and TWAS for gene-metabolite association analysis, supplemented by Random Forest machine learning for validation. This approach enhanced the accuracy in identifying crucial gene-metabolite associations.
  3.**Implications for Agronomic Traits:** Extended the study to include 42 non-metabolic traits (Agronomic, Photosynthetic, Hyperspectral traits), exploring the broader impact of metabolite-associated genes on agronomic characteristics. This highlighted the interrelation of plant metabolism with growth and development, offering insights for maize agronomy improvement.

University of Nebraska-Lincoln
Research Scholar, Plant Breeding and Genetics. (Santra Lab)   2021-2022
Projects: Cultivar and germplasm development of exiting alternative crops and developing new crops for semi-arid High Plains of the USA.

  1.Phenotypic Diversity Analysis And Seed Quality Analysis On Field Pea.
  2.Evaluation Of Pea Varieties Across Sites Over Years In Nebraska.
  3.Morphological Diversity Of The Global Proso Millet (Panicum Miliaceum L.) Germplasm.

Assam Agricultural University-Assam, India
MSc, Plant Breeding and Genetics.   2018-2021
Project: Evaluation of maize (Zea Mays) hybrids at high Plant density for important yield attributes

1.To characterize maize hybrids at high plant density for important traits
2.To determine genetic variation and related parameters for the traits
3.To determine genetic variation and related parameters for the traits

Selected Honors and Awards

ICAR-NTS fellowship - Recipient of ICAR (Indian Council of Agricultural Research)- National Talent Scholarship for M.Sc. (Agri.)   2018-2021

HSS-Merit Scholarship for B.Sc. (Agri)   2014-2018

Skills and Abilities

1.Quantitative Genetics: Experienced in Genome-Wide Association Studies (GWAS) and Transcriptome-Wide Association Studies (TWAS), coupled with expertise in biometrical genetics techniques including experimental design, Principal Component Analysis (PCA), correlation and path analysis, genotype-environment interaction analysis, and statistical modeling methods such as Resampling Model Inclusion Probability (RMIP) in GWAS, enhancing the understanding of genetic associations in plant traits.

2.Machine Learning: Experienced in using machine learning algorithms, including Random Forest and Gradient Boosting, to create data models focused on accurate predictions.

3.Data Analysis Visualization: Demonstrated excellence in R programming and Python for comprehensive data analysis and creating visually compelling data presentations.

4.High-Performance Computing (HPC) Proficiency: Skilled in employing HPC resources to effectively perform complex calculations, especially for processing and analyzing large-scale data sets.

Publications

Research articles

Ramesh Kanna M*, Hiramani Barman1, Kasireddy Sivasankarreddy1, Dikshita Gogoi1, T. V. Rao1 and N. Sarma Barua1. Validation of Maize (Zea mays L.) Hybrids for the Study on Variability, Trait and Path Analysis. International Journal of Plant Soil Science. Pages:11. Article ID: 2021/IJPSS/ 71496. DOI:10.9734/ijpss/2021/v33i2330744

Ramesh Kanna M*, N. Sarma Barua1 , K. K. Sharma1, R. N. Sarma1, R. Das2, M. Barooah3, D. Sarma1 and Dibosh Bordoloi1 . Assessment Of Maize (Zea Mays L.) Hybrids Across Spacings For Variability, Trait Association And Path Analysis in North Eastern India. International journal of environment and climate change. Pages: 21. Article ID: 2021/IJECC/73928. DOI:10.9734/ijecc/2021/v11i1230605

Hiramani Barman, Nagendra Sarma Barua and **Ramesh Kanna M**. Assessment of inbreeding depression tolerance of local maize germplasm. Pages: 4. Pharma Innovation 2022;11(2):2995-2998. https://www.thepharmajournal.com/archives/?year=2022vol=11issue=2ArticleId=1112 8 Pharma Journal Article

Ramesh K. Mathivanan1, Connor Pederson2, Jonathan Turkus1, Vladimir Torres1, Ravi V. Mural1, Toshihiro Obata2 and James C. Schnable1. Integrative Genomic Analysis Of Metabolite Variation And Its Agronomic Implications In A Field Grown Maize Diversity Panel Using Both Quantitative Genetic

And Machine Learning Methods.(To be published)

Review articles

Khound, R.,**Mathivanan, R.K.**, Santra, D.K. (2023). Proso Millet Nutraceutomics for Human Health and Nutritional Security. In: Kole, C. (eds) Compendium of Crop Genome Designing for Nutraceuticals. Springer, Singapore. DOI:https://doi.org/10.1007/978-981-19-3627-2$_1$0 $-$ 1

Presentations

"Both Quantitative Genetic And Machine Learning Methods Identify Genes Associated With Metabolite Variation In A Field Grown Maize Diversity Panel", Nebraska Plant Science Symposium 2023, Lincoln, NE, USA (poster) 2023

"Quantitative genetics of leaf metabolism in a maize diversity panel growing under field condition", Nebraska Plant Science Symposium 2023, Lincoln, NE, USA (poster) 2023

"Morphological Diversity of the USDA Proso Millet (Panicum miliaceum L.) Germplasm", ASA, CSSA, SSSA Annual Meeting, Salt Lake City, UT,(poster) 2021

"Seed Nutrients Analysis of the USDA Proso Millet (Panicum miliaceum L.) Germplasm". ASA, CSSA, SSSA Annual Meeting, Salt Lake City, UT,(poster) 2021

"Modern Breeding tools of Proso millet (Panicum milliaceum L.)" ASA, CSSA, SSSA Annual Meeting, Salt Lake City, UT,(poster) 2021

"Yellow Pea (Pisum sativum L.) Varieties for High Seed Protein Quantity and Quality in Nebraska", ASA, CSSA, SSSA Annual Meeting, Salt Lake City, UT,(poster) 2021

Professional Memberships

1.Crop Science Society of America

2.Soil Science Society of America

3.Agronomy Science Society of America

Personal Experience

Supervised 14 undergraduate students from NAHEP (National Agricultural Higher Education project-India) program in Panhandle Research and Extension Center at UNL for two months