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Name of the Scientist **Dr. R. D. Tripathi**

Present position/designation: Chief Scientist & Professor

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Academic qualifications: B.Sc. onwards

Degree	University/Institution	Year	Distinction, if any
Ph.D. (Botany)	Gorakhpur University	1979	Pesticide India Award – 1978
M.Sc. (Botany)	-do-	1974	-
B.Sc. (Bot., Zool. & Chem.)	-do-	1972	-

Positions, jobs and assignments held in chronological order:

2010-Present **Chief Scientist** - Agriculture and Environment, Environmental Biotechnology, Amino acids and minerals profiling in rice and other crop plants, Transgenic plants for heavy metal/metalloid pollution, Biochemical and molecular aspects of heavy metal tolerance in rice and other plants.

2005-2010 **Senior Principal Scientist** – Environmental microbiology and biotechnology, Transgenic plants for Heavy metal/metalloid pollution, Biochemical and molecular Aspects of heavy metal tolerance in rice and other plant.

2000-2005 **Principal Scientist** – Heavy metal detoxification involving phytochelatins in plants, phytoremediation of metal ions from aquatic and solid wastes.

1998 -1999 **Visiting Scientist** – Lehrstuhl fur Botanik, Technische Universitat, München, Germany.

1995- 2000 **Senior Scientist** – Heavy metal pollution, Metal uptake mechanisms, phytotoxicity in plants.

1991- 1995 **Scientist –** Heavy metal uptake, Ecotoxicology & Bioremediation Aspects.

1990 -1991 **Post-doctoral Fellow** (C.S.I.R.-British Council T.C.T.P.), Department of Biosphere Science, Kings College London, University of London, Heavy metal (^{65}Zn, ^{203}Hg) uptake and metal protein binding aspects.

1982-1987 Antifungal and antibacterial compounds from plants, their mode of action. Plant protection, senescence and biochemical diversity – studies in betel cultivars.

Research publications

1. **Tripathi R. D**., Tripathi P., Dwivedi S., Dubey S., Chatterjee S., Chakrabarty D., Trivedi P.K. (2012). Arsenomics: omics of arsenic metabolism in plants, doi: 10. 3389/ f phys. 2012. 0 0275.
2. Dave R, **Tripathi R. D**., Dwivedi S., Tripathi P., Dixit G., Sharma Y. K., Trivedi P. K., Francisco J. C., Juan B. B., Chakrabarty D., Arsenate and arsenite exposure modulate antioxidants and amino acids in contrasting arsenic accumulating rice (*Oryza sativa* L.) genotypes. doi.org/10.1016/j.jhazmat.2012.06.049.
3. Dwivedi, S., Mishra, A., Tripathi, P., Dave, R., Kumar, A., Srivastava, S., Chakrabarty, D., Trivedi, P.K., Adhikari, B., Norton, G.J., Nautiyal, C.S., **Tripathi, R.D.** (2012). Arsenic affects essential and non-essential amino acids differentially in rice grains: Inadequacy of amino acids in rice based diet. Environment International. 46, 16– 22.
4. Shukla, D., Kesari, R., Mishra, S., Dwivedi, S., **Tripathi, R.D.,** Nath, P. and Trivedi, P.K. (2012). Expression of phytochelatin synthase from aquatic macrophyte *Ceratophyllum demersum* L. enhances cadmium and arsenic accumulation in tobacco. Plant Cell Rep. DOI 10.1007/s00299-012-1283-3.
5. Tripathi, P., Mishra, A., Dwivedi, S., Chakrabarty, D., Trivedi, P.K., Singh, R.P. and **Tripathi, R.D**. (2012). Differential response of oxidative stress and thiol metabolism in

contrasting rice genotypes for arsenic tolerance. Ecotoxicology and Environmental Safety. Doi:10.1016/j.ecoenv.2011.12.019.

6. Dwivedi, S., Mishra, A., Kumar, A., Tripathi, P., Dave, R., Dixit, G., Tiwari, K.K., Srivastava, S., Shukla, M.K., **Tripathi, R.D.** (2012). Bioremediation potential of genus Portulaca L. collected from industrial areas in Vadodara, Gujarat, India. Clean Techn. Environ. Policy, 14:223–228.
7. Tripathi, P., Dwivedi, S., Mishra, A., Kumar, A., Dave, R., Srivastava, S., Shukla, M.K., Srivastava, P.K., Chakrabarty, D., Trivedi, P.K., **Tripathi, R.D.** (2012). Arsenic accumulation in native plants of West Bengal, India: prospects for phytoremediation but concerns with the use of medicinal plants. Environ. Monit. Assess. 184(5): 2617-31.
8. S. Kumar, M.H. Asif, D. Chakrabarty, **R.D. Tripathi**, P. K. Trivedi (2011). Differential expression and alternative splicing of rice sulphate transporter family members regulate sulphur status during plant growth, development and stress conditions. Funct. Integr. Genomics. DOI 10.1007/s10142-010-0207-y.
9. Srivastava P.K., Vaish A., Dwivedi S., **Tripathi R.D.** (2011). Biological removal of arsenic pollution by soil fungi. Science Total Environ. 409 (12)**:** 2430-2442.
10. S. Dubey, P. Misra, S. Dwivedi, S. Chatterjee, S. K. Bag, S. Mantri, M. H. Asif, A. Rai, S. Kumar, M. Shri, P. Tripathi, **R.D. Tripathi**, P. K. Trivedi, D. Chakrabarty, R. Tuli (2010). Transcriptomic and metabolomic shifts in rice roots in response to Cr (VI) stress BMC Genomics, 11:648.
11. S. Dwivedi, **R.D. Tripathi**, P. Tripathi, A. Kumar, R. Dave, S. Mishra, R. Singh, D. Sharma, U.N. Rai, D. Chakrabartya, P.K. Trivedi, B. Adhikari, M.K. Bag, O. P. Dhankher and R. Tuli (2010). Arsenate Exposure Affects Amino Acids, Mineral Nutrient Status and Antioxidants in Rice (*Oryza sativa* L.) Genotypes. Environ. Scien. Technol. 44, 9542–9549.
12. Singh N., Jameel S., Khare P. B. and **Tripathi R. D.** (2010). Arsenic accumulation pattern in 12 Indian ferns and assessing the potential of Adiantum capillus-veneris, in comparison to Pteris vittata, as arsenic hyperaccumulator. Bio. Tech. 101: 3025–3032.
13. S. Dwivedi, **R.D. Tripathi**, S. Srivastava, R. Singh, A. Kumar, P. Tripathi, R. Dave, U.N. Rai, D. Chakrabarty, P.K. Trivedi, R. Tuli, B. Adhikari and M.K. Bag. (2010): Arsenic affects mineral nutrients in grains of various Indian rice (*Oryza sativa* L.) genotypes grown

under arsenic contaminated soils of West Bengal. Protoplasma DOI 10.1007/s00709-010-0151-7.

