# Dr. Manoj Kumar Rai

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## EDUCATIONAL QUALIFICATIONS

**Ph.D. Botany (2009),** Department of Botany, Banaras Hindu University, Varanasi
**M.Sc. Botany (2002)**, ***First Division (64.7%)*** from Udai Pratap Autonomous College, Varanasi
**B.Sc. (Bot. & Chem., 1998),** ***First Division (69.8%)*** from Udai Pratap Autonomous College, Varanasi
**Intermediate (1995),** ***First Division (66.4%)*** from Udai Pratap Inter College Varanasi (U.P.)
**High School (1993)**, ***First Division (72.3%)*** from SRR Inter College, Jahanaganj, Azamgarh (U.P.)
**Others: CSIR-NET-JRF (June 2002)**

## RESEARCH PROFILE (as of March 2026)

| | |
|---|---|
| **SCI/Scopus Indexed publications** | **63** |
| **Book Chapters** | **15** |
| **h-index** | **39** |
| **i10 – index** | **57** |
| **Citations (Google Scholar)** | **6010** |
| **Cumulative impact factor (JCR)** | **178.3** |
| **Total Cite score (Scopus)** | **381.4** |

## SCIENTIFIC EXPERTISE

Competent professional with experience in plant tissue culture of trees, fruit, medicinal and threatened plants, Somatic embryogenesis, organogenesis, encapsulation technology, in vitro conservation, in vitro selection, secondary metabolite production, Plant propagation using aeroponics technique, Genomics, Transcriptomics, molecular markers based genetic diversity analysis

## FELLOWSHIP/ AWARDS/MEMBERSHIP

- Awarded Start-Up Research Grant (Young Scientist), SERB, DST
- Dr. D.S. Kothari post-doctoral fellowship
- Junior and Senior Research Fellowship from the Council of Scientific and Industrial Research (CSIR), New Delhi

- Prof. B.M. Johri memorial best poster award in XXXII PTCA (India) meet organized by M.N. Institute of Applied Sciences, Bikaner (Rajasthan) on February 4-6, 2011
- **Listed in the world's top 2% of scientists published by Elsevier & Stanford University (USA) for the years 2024 and 2025**
- Research appreciation award from IGNTU (2025) for achieving a rank in the Elsevier/ Stanford top 2% of scientists list 2024.
- Annual member of International Association of Plant Biotechnology (IAPB)

## EXPERIENCES

**Assistant Professor**

- Department of Environmental Science, Indira Gandhi National Tribal University, Amarkantak – 484887, M.P., India, from May 24, 2017 - Continue

**Post-doctoral research**

- Awarded Start-Up Research Grant (Young Scientist), SERB, DST, Department of Botany, JNV University, Jodhpur, from June 4, 2014 – May 22, 2017
- Biotechnology Centre, Department of Botany, JNV University, Jodhpur (Rajasthan) – From 24 June 2010 – 23 June 2013 (as a Dr. D.S. Kothari Post Doc Fellow)
- At Centre for Plant Biotechnology, CCSHAU, New Campus, Hisar, Haryana (India) – From 7 August 2009 – 17 June 2010 (as a Research Associate)

**Doctoral**

Laboratory of Morphogenesis, Department of Botany, Banaras Hindu University, Varanasi, India. From September 2003 – August 2009 (as a CSIR-JRF and SRF)
Title of the Ph.D. Thesis: "*In vitro* morphogenesis, propagation and conservation of guava (*Psidium guajava* L.)".

## RESEARCH PROJECTS

| S. No. | Title of project | Agency/ Scheme | Period | Grant | Status | Institute |
|---|---|---|---|---|---|---|
| 1. | Documentation of important trees of Amarkantak and their multiplication for sustaining biodiversity | Start-Up Grant, Basic Science Research (BSR) Program, UGC, New Delhi | April 3, 2018 – 2020 | 10,00,000/- | Completed | IGNT University, Amarkantak, M.P., India |
| 2. | Molecular characterization of *Prosopis* and *Acacia* species – well accepted agroforestry trees of Indian Thar Desert | Start-Up Research Grant (Young Scientist) (SERB-DST) | June 4, 2014-May 22, 2017 | 29,22,000/- | Completed | Department of Botany, JNV University, Jodhpur, Rajasthan |
| 3. | Molecular characterization, propagation and *in vitro* conservation of guava (*Psidium guajava* L.) | Dr. DS Kothari Post-Doctoral Fellowship Scheme, UGC, New Delhi | June 24, 2010 – June 23, 2013 | 14,46,939/- | Completed | Department of Botany, JNV University, Jodhpur, Rajasthan |

