

# College of Post Graduate Studies in Agricultural Sciences

(Central Agricultural University-Imphal)

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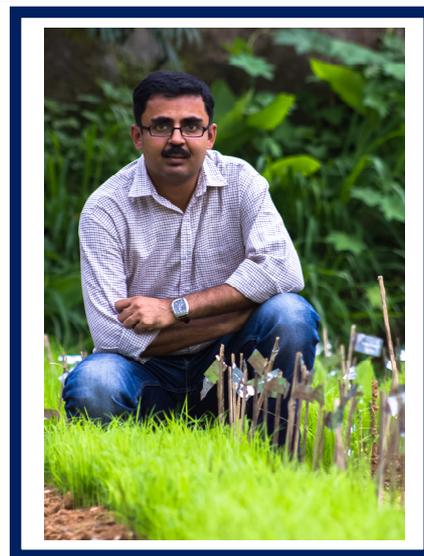
## FACULTY PROFILE

### Dr. Mayank Rai

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#### Professor

School of Crop Improvement



**Ph.D:** Dept. Of Genetics and Plant Breeding, GBPUA&T, Pantnagar; Plant Breeding Genetics and Biochemistry Division, IRRI, Philippines

**Post Doc:** Dept. of Molecular Biology and Genetics, Cornell University, NY, USA

**Specialization** : Rice genetics and breeding, genetic engineering

**Teaching / Research Experience** : 15 Years

#### (A) Selected Publications:

1. Morphological and molecular characterization of two distinct chilli cultivars from North Eastern India with special reference to pungency related genes. Colney, L., Tyagi, W., **Rai, M.** (2018) *Scientia Horticulturae*. 240: 1–10. doi.org/10.1016/j.scienta.2018.05.045.
2. Marker–trait association for low-light intensity tolerance in rice genotypes from Eastern India. Dutta, S.S., Tyagi, W., Pale, G., Pohlong, J., C. Aochen, Pandey, A., Pattanayak, A., **Rai, M.** (2018) *Molecular Genetics and Genomics*. doi.org/10.1007/s00438-018-1478-6.
3. Understanding Fe<sup>2+</sup> toxicity and P deficiency tolerance in rice for enhancing productivity under acidic soils. Das S, Tyagi W, **Rai M** and Yumnam JS (2017) *Biotechnology and Genetic Engineering Reviews* 33:1, 97-117.
4. In silico characterisation of novel rice transcripts differentially expressed in phosphorus deficient conditions suggests a role of these transcripts in multiple abiotic stresses. Yumnam JS, **Rai M** and Tyagi W (2017) *Acta Biologica Hungarica* 68(4), pp. 398–411.
5. Root transcriptomes of two acidic soil adapted Indica rice genotypes suggest diverse and complex mechanism of low phosphorus tolerance. Tyagi W and **Rai M** (2017) *Protoplasma* 254:725–736