14. A. Sharma, M. Sainger, S. Dwivedi, S. Srivastava, **R. D. Tripathi**. (2010). Genotypic variation in *Brassica juncea* (L.) Czern. Cultivars in growth, nitrate assimilation, antioxidant responses and phytoremediation potential during cadmium stress, J. Environ. Biol., 31, 773-780.
15. R. Singh, **R. D. Tripathi**, S. Dwivedi, M. Singh, P. K. Trivedi, D. Chakrabarty (2010). Cadmium-induced biochemical responses of *Vallisneria spiralis*, Protoplasma, DOI 10.1007/s00709-010-0146-4.
16. Tuli R., Chakrabarty D., Trivedi P. K. and **Tripathi R. D.** (2010) "Recent advances in arsenic accumulation and metabolism in rice. Molecular Breeding**.** DOI 10.1007/s11032-010-9412-6.
17. Singh R., **Tripathi R. D**., Dwivedi S., Kumar A., Trivedi P. K., Chakrabarty D. (2010). Lead bioaccumulation potential of an aquatic macrophyte najas indica are related to antioxidant system. Bioresource technology, doi :10.1016/j.biortech.2009.12.031.
18. S. Dwivedi, S. Srivastava, S. Mishra, A. Kumar, **R.D. Tripathi**, U. N. Rai, R. Dave, P. Tripathi, D. Charkrabarty, P.K. Trivedi (2010): Characterization of native microalgal strains for their chromium bioaccumulation potential: phytoplankton response in polluted habitats. Journal of hazardous materials, 173 (2010) 95–101.
19. D. Chakrabarty, P. K. Trivedi, M. Shri, P. Misra, M. H. Asif, S. Dubey, S. Kumar, A. Rai, M. Tiwari, D. Shukla, A. Pandey, D. Nigam, **R. D. Tripathi** & R. Tuli (2010): Differential transcriptional expression following thidiazuron-induced callus differentiation developmental shifts in rice. Plant biology. Doi:10.1111/j.1438-8677.2009.00213.x
20. Srivastava S., Mishra S., Dwivedi S., **Tripathi R. D**., P. K. Tandon and D. K. Gupta. (2009) Evaluation of zinc accumulation potential of Hydrilla verticillata, Biologia Plantarum 53: 789-792.
21. Sudhakar Srivastava, Seema Mishra, Sanjay Dwivedi and R. D. Tripathi 2010. Role of Thiol Metabolism in Arsenic Detoxification in Hydrilla verticillata (L.f.) Royl. Water Air Soil Pollut DOI 10.1007/s11270-010-0329-9.

22. Mishra, S., Srivastava, S., **Dwivedi**, S., Tripathi, R.D. (2011). Investigation of biochemical responses of *Bacopa monnieri* L. upon exposure to arsenate. Environmental Toxicology, DOI: 10.1002/tox.20733.
23. V.H. Lokhande, Sudhakar Srivastava, V.Y. Patade, Sanjay Dwivedi, **R.D. Tripathi**, T.D. Nikam, P. Suprasanna (2010). Sesuvium portulacastrum (L.) L.: An arsenate hypertolerant plant that does not rely on thiol metabolism to combat the stress. Journal of Hazardous Materials.
24. Gupta, D.K., Nicoloso, F.T., Schetinger, M.R.C., Rossato, L.V., Pereira, L.B., Castro, G.Y., Srivastava, S., **Tripathi, R.D**., Antioxidant defense mechanism in hydroponically grown Zea mays seedlings under moderate lead stress (2009). Journal of Hazardous Materials 172 (1), pp. 479-484.
25. Shukla MK, **Tripathi RD**, Sharma N, Dwivedi S, Mishra S, Singh R and Rai UN (2009). Response of cyanobacterium Anabaena doliolum L. during nickel stress. J. Envir. Biol., 30:5-6.
26. Shri, M., Kumar, S., Chakrabarty, D., Trivedi, P. K., Mallick, S., Misra, M., Shukla, D., Mishra, S., Srivastava, S., **Tripathi, R. D**., Tuli, R. (2008): Effect of arsenic on growth, oxidative stress, and antioxidant system in rice seedlings. Ecotoxicology and environmental safety, 72 (2009) 1102–1110.
27. Mishra, M., **Tripathi, R.D**., Srivastava, S., Dwivedi, S., Trivedi, P. K., Dhankher, O. P., Khare, A. (2009): Thiol metabolism play significant role during cadmium detoxification by Ceratophyllum demersum L. Bioresource Technology, 100, 2155-2161.
28. Chakrabarty, D, Trivedi, PK, Misra, P, Tiwari, M, Shri, M, Shukla, D, Kumar, S, Rai, A, Pandey, A, Nigam, D, **Tripathi, RD**, Tuli, R (2009). Comparative transcriptome analysis of arsenate and arsenite stresses in rice seedlings, Chemosphere, 74, 688-702.
29. Mishra, S., Srivastava, S., **Tripathi, R.D.** and Trivedi, P.K. (2008): Thiol metabolism and antioxidant systems complement each other during arsenate detoxification in Ceratophyllum demersum L. Aquatic Toxicology, 86, 205-215.
30. **Tripathi, R.D.**, Dwivedi, S., Shukla, M.K., Mishra, S., Srivastava, S.**,** Singh, R., Rai, U.N. and Gupta, D.K. (2008): Role of blue green algae biofertilizer in ameliorating the nitrogen demand and fly-ash stress to the growth and yield of rice (Oryza sativa L.) plants. Chemosphere, 70, 1919-1929.

31. Mishra, S., Srivastava, S., **Tripathi, R.D.**, Dwivedi, S. and Shukla, M.K. (2008): Response of antioxidant enzymes in coontail (Ceratophyllum demersum L.) plants under cadmium stress. Environmental Toxicology, doi: 10.1002/tox.20340.
32. Tiwari, K. K., Dwivedi, S., Mishra, S., Srivastava, S., **Tripathi, R. D**., Singh, N. K. and Chakraborty, S. (2008). Phytoremediation efficiency of *Portulaca 6alangal rox* and *Portulaca oleracea* L. aturally growing in an industrial effluent irrigated area in Vadodra, Gujrat, India. Environmental Monitoring and Assessment, DOI 10.1007/s10661-007-0093-5.
33. S. Dwivedi, S. Srivastava, S. Mishra, B. Dixit, A. Kumar and **R.D. Tripathi** (2008) Screening of native plants and algae growing on fly ash affected areas near National Thermal Power Corporation, Tanda, Uttar Pradesh, India for accumulation of Toxic Heavy metals. J. of Hazardous Material doi:10.1016/j.jhazmat.2008.01.081.
34. Tripathi, RD, Srivastava, S, Mishra, S, Dwivedi, S (2008). Strategies for phytoremediation of environmental contamination. In: Development in Physiology, Biochemistry and Molecular Biology of Plants, Vol. 2, Bose, B, Hemantranjan, A (Eds.), New India Publishing Agency, New Delhi, India, pp. 175-220.
35. U.N. Rai, S. Dube, O.P. Shukla, S. Dwivedi**, R.D. Tripathi** (2008) Screening and identification of early warning algal species for metal contamination in fresh water bodies polluted from point and nonpoint sources. Environ Monit Assess doi10.1007/s/0661-007-0010-y.
36. **Tripathi, RD**, Srivastava, S, Mishra, S, Singh, N, Tuli, R, Gupta, DK, Maathuis, FJM (2007). Arsenic hazards: strategies for tolerance and remediation by plants. Trends in Biotechnology, 25, 158-165.
37. Srivastava, S, Mishra, S, **Tripathi, RD**, Dwivedi, S, Trivedi, PK, Tandon, P (2007). Phytochelatins and antioxidant systems respond differentially during arsenite and arsenate stress in Hydrilla verticillata (L.f.) Royle. Environmetal Science and Technology, 41, 2930-2936.
38. Gupta, DK, **Tripathi, RD**, Rai, UN, Mishra, S, Srivastava, S, Maathuis, FJM (2007). Growth and biochemical parameters of Cicer arietinum L. grown on amended fly-ash. Environmental Monitoring and Assessment, 134, 479-487.