## EDITORIAL RESPONSIBILITY

**Editorial Board Member:** Current Biotechnology (Bentham Science)
Worked as a reviewer to review/evaluate more than 80 research/review papers for more than 30 international and Scopus-indexed journals

Scientia Horticulturae, Hort Science, Journal of Horticulture Sciences and Biotechnology, Journal of Forestry Research, Plant Biotechnology Reports, Journal of Plant Growth Regulation, Acta Physiologiae Plantarum, Environmental Science and Pollution Research, Indian J Biotechnology, Plant Growth Regulation, Molecular Biology Reports, Protoplasma, Plant Cell Tissue Organ Culture, Biologia Plantarum, Plos One, Industrial Crops and Products, Proc Nat Acad Sci India Sec B: Biol Sci, Indian Journal of Plant Physiology, Tree Genetics and Genomes, Rendiconti Lincei (Springer), 3 –Biotech, Trees Structure and Function, HortTechnology, Scientific Reports, South African Journal of Botany, Current Pollution Reports, Journal of Genetic Engineering and Biotechnology, Frontiers in Plant Sciences, Current Plant Biology, In Vitro Cellular Developmental Biology – Plant, Applied fruit science and many more

## RESEARCH/REVIEW PAPERS PUBLISHED IN JOURNALS

- Biotechnology advances (IF-12.5),
- Critical Reviews in Biotechnology (IF - 7.7),
- Plant Cell Tissue and Organ Culture (IF - 2.4),
- Molecular Biology Reports (IF - 2.8),
- Environmental and Experimental Botany (IF - 4.7),
- Industrial Crops and Products (IF - 6.2),
- Scientia Horticulturae (IF - 4.2),
- AoB Plants (IF - 2.4),
- Planta (IF - 3.8),
- Euphytica (IF- 1.7),
- Applied Biochemistry and Biotechnology (IF - 3.3),
- In Vitro Cellular Developmental Biology – Plant (IF – 1.9),
- Acta Physiologiae Plantarum (IF - 2.2),
- Gene (IF - 2.4),
- Trees Structure and Function (IF - 2.1),
- Physiology and Molecular Biology of Plants (IF - 3.3),
- Genetic Resources and Crop Evolution (IF - 1.6),
- Journal of Horticultural Science and Biotechnology (IF - 2.1),
- Arid Land Research and Management (IF - 1.6),
- Plant Gene (IF - 1.6),
- Proc Nat Acad Sci India Sec B: Biol Sci (Cite score - 3.2),
- Indian Journal of Plant Physiology currently Plant Physiology Reports (IF – 1.6),
- Journal of Horticultural Research formerly J Fruit Ornamental Plant Research (Cite score - 2.1),
- Toxicology Reports (Cite score – 7.6),
- Current Biotechnology
- Vegetos (Cite score 2.4)

- Applied fruit Science (Erwerbs-Obstbau) (IF – 1.4)
- Ecological Genetics and Genomics (Cite score 2.1)
- South African Journal of Botany (IF - 2.7)
- Plant Science Today (IF - 0.8)

## RESEARCH/REVIEW PAPERS

**Year 2007:**

1. **Rai MK**, Akhtar N, Jaiswal VS (**2007**) Somatic embryogenesis and plant regeneration in *Psidium guajava* L. cv. Banarasi local. **Scientia Horticulturae** 113:129-133, ISSN: 1879-1018

**Year 2008:**

2. **Rai MK**, Jaiswal VS, Jaiswal U (**2008**) Alginate-encapsulation of nodal segments of guava (*Psidium guajava* L.) for germplasm exchange and distribution. **Journal of Horticultural Science and Biotechnology** 83: 569-573, ISSN: 2380-4084
3. **Rai MK**, Jaiswal VS, Jaiswal U (**2008**) Effect of ABA and sucrose on germination of encapsulated somatic embryos of guava (*Psidium guajava* L.). **Scientia Horticulturae** 117: 302-305, ISSN: 1879-1018
4. **Rai MK**, Jaiswal VS, Jaiswal U (**2008**) Encapsulation of shoot tips of guava (*Psidium guajava* L.) for short-term storage and germplasm exchange. **Scientia Horticulturae** 118: 33-38, ISSN: 1879-1018