6. From QTL to variety-harnessing the benefits of QTLs for drought, flood and salt tolerance in mega rice varieties of India through a multi-institutional network. Singh R, ... **Rai M** et al., (2016) *Plant Science* 242: 278-287
7. Allele mining across DREB1A and DREB1B in diverse rice genotypes suggests a highly conserved pathway inducible by low temperature Challam C, Ghosh T, **Rai M**, Tyagi W (2015) *Journal of Genetics* 94, 231-238
8. Quantitative evaluation of lentil (*Lens culinaris* Medikus.) germplasm under low-input acidic upland soil conditions of North East India. Sapam RK, Khanna VK, Pandey A, **Rai M** (2015) *Indian Journal of Genetics and Plant Breeding* 74 (4 Suppl): 682-687.
9. Allele mining across two low-P tolerant genes PSTOL1 and PupK20-2 reveals novel haplotypes in rice genotypes adapted to acidic soils. Yumnam JS, **Rai M**, Tyagi W (2015) *Plant Genetic Resources: Characterization and Utilization* 1–9
10. Looking beyond *PsTOL1*: marker development for two rice genes showing differential expression in P deficient conditions. Dkhar F, **Rai M** and Tyagi W (2014) *Journal of Genetics* **93**, 573–577
11. Association of qLTG3-1 with germination stage cold tolerance in diverse rice germplasm from the Indian subcontinent. Challam C, Kharshing GA, Yumnam JS, **Rai M**, Tyagi W (2013) *Plant Genetic Resources: Characterization and Utilization* 1–6
12. Evaluation of genetic diversity of chilli landraces from North Eastern India based on morphology, SSR markers, and the *Pun1* locus. Yumnam JS, Tyagi W, Pandey A, Meetei NT, **Rai M** (2012) *Plant Mol Biol Rep.* 30:1470-1479
13. Haplotype analysis for locus in rice genotypes of north eastern and eastern India to identify suitable donors tolerant to low phosphorus. Tyagi W, **Rai M**, and Dohling A (2012) *SABRAO Journal of Breeding and Genetics* 44 (2) 398-405
14. Genetic variability in yield and its components in upland rice grown in acid soils of North East India. Fukrei KP, Kumar A, Tyagi W, **Rai M**, Pattanayak A (2011) *Journal of Rice Research* 4:4-7
15. Comparative functional analysis of three abiotic stress inducible promoters in transgenic rice. **Rai M**, He CK and Wu R (2009) *Transgenic Research* 18(5): 787-799
16. Variable T-DNA linkage configuration affects inheritance of carotenogenic transgenes and carotenoid accumulation in transgenic indica rice. **Rai M**, Datta K, Parkhi V, Tan J, Oliva N, Chawla HS and Datta SK (2007) *Plant Cell Reports* 26:1221-1231
17. Golden rice: introgression, breeding, and field evaluation. Datta SK, Datta K, Parkhi V, **Rai M**, Baisakh N, Sahoo G, Rehana S, Bandopadhyaya A, Alamgir M, Oliva N and Torrizo L. *Euphytica* 154 (3): 271-278 (2007)
18. Improved 'golden' indica rice and post- transgeneration enhancement of metabolic target products of carotenoids ( $\beta$ -carotene) in transgenic elite cultivars (IR64 and BR29). Datta K, **Rai M**, Parkhi V, Oliva N, Tan J and SK Datta (2006) *Current science* 4(7): 935-939
19. Marker free transgenic (MFT) introgression lines of Golden indica rice (cv. IR64) with accumulation of provitamin A in endosperm tissue. Baisakh N, Datta K, **Rai M**, Oliva N, Rehana S, Tan J, Mackill DJ, and Datta SK (2006) *Plant Biotechnology Journal* 4: 467-475
20. Molecular characterization of marker free transgenic events accumulating differential expression of carotenoids in seed endosperm of indica rice. Parkhi V, **Rai M**, Tan J, Oliva N, Rehana S, Bandyopadhyay A, Torrizo L, Ghole V, Datta K and Datta SK (2005) *Molecular Genetics and Genomics* 274: 325-336

21. The screening of rice germplasm, including those transgenic rice lines which accumulate  $\beta$ -carotene in their polished seeds, for their carotenoid profile. Tan J, Baisakh N, Oliva N, Parkhi V, **Rai M**, Torrizo L, Datta K and Datta SK (2005) *Int. J. Food Sci. Tech.* **40**, 1-7 **7.5**
22. Bioengineered 'golden' indica rice cultivars with  $\beta$ -carotene accumulation in the endosperm with hygromycin and mannose selection systems. Datta K, Baisakh N, Oliva N, Torrizo N, Abrigo E, Tan J, **Rai M**, Rehana S, Al-Babili S, Beyer P, Potrykus I, Datta SK (2003) *Plant Biotechnology Journal* 1:81-90

**(B) Projects :-**

**Ongoing (4)**

Sl. No.	Title of the project	Agency	Period
1.	From QTL to variety: Genomics assisted introgression and field evaluation of rice varieties with genes/QTLs for yield under drought flood and salt stress (PI)	DBT, GOI	3 years (2018-2021)
2.	Understanding phosphorus deficiency and iron toxicity tolerance in rice under acidic soils of North East Hill Region (Co-PI)	DBT, GOI	3 years 2017 to 2020
3.	AICRP on Maize (PI), (Funded centre)	ICAR, GOI	Ongoing
4.	AICRP on Rice (Voluntary centre)	ICAR, GOI	Ongoing

**Completed (4)**

Sl. No.	Title of the project	Agency	Period
1.	Improvement of Locally Adapted Rice Cultivars of North East Hill Region by Incorporating Blast Resistance Genes through Marker Assisted Backcrossing (PI)	DBT,GOI	5 years 2009 to 2014
2.	QTL to Variety: Marker Assisted Breeding of Abiotic Stress Tolerant Rice Varieties with Major QTLs for Drought, Submergence and Salt Tolerance (PI)	DBT,GOI	5 years 2010 to 2015
3.	Bioprospecting of genes and allele mining for abiotic stress tolerance (Co-PI)	NAIP, ICAR	5 years (2009-14)
4.	Generation of early maturing and low moisture tolerant mutants in <i>Brassica campestris</i> (Co-PI)	BRNS, BARC, GOI	3 years (2014-17)