39. Dwivedi, S, **Tripathi, RD**, Srivastava, S, Mishra, S, Shukla, MK, Singh, R, Rai, UN (2007). Growth performance and biochemical responses of three rice (Oryza sativa L.) cultivars grown in fly-ash amended soil. Chemosphere, 67, 140-151.
40. Gupta, DK, **Tripathi, RD**, Mishra, S, Srivastava, S, Dwivedi, S, Rai, UN, Inouhe, M (2007). Accumulation of arsenic in root and shoot affects the growth and level of phytochelatins in seedlings of two varieties of Cicer arietinum L. var. CSG-8962 and var. C-235. Journal of Environmental Biology (in press).
41. Rai, U.N., Dwivedi, S., Baghel, V.S. and **Tripathi, R.D.** (2007). On morphology and cultural behaviour of botryococcus protuberans - With notes on the Genus. **Journal of** Environmental Biology 28(2), 181-184.
42. Srivastava, S, Mishra, S, **Tripathi, RD**, Dwivedi, S, Gupta, DK (2006). Copper-induced oxidative stress and responses of antioxidants and phytochelatins in Hydrilla verticillata (L.f.) Royle. Aquatic Toxicology, 80, 405-415.
43. Gupta, DK, **Tripathi, RD**, Rai, UN, Dwivedi, S, Mishra, Seema, Srivastava, S, Inouhe, M (2006). Changes in amino acid profile and metal content in seeds of Cicer arietinum L. (Chickpea) grown under various fly-ash amendments. Chemosphere, 65, 939-945.
44. Mishra, S, Srivastava, S, **Tripathi, RD,** Kumar, R, Seth, CS, Gupta, DK (2006). Lead detoxification by coontail (Ceratophyllum dermersum L.) involves induction of phytochelatins and antioxidant system in response to its accumulation. Chemosphere, 65, 1027-1039.
45. Mishra, S, Srivastava, S, **Tripathi, RD**, Govindarajan, R, Kuriakose, SV, Prasad, MNV (2006). Phytochelatin synthesis and resopsne of antioxidants during cadmium stress in Bacopa monieri L. Plant Physiol. Biochem**.,** 44, 25-37.
46. Dwivedi, S, **Tripathi, RD**, Rai, UN, Srivastava, S, Mishra, S, Shukla, MK, Gupta, AK, Sinha, S, Baghel, VS, Gupta, DK (2006). Dominance of algae in Ganga water polluted through fly-ash leaching: metal bioaccumulation potential of selected algal species. Bulletin of Environmental Contamination and Toxicology, 77, 427-436.
47. Tiwari, KK, **Dwivedi,** S, Rai, UN, Pandey , AK, Chaterjee, C, Tripathi, RD (2006) Phytotoxic effect of coal mine effluent on growth behavior and metabolic changes in rice (Oriza sativa L.) c.v. IR-36 stress. Bulletin of Environmental Contamination and Toxicology, 77, 194-202**.**

48. Grill E, Mishra, S, Srivastava, S, **Tripathi, RD** (2006). Role of phytochelatins in phytoremediation of heavy metals. In: Environmental Bioremediation Technologies, Singh, SN, Tripathi, RD (Eds.), Springer, Heidelberg, 101-145.
49. **Tripathi, RD**, Srivastava, S, Mishra, S (2006). Bioremediation of hazardous lead from the environment. In: Focus on Environmental Research, Davis, EB (Ed.), Nova Science Publisheres Inc., NY, 1-26.
50. Mishra, S, Srivastava, S, **R.D. Tripathi** (2006). Arsenic Vishaktata: Samasya avam Samadhan. VigyanVani, 12, 14-19.
51. Gupta, DK, Rai, UN, **Tripathi, RD,** Sinha, S, Inouhe, M (2005). Fly-ash induced synthesis of phytochelatins in chickpea (Cicer arietinum L.) plants. Journal of Environmental Biology, 26, 539-546.
52. Rai, U. N., Dwivedi S, **Tripathi, R.D.**, Shukla O.P., Singh N.K. (2005). Algal Biomass: An economic method for removal of chromium from tannery effluent. Bull. Environ. Contam. Toxicol. 75: 297-303.
53. Srivastava, S, Misra S, Dwivedi S, Baghel,V.S., Verma, S., Tendon P.K., Rai U.N., **Tripathi, R.D.** (2005). Nikel phytoremediation of broad bean Vicia faba L. and its biochemical responses Bull. Environ. Contam. Toxicol. 74: 715-724.
54. Singh, NK, Pandey, GC, Rai, UN, Tripathi, RD, Singh, HB, Gupta, DK (2005). Metal accumulation and ecophysiological effect of distillery effluents on Potamogeton pectinatus L. Bull. Environ. Contam. Toxicol**.,** 74, 857-863.
55. Vajpayee, P., Rai, U.N., Ali, M.B., Kumar, A., **Tripathi, R.D.** and Singh, S.N. (2005). Possible involvement of oxidative stress in Copper induced inhibition of nitrate reductase activity in Vallisneria spiralis L. Bull. Env. Contam. Toxicol**.** 74:745-754.
56. Gupta, D.K., Rai, U.N., **Tripathi, R.D.**, Sinha, S., Nautiyal, B.D., Rai, Pooja and Inouhe, M. (2005). Role of Rhizobium (CA-I) inoculation in increasing growth and metal accumulation in Cicer arietinum L. growing under fly-ash stress condition. Bull. Environ. Contamin. Toxicol., 73, 424-431.
57. S. Dwivedi, P.K. Mishra, **R.D. Tripathi**, U.N. Rai, C.P. Dwivedi, V.S. Baghel, M.S. Suseela and M.N. Srivastava (2005) Systematic and ecological studies on chlorophyceaae of North India and their relationship with water quality. Journal of Environmental Biology 26 (3): 495-503.