**Year 2009:**

5. **Rai MK**, Asthana P, Singh SK, Jaiswal VS, Jaiswal U (**2009**) The encapsulation technology in fruit plants – A review. **Biotechnology Advances** 27:671-679, ISSN: 1873-1899
6. **Rai MK**, Jaiswal VS, Jaiswal U (**2009**) Effect of selected amino acids and polyethylene glycol on maturation and germination of somatic embryos of guava (*Psidium guajava* L.). **Scientia Horticulturae** 121: 233-236, ISSN: 1879-1018
7. **Rai MK**, Jaiswal VS, Jaiswal U (**2009**) Shoot multiplication and plant regeneration of guava (*Psidium guajava* L.) from nodal explants of in vitro raised plantlets. **J Fruit Ornamental Plant Res** Currently known as **Journal of Horticultural research** 17:29-38, ISSN: 1231-0948
8. Singh SK, **Rai MK,** Asthana P, Pandey S, Jaiswal VS, Jaiswal U (**2009**) Plant regeneration from alginate encapsulated shoot-tips of *Spilanthes acmella* (L.) Murr., a medicinally important and herbal pesticidal plant species. **Acta Physiologiae Plantarum** 31: 649-653, ISSN: 1861-1664
9. Singh SK, **Rai MK,** Asthana P, Sahoo L (**2009**) An improved micropropagation of *Spilanthes acmella* through thin cell layer culture. **Acta Physiologiae Plantarum** 31:693-698, ISSN: 1861-1664

**Year 2010:**

10. **Rai MK**, Asthana P, Jaiswal VS, Jaiswal U (**2010**) Biotechnological advances in guava (*Psidium guajava* L.): Recent developments and prospects for further research. **Trees- Structure and Function** 24:1-12, ISSN: 1432-2285
11. **Rai MK**, Jaiswal VS, Jaiswal U (**2010**) Regeneration of plantlets of guava (*Psidium guajava* L.) from somatic embryos developed under salt-stress condition. **Acta Physiologiae Plantarum** 32:1055-1062, ISSN: 1861-1664

12. Singh SK, **Rai MK,** Asthana P, Sahoo L (**2010**) Alginate-encapsulation of nodal segments for propagation, short-term conservation and germplasm exchange and distribution of *Eclipta alba* (L.). **Acta Physiologiae Plantarum** 32:607–610, ISSN: 1861-1664
13. Verma SK, **Rai MK**, Asthana P, Jaiswal VS, Jaiswal U (**2010**) *In vitro* plantlets from encapsulated shoot tips of *Solanum nigrum* L. **Scientia Horticulturae** 124:517–521, ISSN: 1879-1018
14. Kumar S, **Rai MK**, Singh N, Mangal M (**2010**) Alginate-encapsulation of shoot tips of jojoba [*Simmondsia chinensis* (Link) Schneider] for germplasm exchange and distribution. **Physiology and Molecular Biology of Plants** 16:379-382, ISSN: 0974-0430

**Year 2011:**

15. Kalia RK, **Rai MK,** Kalia S, Singh R, Dhawan AK (**2011**) Microsatellite markers: an overview of the recent progress in plants. **Euphytica** 177: 309-334, ISSN: 1573-5060
16. **Rai MK**, Kalia RK, Singh R, Gangola MP, Dhawan AK (**2011**) Developing stress tolerant plants through *in vitro* selection – an overview of the recent progress. **Environmental and Experimental Botany** 71: 89-98, ISSN: 1873-7307
17. Kalia RK, Singh R, **Rai MK,** Mishra GP, Singh SR, Dhawan AK (**2011**) Biotechnological interventions in sea buckthorn (*Hippophae* L.): current status and future prospects. **Trees- Structure and Function** 25:559-579, ISSN: 1432-2285
18. Gupta AK, Harish, **Rai MK**, Phulwaria M, Shekhawat NS (**2011**) Isolation of genomic DNA suitable for community analysis from mature trees adapted to arid environment. **Gene** 487:156-159, ISSN: 1879-0038
19. **Rai MK**, Shekhawat NS, Harish, Gupta AK, Phulwaria M, Ram K, Jaiswal U (**2011**) The role of abscisic acid in plant tissue culture – a review of recent progress. **Plant Cell Tissue and Organ Culture** 106: 179-190, ISSN: 1573-5044

**Year 2012:**

20. **Rai MK**, Phulwaria M, Harish, Gupta AK, Shekhawat NS, Jaiswal U (**2012**) Genetic homogeneity of guava plants derived from somatic embryogenesis using SSR and ISSR markers. **Plant Cell Tissue and Organ Culture** 111:259-264, ISSN: 1573-5044
21. Singh SK, **Rai MK,** Sahoo L (**2012**) An improved and efficient micropropagation of *Eclipta alba* through transverse thin cell layer culture and assessment of clonal fidelity using RAPD analysis. **Industrial Crops and Products** 37:328-333, ISSN: 0926-6690
22. Phulwaria M, **Rai MK**, Harish, Gupta AK, Ram K, Shekhawat NS (**2012**) An improved micropropagation of *Terminalia bellirica* from nodal explants of mature tree. **Acta Physiologiae Plantarum** 34: 299-305, ISSN: 1861-1664
23. Rathore JS, **Rai MK**, Shekhawat NS (**2012**) Induction of somatic embryogenesis in gum arabic tree [*Acacia senegal* (L.) Willd.]. **Physiology and Molecular Biology of Plants** 18:387-392, ISSN: 0974-0430
24. Shekhawat NS, Phulwaria M, Harish, Rai MK, Kataria V, Shekhawat S, et al. (**2012**) Bioresearches of Fragile Ecosystem/ Desert. **Proceedings of the National Academy of Sciences, India Section B: Biological Sciences** 82:319-334, ISSN: 2250-1746

**Year 2013:**

25. **Rai MK**, Phulwaria M, Shekhawat NS (**2013**) Transferability of simple sequence repeat (SSR) markers developed in guava (*Psidium guajava* L.) to other Myrtaceae species. **Molecular Biology Reports** 40:5067–5071, ISSN: 1573-4978
26. Phulwaria M, **Rai MK**, Shekhawat NS (**2013**) An improved micropropagation of *Arnebia hispidissima* (Lehm.) DC. And assessment of genetic fidelity of micropropagated plants using DNA based molecular markers. **Applied Biochemistry and Biotechnology** 170:1163–1173, ISSN: 1559-0291
27. Phulwaria M, **Rai MK**, Patel AK, Kataria V, Shekhawat NS (**2013**) A genetically stable rooting protocol for propagating a threatened medicinal plant – *Celastrus paniculatus*. **AoB Plants** Pls054, ISSN 2041-2851

**Year 2014:**

28. **Rai MK**, Shekhawat NS (**2014**) Recent advances in genetic engineering for improvement of fruit crops. **Plant Cell Tissue and Organ Culture** 116: 1-15, ISSN: 1573-5044
29. Rathore NS, **Rai MK**, Phulwaria M, Rathore N, Shekhawat NS (**2014**) Genetic stability in micropropagated *Cleome gynandra* revealed by SCoT analysis. **Acta Physiologiae Plantarum** 36:555-559, ISSN: 1861-1664
30. Patel AK, Phulwaria M, **Rai MK**, Gupta AK, Shekhawat S, Shekhawat NS (**2014**) *In vitro* propagation and *ex vitro* rooting of *Caralluma edulis* (Edgew.) Benth. & Hook. F.: an endemic and endangered edible plant species of the Thar Desert. **Scientia Horticulturae** 165: 175–180, ISSN: 1879-1018
31. Harish, Gupta AK, Phulwaria M, **Rai MK**, Shekhawat NS (**2014**) Conservation genetics of endangered medicinal plant *Commiphora wightii* in Indian Thar Desert. **Gene** 535:266–272, ISSN: 1879-0038
32. Gupta AK, Harish, **Rai MK**, Phulwaria M, Agarwal T, Shekhawat NS (**2014**) In vitro propagation, encapsulation, and genetic fidelity analysis of *Terminalia arjuna*: a cardio-protective medicinal tree. **Applied Biochemistry and Biotechnology** 173:1481-1494, ISSN: 1559-0291
33. Kalia RK, **Rai MK**, Sharma R, Bhatt RK (**2014**) Understanding *Tecomella undulata*: an endangered pharmaceutically important timber species of hot arid regions. **Genetic Resources and Crop Evolution** 61:1397–1421, ISSN: 1573-5109
34. Lodha D, Patel AK, **Rai MK**, Shekhawat NS (**2014**) In vitro plantlet regeneration and assessment of alkaloid contents from callus cultures of *Ephedra foliata* (Unth phog), a source of anti-asthmatic drugs. **Acta Physiologiae Plantarum** 36:3071–3079, ISSN: 1861-1664
35. Mehandru P, Shekhawat NS, **Rai MK**, Kataria V, Gehlot HS (**2014**) Evaluation of aeroponics for clonal propagation of *Caralluma edulis*, *Leptadenia reticulata* and *Tylophora indica* – three threatened medicinal Asclepiads. **Physiology and Molecular Biology of Plants** 20:365-373, ISSN: 0974-0430
36. Rathore JS, **Rai MK**, Phulwaria M, Shekhawat NS (**2014**) A liquid culture system for micropropagation of mature *Acacia nilotica* (L.) Del. Ssp. *indica* and ex vitro rooting. **Proceedings of the National Academy of Sciences, India Section B: Biological Sciences** 84: 193–200, ISSN: 2250-1746