58. M.K. Shukla, **R.D. Tripathi**, S. Dwivedi, S Mishra , S.Shrivastava V.S.Baghel S.N. Singh (2005) Utilization of blue green algae in removal of fly-ash toxicity; Vaigayanik (BARC-Mumbai) Volume 37; 2/3, Pp. 67-68.
59. S. Dwivedi**,** U. N. Rai, **R.D. Tripathi** and M. K. Shukla (2005) Bioremediation of heavy metal and enhancement of bio-fertility of soil by cyanobacteria. Ed. By Dr. Kiran Singh. Biotechnological Applications of Cyanobacteria , pp. 59-80.
60. **Tripathi, R.D.** Vajpayee, P. Singh, N., Rai, U. N., Kumar, A., Ali, M. B., Kumar, B. and M. Yunus (2004). Efficacy of various amendments for amelioration of fly-ash toxicity: Growth performance and metal composition of Cassia siamea Lamk. Chemosphere 54:1581-1588.
61. **Tripathi RD**, Kulshrestha K, Ahmad KJ, Krupa S, Agrwal M., & Varshney CK, (2004) Plant response to Environmental Stress, IBDC Publishers, Lucknow.
62. Dwivedi, S., Misra, P.K., Rai, U.N., **Tripathi, R.D.**, Suseela, M.R., Shina, S., Pal, A., Baghel, V.S. and Dwivedi, C.P. (2004). Fresh water cyanobacteria from three agroclimatic zones of Uttar Pradesh, India: Distribution pattern with seasonal variation. Journal of Environmental Biology 26(1):21-30
63. Dwivedi, S., Misra, P.K., **Tripathi, R.D.**, Rai, U.N., Baghel, V.S. and Srivastava, M.N. (2004). Systematic and ecological studies on Chlorophyceae of North India and their relationship with water quality. Journal of Environmental Biology 26(3): 495-503.
64. Baghel, V.S., **Tripathi, R. D.,** Ramteke, P.W., Gopal, K., Dwivedi, S. Jain R.K., Rai U.N., and **Singh, S.N.** (2004). Psychrotrophic proteolytic bacterial from cold environment of Gangotri glacier, Western Himalaya, India. Enzyme and Microbial Technology 36(5-6):654-659.
65. Gupta, D.K., Rai, U.N., **Tripathi, R.D.,** Sinha, S., Rai, P. and Inouhe, M. (2004). Induction of PCs and metal accumulation 9alangal9 by two varieties of Cicer arietinum L. growing under various fly-ash amendments. Journal of Environmental Biology 26(3)539-546.
66. Srivastava, S., **Tripathi, R.D.** and Dwivedi, U.N. (2004). Effect of cadmium on antioxidants and synthesis of phytochelatins in Cuscuta reflexa A parasitic angiosperm. J. Plant Physiol. 161:665-674.
67. Srivastava, S, Mishra, S, **R.D. Tripathi** (2004). Phytoremediation of hazardous lead from environment. Environews, 10, 9-10.

68. Baghel, V.S., Gopal, K., Dwivedi, S. and **Tripathi, R.D.** (2004). Bacterial indicators of faecal contamination in the runoff of Gangotri glacier, Western Himalaya, India. Ecological Indicators 5(1):49-56.
69. M.K.Shukla, **R.D. Tripathi,** U.N. Rai, S Dwivedi (2004). Removal of Fly ash toxicity through Blue green algae in paddy field; Smarika Pp-240.
70. Sharma, D.C., Sharma, C.P. and **Tripathi, R.D.** (2003). Phytotoxic lesions of chromium in maize. Chemosphere 51: 63-68.
71. Rai, U. N., **Tripathi, R.D.**, Vajpayee, P., Pandey, N., Ali, M.B. and Gupta, D.K. (2003). Cadmium accumulation and its phytotoxicity in Potamogeton pectinatus L. (Potamogetonaceae). Bull**.** Environ. Contam. Toxicol. 70: 566-575.
72. M.K.Shukla, S.N. Singh, **R.D. Tripathi** and U.N. Rai (2003). The role of Phytoremediation technique in the removal of water pollution". Vagyanika pp 16-17.
73. Ali, M.B., Vajpayee P., **Tripathi. R.D**., Rai, U. N., Singh, S. N. and S. P. Singh (2003). Phytoremediation of lead, nickel and copper by Salix acmophylla Bioss.: Role of antioxidant enzymes and antioxidant substances. Bull. Environ. Contam. Toxicol. 70: 462-469.
74. Singh, R. P., **Tripathi, R. D**., Dabas, S., Rizvi, S. M. H., Ali, M. B., Sinha, S.K., Gupta, D. K., Mishra, S. and U.N. Rai. (2003). Effect of lead on growth and nitrate assimilation of Vigna 10alanga (L.) Wilczek seedlings in a salt affected environment. Chemosphere 52(7): 1245-1250.
75. **R.D. Tripathi** and M.K.Shukla (2003) Role of women in Phytoremediation; Shultanpur Today 15 March Pp 3.
76. Shukla M. K., Singh S.N., **Tripathi R.D.** & Rai U.N. (2003). Phytoremediation Indian Herald 15 Nov- 14 Dec. Pp 48-49.
77. Shukla M. K., Singh S.N., **Tripathi R.D.** & Rai U.N. (2003). Phytoremediation in environmental conservation: Vigyanvani (9:1) Pp 28-32.
78. **Tripathi, R.D.**, Rai, U.N., Vajpayee, P., Ali, M.B., Khan, E., Gupta, D.K., Shukla, M.K., Mishra, S. and Singh, S.N. (2003). Biochemical responses of P. pectinatus L. exposed to higher concentration of zinc. Bull. Environ. Contam. Toxicol. 71(2): 255-262.