**Year 2015:**

37. **Rai MK**, Shekhawat NS (**2015**) Genomic resources in fruit plants: an assessment of current status. **Critical Reviews in Biotechnology** 35: 438-447, ISSN · 0738-8551

38. Singh R, **Rai MK**, Kumari N (**2015**) Somatic embryogenesis and plant regeneration in *Sapindus mukorossi* Gaertn. From leaf-derived callus induced with 6-benzylaminopurine. **Applied Biochemistry and Biotechnology** 177:498–510, ISSN: 1559-0291
39. Rathore JS, Phulwaria M, **Rai MK**, Shekhawat S, Shekhawat NS (**2015**) Use of liquid culture medium and ex vitro rooting for micropropagation of *Acacia nilotica* (L.) Del. Ssp. *cupressiformis*. **Indian Journal of Plant Physiology,** currently known as **Plant Physiology Reports** 20: 172-176, ISSN: 2662-2548

**Year 2017:**

40. Asthana P, **Rai MK**, Jaiswal U (**2017**) Somatic embryogenesis from sepal explants in *Sapindus trifoliatus*, a plant valuable in herbal soap industry. **Industrial Crops and Products** 100: 228–235, ISSN: 0926-6690
41. **Rai MK**, Shekhawat JK, Kataria V, Shekhawat NS (**2017**) Cross species transferability and characterization of microsatellite markers in *Prosopis cineraria*, a multipurpose tree species of Indian Thar Desert. **Arid Land Research and Management** 31: 462-471, ISSN: 1532-4990
42. **Rai MK**, Shekhawat JK, Kataria V, Shekhawat NS (**2017**) De novo assembly of leaf transcriptome, functional annotation and genomic resources development in *Prosopis cineraria*, a multipurpose tree of Indian Thar Desert. **Plant Gene** 12: 88-97, ISSN: 2352-4073

**Year 2018:**

43. Shasmita, **Rai MK**, Naik SK (**2018**) Exploring plant tissue culture in *Withania somnifera* (L.) Dunal: in vitro propagation and secondary metabolite production. **Critical Reviews in Biotechnology** 38: 836-850, ISSN · 0738-8551
44. Shekhawat JK, **Rai MK**, Shekhawat NS, Kataria V (**2018**) Start codon targeted (SCoT) polymorphism for evaluation of genetic diversity of wild population of *Maytenus emarginata*. **Industrial Crops and Products** 122:202–208, ISSN: 0926-6690
45. Shekhawat JK, **Rai MK**, Shekhawat NS, Kataria V (**2018**) Exploring genetic variability in *Prosopis cineraria* using two gene targeted CAAT box-derived polymorphism (CBDP) and start codon targeted (ScoT) polymorphism markers. **Molecular Biology Reports** 45:2359–2367, ISSN: 1573-4978

**Year 2019:**

46. Sharma U, **Rai MK**, Shekhawat NS, Kataria V (**2019**) Genetic homogeneity revealed in micropropagated *Bauhinia racemosa* Lam. using gene targeted markers CBDP and SCoT. **Physiology and Molecular Biology of Plants** 25: 581–588, ISSN: 0974-0430

**Year 2020:**

47. Choudhary D, **Rai MK**, Shekhawat NS, Kataria V (**2020**) *In vitro* propagation of *Farsetia macrantha* Blatt. & Hallb.: an endemic and threatened plant of Indian Thar Desert. **Plant Cell Tissue and Organ Culture** 142:519–526, ISSN: 1573-5044

**Year 2021:**

48. Shekhawat JK, **Rai MK**, Shekhawat NS, Kataria V (**2021**) Synergism of *m*-topolin with auxin and cytokinin enhanced micropropagation of *Maytenus emarginata*. **In Vitro Cellular Developmental Biology – Plant** 57:418-426, ISSN: 1054-5476

49. **Rai MK**, Shekhawat JK, Kataria V, Phulwaria M, Shekhawat NS (**2021**) Genomic and biotechnological interventions in *Prosopis cineraria*: current status, challenges and opportunities. **Tree Structure and Function** 35:1109–1121, ISSN: 1432-2285
50. Saxena P, Saharan V, Baroliya PK, Gour VS, **Rai MK**, Harish (**2021**) Mechanism of nanotoxicity in *Chlorella vulgaris* exposed to zinc and iron oxide. **Toxicology Reports** 8:724-731, ISSN: 2214-7500
51. Rai MK, R Rathour (2021) पादप संरक्षण में ऊतक संवर्धन तकनीक की भूमिका. मैकल मीमांसा 13 (1), 143-156, ISSN- 0974-0118

**Year 2022:**

52. Arora K, **Rai MK**, Sharma AK (**2022**) Tissue culture mediated biotechnological interventions in medicinal trees: recent progress. **Plant Cell Tissue and Organ Culture** 150: 267-287, ISSN: 1573-5044

**Year 2023:**

53. **Rai MK** (**2023**) Start codon targeted (SCoT) polymorphism marker in plant genome analysis: current status and prospects. **Planta** 257: 34, ISSN: 1432-2048
54. Asthana P, **Rai MK**, Jaiswal U (**2023**) In vitro selection, regeneration and characterization of NaCl-tolerant plants of *Sapindus trifoliatus*: an important multipurpose tree. **Plant Cell Tissue and Organ Culture** 154: 227–238, ISSN: 1573-5044
55. Rathour R, Yadav S, Singh A, Kaushik S, **Rai MK** (**2023**) A liquid culture system for plantlet conversion and slow growth storage of encapsulated shoot tips of *Justicia adhatoda* L. **Industrial Crops and Products** 205: 117534, ISSN: 0926-6690
56. Sharma U, **Rai MK**, Shekhawat NS, Kataria V (2023) Genetic diversity in *Tamarix aphylla* (L.) H. Karst. using CAAT box-derived polymorphism (CBDP) and start codon targeted (SCoT) polymorphism markers. **Ecological Genetics and Genomics** 29: 100200, ISSN: 2405-9854

**Year 2024:**

57. Asthana P, **Rai MK**, Jaiswal U (**2024**) Factors Affecting the Micropropagation of *Sapindus trifoliatus* from Nodal Explants of Mature Tree. **Current Biotechnology** 13: 58-67, ISSN: 2211-5501
58. Singh M, Asthana P, **Rai MK**, Jaiswal U (**2024**) Somatic embryogenesis and plant regeneration from suspension cultures of *Sapindus trifoliatus*. **Plant Cell Tissue and Organ Culture** 157: 36, ISSN: 1573-5044

**Year 2025:**

59. Asthana P, **Rai MK**, Jaiswal U (**2025**) 6-Benzylaminopurine mediated indirect organogenesis in *Sapindus trifoliatus* L. through internodal segments. **Vegetos** 38: 397 – 407, ISSN: 2229-4473
60. Rathour R, Yadav S, Singh A, Kaushik S, **Rai MK** (**2025**) Meta-Topolin-Mediated Plant Regeneration in Giant Granadilla (*Passiflora quadrangularis* L.): An Underutilized Fruit Crop. **Applied Fruit Science (Erwerbs-Obstbau)** 67: 50, ISSN: 2948-2631
61. Yadav S, Singh A, Madan Mohan, Das SN, **Rai MK** (**2025**) In vitro propagation, phytochemical analysis and assessment of antioxidative potential of micropropagated plants of *Tecomaria capensis* (Thunb.) Spach. **South African Journal of Botany** 185: 16-23, ISSN: 1727-9321

**Year 2026:**

62. Singh A, Yadav S, **Rai MK** (**2026**) Somatic embryogenesis, secondary somatic embryogenesis and plant regeneration in *Dillenia indica* L., an underutilized fruit tree. **In Vitro Cellular & Developmental Biology – Plant**; https://doi.org/10.1007/s11627-025-10620-7; ISSN: 1054-5476
63. Shyam P, **Rai MK**, Kaushik S (**2026**) Ethnoveterinary Potential of Plants in Anuppur, Madhya Pradesh: Traditional Healthcare for Livestock. **Plant Science Today** (accepted). https://doi.org/10.14719/pst.11507; ; eISSN: 2348-1900
64. Singh A, Yadav S, **Rai MK** (**2026**) In vitro propagation and foliar micromorphological studies in *Dillenia indica* L.: an underutilized fruit tree. **Journal of Horticultural Research** (accepted). DOI: 10.2478/johr-2026-0006. eISSN: 2353-3978