79. Rai, U.N., **Tripathi, R.D.**, Vajpayee, P, Jha, Vidyanath and Ali, M.B. (2002). Bioaccumulation of toxic metal (Cr, Cd, Pb and Cu) by seeds of Euryale ferox Salibs. (Makhana). Chemosphere 46: 267-272.
80. Kumar, A., Vajpayee, P., Ali, M.B., **Tripathi, R.D.**, Singh, N., Rai, U.N. and S.N. Singh (2002). Biochemical responses of Cassia siamea L. grown on coal combustion residue (fly-ash). Bull. Environ. Contam. 68: 675-683.
81. **R.D. Tripathi**, S.N. Singh, U.N. Rai, K. Kulshreshtha, N. Singh, R. Banerji, P. Vajpayee, M.K.Shukla & DK Gupta Performance of Brassica comprestris for utilization of solid waste of coal combustion residue (fly ash). Proceedings of ICPEP-2 Pp 49.
82. M.K.Shukla,S.N. Singh, **R.D. Tripathi** & U.N. Rai (2002) Importance of fly-ash on agriculture; Vigyanvani 8:1 Pp 47-48.
83. M.K.Shukla, R.D. Tripathi, Rajesh Vajpayee, Seema Mishra (2002) Yagya and Environmental Conservation; (8:2) Pp 30-32.
84. Gupta, D.K., Rai, U.N., **Tripathi, R.D.** and Inouhe, M. (2002). Impacts of fly-ash on soil and plant responses. Journal of Plant Research 115: 401-409.
85. Vajpayee, P., Rai, U. N., Ali, M.B., **Tripathi, R.D.**, Yadav, V., Sinha, S. and S.N. Singh (2001). Chromium induced physiologic changes in Vallisneria spiralis L. and its role in phytoremediation of tannery effluent**. Bull. Environ. Contam. Toxicol**. 67(2): 246-256.
86. Mehra, R.K. and **Tripathi, R.D.** (2000). Phytochelatins and metal tolerance. In: S.B. Agarwal and M. Agarwal (eds.) Environmental Pollution and Plant Responses, Lewis Publishers, Boca Raton, FL, USA.
87. Vajpayee, P., **Tripathi, R.D.**, Rai, U.N., Ali, M.B. and Singh, S.N. (2000). Chromium (VI) accumulation reduces chlorophyll biosynthesis nitrate reductase activity and protein content in Nymphaea alba. Chemosphere 41: 1075-1082.
88. Rai, U.N., **Tripathi, R.D.**, Kumar, A., Ali, M.B., Pal, A., Singh, N. and Singh, S.N. (2000). Bioremediation of fly-ash by selected nitrogen fixing blue green algae. Bull. Env. Contam. Toxicol. 64(2): 5-8.
89. Ali, M.B., Vajpayee, P., **Tripathi, R.D.**, Rai, U.N., Singh, N. and Behl, H.M. (2000). Mercury bioaccumulation induced oxidative stress and toxicity to submerged macrophyte Potamogeton crispus. Bull. Env. Contam. Toxicol. 65: 573-582.

90. **Tripathi, R.D.** and Smith, S. (2000). Effect of hexavalent chromium on phosphosynthetic pigment, photosynthesis, nitrate pool and protein content in the giant Duck weed Spirodela polyrrhiza. In: M.Yunus, K.J. Ahmad, L.J. DeKok (eds.) Proc. ICPEP '96. Kluwer Academic Publishers, Netherlands.
91. Gupta, M., **Tripathi, R. D**., Rai, U. N. and P. Chandra (2000) Lead mediated synthesis of metal-binding peptides (Phytochelatins) in submerged plant Vallisneria spiralis L. in Yunus M., Singh N. and DeKok L.J. (eds.) Environmental Stress Indication Mitigation and Ecoconservation, Kluwer Academic Publisher, The Netherlands, pp 357-364.
92. **Tripathi, R.D.**, Rai, U.N. and Srivastava, H.S. (2000). Uptake transport and emission of ammonia from plants. In: Trace Gas Emissions and Plants, S.N. Singh (Eds.), Kluwer Academic Publishers, Netherlands.
93. Ali, M.B., **Tripathi, R.D.**, Rai, U.N. and Singh, S.P. (1999). Physico-chemical properties and metal pollution in lake Nainital : Role of aquatic macrophytes and phytoplankton in phytoremediation of heavy metal. Chemosphere 39(12): 2171-2182.
94. Gupta, M., **Tripathi, R.D.**, Rai, U.N. and Haq, W. (1999). Lead induced synthesis of metal binding peptides (Phytochelatins) in submerged macrophyte Vallisneria spiralis L. Physiol. Mol. Biol. Plants 5: 173-180.
95. Vajpayee, P., Sharma, S.C., Rai, U.N., **Tripathi, R.D.** and Yunus, M. (1999). Bioaccumulation of chromium and toxicity to photosynthetic pigments, nitrate reductase activity and protein content of Nelumbo nucifera Gaertn. Chemosphere 39: 2079-2085.
96. M.K.Shukla,S.N. Singh, **R.D. Tripathi** and U.N. Rai: (1999) Environmental conservation and plants; Vigyanvani Pp 20-23.
97. Vajpayee, P., Sharma, S.C., **Tripathi, R.D.** and Yunus, M. (1999). Bioaccumulation of chromium and toxicity to photosynthetic pigments, nitrate reductase activity and protein content of Nelumbo nucifera Gaertn. Chemosphere 39(12): 2159-2169.
98. Gupta, M., **Tripathi, R.D.**, Rai, U.N. and Chandra, P. (1998). Role of glutathione and phytochelatin in Hydrilla verticillata (l.f.) Royle and Vallisneria spiralis L. under mercury stress. Chemosphere 37: 785-800.
99. Balasubrahmanyam, V.R., Chaurasia, R.S., **Tripathi, R.D.** and Johri, J.K. (1998). Control of fungal and bacterial diseases of Betelvine by fungicides and antibiotics. Trop. Pest. Manag. 34(3): 315-317.

100. Garg, P., **Tripathi, R.D.**, Rai, U.N. and Sinha, S. (1997). Cadmium accumulation and toxicity in 13alangal13 plant Hydrilla verticillata (l.f.) Royle. Env. Monit. Asses. 47: 161-173.
101. Singh, R.P., **Tripathi, R.D.**, Sinha, S.K., Maheshwari, R. and Srivastava, H.S. (1997). Response of higher plants to lead contaminated environment. Chemosphere 34(11): 2467-2493.
102. Rai, U.N., Gupta, M., **Tripathi, R.D.** and Chandra, P. (1997). Cadmium regulated nitrate reductase activity in Hydrilla verticillata (l.f.) Royle. Wat. Air Soil. Pollut. 106: 171-177.
103. **Tripathi, R.D.**, Rai, U.N., Gupta, M. and Chandra, P. (1996). Phytochelatin synthesis and glutathione levels under cadmium stress in aquatic weed Hydrilla verticillata (l.f.) Royle. Bull. Env. Contam. Toxicol. 56: 505-512.
104. Sane, P.V., Yunus, M. and **Tripathi, R.D.** (1996). Impact of ozone on carbon metabolism in plants in Plant Responses to Air Pollution (eds. M. Yunus and M. Iqbal) pp 295-318, John Wiley (U.K.).
105. **Tripathi, R.D.**, Rai, U.N., Gupta, M. and Chandra, P. (1996). Induction of phytochelatins in Hydrilla verticillata. Bull. Env. Contam. Toxicol. 56: 505-513.
106. **Tripathi, R.D.**, Yunus, M. and Mehra, R.K. (1996). Phytochelatins and phytometallothioneins : The potential of these unique metal detoxifying systems in plants. Physiol. Mol. Biol. Plants 2: 101-104.
107. Vajpayee, P., Rai, U.N., Sinha, S., **Tripathi, R.D.** and Chandra, P. (1995). Bioremediation of tannery effluent by aquatic macrophytes. Bull. Environ. Contam. Toxicol**.** 55: 546-553.
108. **Tripathi, R.D.**, Rai, U.N., Gupta, M., Yunus, M. and Chandra, P. (1995). Cadmium transport in Ceratophyllum demersum in presence of metabolic inhibitors and calcium channel blockers. Chemosphere 31: 3783-3791.
109. Rai, U.N., **Tripathi, R.D.**, Sinha, S. and Chandra, P. (1995). Chromium and cadmium bioaccumulation and toxicity in aquatic macrophytes Hydrilla verticillata (l.f.) Royle and Chara corollina Wildenow. J. Environ. Sci. Health Pt.A30(3): 537-551.
110. Gupta, M., Rai, U.N., **Tripathi, R.D.** and Chandra, P. (1995). Lead induced changes in glutathione and phytochelain in Hydrilla verticillata (l.f.) Royle. Chemosphere 30(10): 2011-2020.