## BOOK CHAPTERS

1. **Rai MK**, Jaiswal VS (**2008**) Synthetic seeds of guava (*Psidium guajava* L) from somatic embryos and plant regeneration. In: Utilization of biotechnology in plant sciences, (I.D. Arya and Sarita Arya, Eds.), Microsoft Printech (I) Pvt. Ltd., Dehradun, India, pp. 857-880.
2. Singh R, Kalia RK, **Rai MK**, Dhawan AK (**2011**) Recent trends in applications of plant growth regulators in tissue culture. In: Plant Environment and Sustainability, Trivedi P.C. (ed.), Agrobios, India, pp. 103-128. ISBN: 978-817-75-4444-2
3. Shekhawat NS, Rathore MS, Shekhawat S, Choudhary SK, Phulwaria M, Harish, **Rai MK**, Jb V, Rathore NS, Patel AK, Kataria V (**2014**) Micropropagation of *Aloe vera* for improvement and enhanced productivity. Climate change and abiotic stress tolerance. In: Tuteja N, Gill SS (eds.) Wiley – Blackwell, Germany, pp. 857-880. ISBN No.: 978-352-73-3491-9
4. Shekhawat NS, **Rai MK**, Phulwaria M, Rathore JS, Gupta AK, Purohit M, Patel AK, Kataria V, Shekhawat S (**2014**) Tree Biotechnology with special reference to species of Fragile Ecosystems and Arid Environments. Tree Biotechnology In: Ramawat KG, Merillon JM, Ahuja MR (eds.). CRC Press., pp.187-222. ISBN No.: 13:978-146-65-9714-3
5. Shekhawat NS, Phulwaria M, Harish, Gupta AK, Ram K, Shekhawat S, JB V, **Rai MK**, Kataria V, Kaur G, Patel AK, Rathore JS, Singh RP (**2015**) Biotechnology: applications for conservation and sustainable use of plants of fragile arid ecosystems. Recent trends in life sciences. In: Fulekar MH, Kale RK (eds.). I K International Publishing House, pp. 94-118. ISBN No.: 13: 978-938-23-3225-1
6. **Rai MK**, Jaiswal U (**2020**) Guava (*Psidium guajava* L.). Biotechnology of Fruit and Nut Crops, 2nd Edition, Richard Litz, Fernando Pliego Alfaro and Jose I. Hormaza (editors), CAB International. pp. 330-342. ISBN – 978-178-06-4827-9 (hardback), 978-178-06-4828-6 (ePDF), DOI: 10.1079/9781780648279.0330; https://www.cabi.org/cabebooks/ebook/20203113761
7. **Rai MK**, Rathour R, Kaushik S (**2021**) Recent advances in transcriptomics: an assessment of current progress in fruit plants. In: Omics technologies for sustainable agriculture and global food security (Vol. II), Kumar A, Kumar R, Shukla P, **Patel** HK (eds), Springer Nature Singapore, pp. 95-122. ISBN 978-981-16-2956-3
8. **Rai MK**, Rathour R, Behera S, Kaushik S, Naik SK (**2021**) Encapsulation technology: an assessment of its role in in vitro conservation of medicinal and threatened plant species. In: Agricultural biotechnology: latest research and trends, Srivastava DK, Thakur AK, Kumar P (eds.), Springer

Nature Singapore, pp 103-128, eBook ISBN: 978-981-16-2339-4, Hardcover ISBN: 978-981-16-2338-7

9. **Rai MK** (**2021**) Somaclonal variation in improvement of agricultural crops: recent progress. In: Agricultural biotechnology: latest research and trends, Srivastava DK, Thakur AK, Kumar P (eds.), Springer Nature Singapore, pp 129-146, eBook ISBN: 978-981-16-2339-4, Hardcover ISBN: 978-981-16-2338-7
10. **Rai MK** (**2022**) Plant tissue culture targeting germplasm conservation. In: Advances in plant tissue culture: Current developments and future trends. Rai AC, Modi A, Kumar A, Singh M (eds.), Elsevier, U.K., pp 205-221, **ISBN:** 978-032-39-0795-8
11. Shweta S, Subramaniam B, **Rai MK**, Danda S, Kurmi A, Kaushik S (**2023**) Traditional Agriculture: A Sustainable Approach Toward Attaining Food Security. In: Crop Sustainability and Intellectual Property Rights. Mukherjee S, Mukherjee P, Aftab T (eds.), Apple Academic Press. pp 23-76, eBook ISBN 978-100-33-8302-4
12. **Rai MK**, Rathour R, Yadav S, Singh A, Kaushik S (**2024**) Somaclonal variation in fruit crop improvement. In: Somaclonal Variation: Basic and Practical Aspects. Sánchez-Romero C (ed.) Springer, pp - 99-121, ISBN: 978-3-031-51625-2
13. Patel AK, Sharma I, Choudhary M, Shekhawat NS, **Rai MK** (**2025**) Exploring Plant Tissue Culture for In Vitro Conservation of Trees: Recent Progress. In: Kalia, R.K., Pathak, R. (eds) Tree Biology and Biotechnology. Springer, Singapore. pp 1-15, ISBN: 978-981-96-0001-4
14. Saraogi S, Shweta S, **Rai MK,** Kaushik S (**2025**) Traditional Agricultural Knowledge for Sustainable Production. In: Sharma, N.K., Rai, P.K., Rai, D.C. (eds) Indian Agriculture: Challenges, Priorities and Solutions. Springer, Singapore. pp. 319–336. Print ISBN: 978-981-96-5272-3
15. Shekhawat NS, Singh R, Shekhawat S, Patel AK, Kataria V, Choudhary SK, Ram K, **Rai MK**, Harish (**2025**) Phytodiversity of Thar Desert: Traditional Knowledge, Sustainable Utilisation and Conservation. In: M.S. Rathore, Tej Partap and Laxman Singh Rathore (eds.) Desert Ecosystems: Rescripting Development Paradigms. Capital Publishing Company, New Delhi, India. Co-published by Springer, International Publishing, Cham, Switzerland. pp. 87-105. ISBN: 978-93-81891-90-2

## RESEARCH ACHIEVEMENTS

### Research achievement in plant tissue culture

Somatic embryogenesis in guava (*Psidium guajava*), *Sapindus trifoliatus*, *Sapindus mukorossi*, *Acacia Senegal*, *Dillenia indica*

Synthetic seed production and *in vitro* conservation in guava, *Spilanthes acmella*, *Eclipta alba*, *Solanum nigrum*, *Simmondsia chinensis*, *Terminalia arjuna*, *Justicia adathoda*

*In vitro* propagation of *Spilanthes acmella, Eclipta alba*, *Terminalia bellirica*, *Arnebia hispidissima*, *Caralluma edulis*, *Terminalia arjuna*, *Ephedra foliata*, *Acacia nilotica* (L.) Del. ssp. *indica*, *Acacia nilotica* (L.) Del. ssp. *cupressiformis*, *Maytenus emarginata*, *Farsetia macrantha*, *Passiflora quadrangularis*, *Tecomaria capensis*, *Dillenia indica*, *Dillenia pentagyna*

Genetic stability of tissue culture raised plants using molecular markers in guava, *Eclipta alba*, *Arnebia hispidissima*, *Celastrus paniculatus*, *Cleome gynandra*, *Terminalia arjuna*, *Bauhinia racemosa*

Regeneration of salt-tolerant plants of guava and *Sapindus trifoliatus* under *in vitro* conditions

## Research achievement in genomics

Genetic diversity analysis in *Commiphora wightii*, *Maytenus emarginata*, *Prosopis cineraria*, *Tamarix aphylla*, *Maytenus emarginata* using molecular markers like ISSR, SCoT and CBDP

De novo assembly of leaf transcriptome, functional annotation and genomic resources development in *Prosopis cineraria*

Cross-species transferability of SSR markers in Myrtaceae species and *Prosopis* species

## NCBI database

*Prosopis cineraria*

Short Read Archive (SRA) database: SRR5234756

Bio-project ID: PRJNA371524;

Biosample ID: SAMN06309434;

Transcriptome Shotgun Assembly (TSA): ACCESSION GFOW00000000

Eight GenBank accession numbers obtained for nucleotide sequences of *Prosopis cineraria* and *Acacia nilotica*

## Aeroponic technique for propagation of plants

Clonal propagation of *Caralluma edulis*, *Leptadenia reticulata* and *Tylophora indica*

## Ph.D./P.G. Dissertation GUIDED

(1) Dr. Roshni Rathour - Title: *In vitro* propagation and conservation of *Justicia adhatoda* and *Passiflora quadrangularis*. Awarded Year - 2024
(2) Ms. Srishti Yadav – Ph.D., ongoing
(3) Mr. Amit Singh - Ph.D., ongoing
(4) Ms. Sakshi Tirkey - Ph.D., ongoing

Number of P.G. Dissertation Guidance: 23

## Other Academic/Administrative/Co-curricular Responsibilities

- Member of Board of Studies (Department of Environmental Science, IGNTU)
- Member of Drafting Committee for 'Waste Management Guidelines of IGNTU' 2025
- Various academic and administrative committees of IGNTU since 2017
- Delivered scientific talks as a resource person for refresher courses/seminars

## Weblinks of research profiles

**Google Scholar citation:**
https://scholar.google.co.in/citations?user=r1foUwkAAAAJ&hl=en
**Research Gate profile**
https://www.researchgate.net/profile/Manoj_Rai3
**ORCID profile**

https://orcid.org/0000-0002-2385-6325
**Google site**
https://sites.google.com/view/dr-manoj-k-rai/home
**Scopus ID**
http://www.scopus.com/authid/detail.url?authorId=16308039200
**Vidwan-ID: 105120**
https://igntu.irins.org/profile/105120