111. Rai, U.N., Sinha, S., **Tripathi, R.D.** and Chandra, P. (1995). Wastewater treatability potential of some aquatic macrophytes: removal of heavy metals. Ecological Enginnering 157: 1-8.

112. Rai, U.N., **Tripathi, R.D.**, Gupta, M. and Chandra, P. (1995). Phytochelatin synthesis and glutathione levels under cadmium stress in water lettuce Pistia stratiotes. J. Env. Sci. Hlth. (A)30: 537-551.

113. Sinha, S.K., Srivastava, H.S. and **Tripathi, R.D.** (1994). Inhibition of nitrate reductase activity in presence of divalent cations and growth hormones in maize leaves. Chemosphere 29: 1775-1782.

114. V.K. Balasubrahmanyam, J.K. Johri, **R.D. Tripathi**, A.K.S. Rawat and R.S. Chaurasia (1994). Betelvine (Piper betle), E.B.I.S., NBRI, Lucknow.

115. Sinha, S., Rai, U.N., **Tripathi, R.D,** and Chandra, P. (1993). Chromium and Manganese bioaccumulation; Amelioration of Cr toxicity by Mn in Hydrilla verticillata. J. Env. Sci & Health, A28(7):1545-1552.

116. Sinha, S.K., Srivastava, H.S. and **Tripathi, R.D.** (1993). Influence of growth hormones and divalent cations of the inhibition of chlorophyll biosynthesis by Lead in maize. Bull. Env. Contam, Toxicol. 51(2): 443-446.

117. Chandra, P., **Tripathi, R.D.**, Rai, U.N., Sinha, S. and Garg, P. (1993). Monitoring and mitigation of non-point source pollution in some water bodies by aquatic plants. Water Sci. & Tech. 28(3-5): 323-326.

118. Rai, U.N., **Tripathi, R.D.** and Kumar, N. (1992). Chromium accumulation and toxicity on Biomass, pigments, nitrate reductase activity and protein content in chlorococcalean green algae glaucocystis nostochiniarum. Chemosphere 25: 1721-1732.

119. **Tripathi. RD,** and Chandra, P. (1991). Influence of metal chelators and pH on chromium uptake by Duckweed Spirodela polyrrhiza (L.) Schleiden. Bull. Env. Contam. Toxicol. 47: 764-769.

120. **Tripathi R.D.**, Chaurasia, R.D. and Johri, J.K. (1990). Evaluation of some natural products against bacterial pathogen of betelvine. Nat. Acad. Sci. Lett. 13(4): 117-118.

121. Singh, K.K., **Tripathi, R.D.**, Balasubrahmanyam, V.R. and Kochhar, V.K. (1989). Inhibition of changes in chlorophyll, protein, phenolic and cell permeability during senescence of Betel leaves by Benzyl adenine. Beitragen Zur Biologie Plf. 62: 414-427.

122. Rawat, A.K.S., **Tripathi, R.D.**, Khan, A.J. and Balasubrahamanyam, V.R. (1989). Essental oil components as markers of the betelvine cultivars. Biochem. Systematics Ecol. 17(1): 35-38.
123. Johri, J.K., **Tripathi, R.D.**, Chaurasia, R.S. and Balasubrahmanyam, V.R.(1987). Dialeurodos pallida Singh on Betelvine (Piper betel L.). Agric. Sci. Digest 6(4): 215-217.
124. Misra, P.S., Misra, G., Prakash, D., **Tripathi, R.D.**, Chaudhary, A.R. and Misra, P.N. (1987). Assay of some nutritional antinutritional factors in different cultivars of winged bean Psophocarpus tetragonolobus (L.) D.C. seed. Plant foods for Human Nutrition. 36: 367-371.
125. **Tripathi, R.D.**, Banerjee, R., Sharma, M.M., Balasubrahmanyam, V.R. and Nigam, S.K. (1985). Toxicity of essential oil from a new strain of Ocimum gratissium (clocimum) of Betelvine Pathogenic Fungi. Agric. Biol. Chem. 49(8): 2277-2285.
126. **Tripathi, R.D.**, Rawat, A.K.S., Johri, J.K., Chaurasia, R.S., Nainon, M.O. and Balasubrahmanyam, V.R. (1985). Tolerance factor of Piper betel cv. 'Kapoori' to fungal pathogens of Betelvine. Ind. J. Plant Pathol. 3(1): 128-133.
127. **Tripathi, R.D.**, Johri, J.K. and Balasubrahmanyam, V.R. (1984). Evaluation of some chemicals inhibitory bacterial leaf spot pathogen of betelvine. Trop. Pest. Management 39(4): 441-444.
128. Saxena, A.R., Renu, **Tripathi, R.D.** and Saxena, S.N. (1983). Fungitoxic properties of Putranjiva roxburghii Wall. Nat. Acad. Sci. Lett. 27(2): 69-72.
129. Tripathi, N.N., Dubey, N.K., **Tripathi, R.D.**and Dixit, S.N. (1983). Growth stages I fungitoxicity in Iberis amara. Indian Phytopath. 36(2): 264-287.
130. Singh, Y., **Tripathi, R.D.**, Tripathi, N.N. and Dixit, S.N. (1983). Properties of fungitoxic principal from Zingiber officinale. Ind. J. Plant Pathol. 1(1): 89-96.
131. Pandey, D.K., Chandra, H., **Tripathi, R.D.** and Dixit, S.N. (1983). Plant products I potato pathogenic bacteria. Nat. Acad. Sci. Lett. 6(8): 257-260.
132. Pandey, D.K., **Tripathi, R.D.**, Tripathi, N.N. and Dixit, S.N. (1983). Fungitoxic properties of seeds of Iberis amara. Quarterly J. Crude Drug Res. 21(4): 177-182.
133. Tripathi, N.N., **Tripathi, R.D.**, Dubey, N.K. and Dixit, S.N. (1983). Fungitoxic properties of Alpinia 15alangal. Tropical Plant Sci. Res. 1(1): 49-52.

134. Pandey, D.K., Tripathi, R.N., **Tripathi, R.D.** and Dixit, S.N. (1983). Phytotoxicity in pollen grains. Grana 22: 31-33.
135. Srivastava, R.C., Bose, B., **Tripathi, R.D.**, Mukherjee, D. and Mathur, S.N. (1982). Regulation of nitrage reductase by chloramphenicol in mungbean. Biol. Plantarum**.** 24: 183-187.
136. Pandey, D.K., Tripathi, N.N., **Tripathi, R.D.** and Dixit, S.N. (1982). Fungitoxic and phytotoxic properties of Caesulia auxillaries. Angew. Bot. 56: 259-267.
137. Pandey, D.K., Tripathi, N.N., **Tripathi, R.D.** and Dixit, S.N. (1982). Fungitoxic and phytotoxic properties of essential oil of Hyptis suaveolens. J. Plant Dis. & Protection. 89: 344-349.
138. Pandey, D.K., Tripathi, N.N., **Tripathi, R.D.** and Dixit, S.N. (1982). Fungitoxic properties of seeds of Iberis amara. Quarterly J. Crude Drug Res. 21(2): 67-71.
139. Dubey, N.K., **Tripathi, R.D.** and Dixit, S.N. (1982). Fungitoxicity of essential oil of Citrus media against storage fungi. Ann. Appl. Biol. 100(Suppl. No. 3): 58-59.
140. Dixit, A., Dubey, N.K., **Tripathi, R.D.** and Dixit, S.N. (1982). Control of storage diseases of some species by the essential oil of Cedrus deodara. Ann. Appl. Biol. 100(Suppl. No. 3): 56-57.
141. Chandra, H., Dubey, N.K., **Tripathi, R.D.** and Singh, S.K. (1982). Fungitoxic in the volatile oil from the fruit of Cinnamomum cedidodaphne. Phytopath. Medit. 21: 35-36.
142. Kishore, N., Dubey, N.K., **Tripathi, R.D.** and Singh, S.K. (1982). Fungitoxicity of leaf extracts of some higher lants against Fusarium moniliforme. Nat. Acad. Sci. Lett. 5: 43-45.
143. Kishore, N., Dubey, N.K., **Tripathi, R.D.** and Singh, S.K. (1982). Fungitoxic activity of leaves of some higher plants. Nat. Acad. Sci. Lett**.** 5: 9-10.
144. **Tripathi, R.D.** (1981). Evaluation of products from some higher plants of their toxicity against fungi. Sci. Acad. Medal for Young Scientists – Lecture, INSA, New Delhi, pp 307-318.
145. Chandra, H., Asthana, A., **Tripathi, R.D.** and Dixit, S.N. (1981). Effect of some homoeopathic drug against spore germination of some fungi. Nat. Acad. Sci. Lett. 5: 8-12.
146. Bhargava, K.S., Dixit, S.N., Dubey, N.K. and **Tripathi, R.D.** (1981). Fungitoxic properties of Oimum anum. J. Indian Bot. Soc. 60: 24-27.

147. Dubey, N.K., Kishore, N., Tripahti, N.N., **Tripathi, R.D.** and Dixit, S.N. (1981). Fungitoxicity of essential oil Ocimum canum against Aspergillus flavus and A. versicolor. Ind. Perf. 25(2): 22-28.
148. Renu, **Tripathi, R.D.** and Dixit, S.N. (1980). Fungitoxic properties of Cestrum diurnum L. Naturwissenschaften 67: 150-151.
149. **Tripathi, R.D.**, Srivastava, H.S. and Dixit, S.N. (1980). Regulation of nitrate reductase, soluble and protein nitrogen by Lawsone in Helminthosporium oryzae. Experientia (Cellular and Molecular Research) 36: 960-961.
150. **Tripathi, R.D.**, Tripathi, R.C. and Dixit, S.N. (1980). Structure activity relationship amongst some fungitoxic L-napthoquinones of angiosperm origin. Agric. Biol. Chem. 44: 2483-2485.
151. Bose, B., **Tripathi, R.D.**, Srivastava, H.S. and Dixit, S.N. (1980). Temperature dependent chloramphenicol effect on nitrate reductase in the leaves of Zea mays and Vigna mungo. Nat. Acad. Sci. Lett. 4: 1-4.
152. **Tripathi, R.D.**, Srivastava, H.S. and Dixit, S.N. (1978). A fungitoxic principle from the leaves of Lawsonia inermis. Experientia (Cellular and Molecular Research) 34: 51.
153. **Tripathi, R.D.**, Srivastava, H.S. and Dixit, S.N. (1977). Inhibition of induction of nitrate reductase by chloramphenicol in maize leaves. Ind. J. Exp. Biol. 15: 939-940.

Book Chapter/ Popular Articles:

1. P. Tripathi, S. Dwivedi, D. Chakraborty, P. K. Trivedi, **R. D. Tripathi**. (2010). Dual nature of reactive oxygen species; an ally or adversary for plants. Environews, vol 16 no 3 July 2010.
2. Richa Dave, **Rudra Deo Tripathi**, Sanjay Dwivedi & S. N. Singh 2010. Earth Climate 2050, Towards a booming bane. Environews, 16 (2), 2-5
3. Rakesh Tuli, **R. D. Tripathi**, Debasis Chakrabarty, B. Adhikari, Prabodh K. Trivedi 2010. Arsenic Hazards Associated With Food Security, SATSA MUKHPATRA, Annual Technical Issue, 14, 82-97 (SATSA, Kolkota, W.B.).
4. Shri, M., Rai Arti., Mishra P., Kumar S., Dubey S., **Tripathi R D**., Trivedi, P. K., Chakrabarty, D., Tuli, R. (2010): High Frequency, regeneration and agrobacterium mediated

transformation of Indica rice cultivars. National symposium on plant cell Tissue and organ, culture. The present scenario, 3-5 March 2010, Kolkota.

5. Sudha chandran, MK Shukla , and **R.D.Tripathi** (2007). Effect of aluminum on biomass, photosynthetic pigments and protein content of nitrogen fixing cynobacteria *Anabaena doliolum*; Samae 2007 Pp- 82.
6. M. K. Shukla, S.Dwivedi, **R.D.Tripathi**, U.N.Rai, S.Chandran V.S.Baghel, S.Mishra and S. Srivastava (2006). Effect of aluminum, arsenic and lead on biomass photosynthetic pigment and protein content of nitrogen fixing cynobacterium Anabaena doliolum; Vaghyanika pp 22-23**.**

List of books/Edited: Eight

Particulars of citation index of published work in national and international journals.

Status	**Numbers**	**Total Impact Factor**	**Total citation Index**	**h-Index**
Papers published	**153**	**210.00**	**2012**	**23**

Overseas visit:

1. Dhaka, **Bangladesh,** participated as one of the Expert from India in the conference entitled Arsenic in Rice South-South Exchange network for International Collaboration (ARSSENIC) held on 18-20 October 2010.
2. Lyon, **France,** during February 10-17, 2004.
3. München, **Germany**, worked with Prof. Erwin Grill, Lehrstuhl fur Botanik, Technische Universitat during 1998-1999.
4. London, **United Kingdom,** Post-doctoral study fellowship (C.S.I.R.-British Council T.C.T.P.) to work at the Department of Biosphere Science, Dr. Steven Smith, Kings College, University of London, 1990-1991.
5. Berlin, **Germany**, Botanical Congress, July 8-17, 1987.

Particulars of memberships of academic/societies/professional bodies:

1. Life member of Indian Science Congress Kolkata.
2. Life member of International Society of Environmental Botanists.
3. Life member of Prof. H.S. Srivastava Foundation for Science and Society.
4. Life member of the Academy of Environmental Biology.
5. Member of Association for Plant Taxonomy.

Awards / Honours/Fellowships (Give full particulars and the nature of award etc)

1. **FELLOW OF NATIONAL ACADEMY OF SCIENCES (FNASc)**, Allahabad, India (NASI) in 2011.
2. **ARCHANA GOLD MEDAL** award in 2011 by Academy of Environmental Biology, Lucknow (India).
3. **VIGYAN RATNA AWARD** in 2010 by Uttar Pradesh Council of Science and Technology (UPCST), Government of Uttar Pradesh.
4. **SARYU RATNA AWARD** (Environment) for 2009 for his contribution in this Area of Environmental Science. Gorakhpur, sponsored by Ministry of Tourism and culture, Govt. of Uttar Pradesh.
5. **FELLOW** of Academy of Environmental Biology, India (Lucknow) in 2005.
6. Worked as member of **WHO EXPERT** group for IARC monograph volume 87, Evaluation of carcinogenic risks to human beings: Lead and Lead Compounds, Lyon, France, February 10-17, 2004.
7. Awarded Science Academy Medal for **YOUNG SCIENTIST** by Indian National Science Academy (INSA), New Delhi, India – 1981 received from **Hon'ble Mrs. Indira Gandhi**.
8. Awarded **PESTICIDES INDIA AWARD** by Society of Mycology and Plant Pathology (Udaipur), Rajasthan, India – 1978.

Significant Research Contribution:

Dr. R. D. Tripathi, Chief Scientist working in Plant Ecology and Environmental Science Division at CSIR-National Botanical Research Institute, Lucknow. Presently he is working on the characterization of low arsenic accumulating rice genotypes and how arsenic affects mineral contents and amino acid contents in the rice grains. For more than a decade, he has been working on various aspects of plant metal interaction focusing on phytoremediation of toxic metal ions from the environment. During 1990-91 he worked as a study fellow, in the Division of Biosphere Science, at Kings College London, University of London (UK) on the mechanism of uptake of heavy metals like zinc, mercury in duckweed. During 1998-1999, he worked at Technical University of Munich (Germany) on the isolation and characterization metal binding peptides (phytochelatins) and regulation of phytochelatin synthase activity. He has made important contributions to phytoremediation of toxic metal ions by identifying heavy metal accumulating plant species (Tripathi et al,. 1996, Tripathi and Smith, 2005). He has worked on the mechanism of Cd uptake and the role phytochelatins (PCs) in detoxification of metals/metalloids (Tripathi et al., 1996, Mishra et al,. 2006 a, b, 2008 a, b; Srivastava et al., 2007). He has established that, both phytochelatins and antioxidant systems complement to provide As tolerance to the aquatic plant *Ceratophyllum demersum.* The PCs play an important role in As detoxification, through their turnover (Mishra et al, 2008 a). PC synthase transgenic tobacco plants have several fold higher arsenic phytoremediation potential. His researches have discriminated the response of As accumulation and detoxification in *Hydrilla verticillata* towards arsenite (As^{III}) and arsenate (As^{V}). While As^{V} predominantly stimulated antioxidant enzymes (SOD, APX and GR), As^{III} primarily caused enhanced levels of thiols including PCs (Srivastava et al., 2007; Tripathi et al., 2007). During field screening of rice germplasms in arsenic contaminated soils, he has identified many high grain arsenic accumulating rice genotypes (HAARGs) and low grain arsenic accumulating rice genotypes (LAARGs). These lines should lead to the development of new rice varieties safer for human consumption. He also studies the behaviour of various amino acids in these genotypes and found that As accumulation in rice grain alters essential amino acids (EAAs) and non-essential amino acids (NEAAs) differentially, and reduction was more pronounced in HAARGs than in LAARGs. Thus, As tainted rice limits required levels of amino acids in rice based diets and therefore cannot alone fulfill the recommended daily intake of amino acids. Transcriptome analysis revealed that cytochrome P-450 and glutaredoxin genes were upregulated during As^{V} and As^{III} stress respectively in rice seedlings (Chakrabarty et al, 2008). He is Fellow of National Academy of Sciences, Allahabad, India (NASI) in 2011 and also fellow of Academy of Environmental Biology, India (Lucknow). He has been awarded ARCHANA GOLD MEDAL-2011 by Academy of Environmental Biology, Lucknow (India). He was conferred VIGYAN RATNA AWARD-2010 (by U.P.C.S.T., Govt. of U.P.). He has been conferred upon SARYU RATNA AWARD (Environment) for 2009 for his contribution in this Area of Environmental Science. He also worked as a member of WHO Expert Group on evaluation of carcinogenic risks to human beings on inorganic and organic lead compounds during February 2004 in Lyon, France. He is an Associate Editor of the International Journal Physiology and

Molecular Biology of Plants (Springer, Germany). He has been conferred Pesticide India Award – 1978 (Society of Mycology and Plant Pathology, Udaipur, India) and INSA Medal for Young Scientist – 1981 (Indian National Science Academy, New Delhi, India) and was a Guest Editor of a special issue of Environmental Pollution published by Elsevier. He has co-authored a book on Betelvine (*Piper betle* L.) (NBRI) and co-edited the books Plant Response to Environmental Stress (IBDC, Lucknow, 2005), Environmental Bioremediation Technologies (Springer, Germany) and published 153 papers mostly in journals with science citation index 2012 and h-index is 23.

c. Principal Investigator of Project: Ongoing/Completed

1. Role of thiol and nitric oxide metabolism mediated pathways in arsenic stress in higher plants. (Indo-Spanish Joint research project). **Ongoing**
2. Plant based screening technologies for biomonitoring and assessment of heavy metal/metalloid pollution (CSIR Network project). **Completed**
3. Development of transgenic rice and hyperaccumulator species for arsenic contaminated (CSIR Network project). **Completed**
4. Characterization of Blue green algae with special reference to metal toxicity/ fly-ash stress during paddy cultivation near NTPC, Unchahar, Raebareli. (NTPC, Unchahar, Raebareli). **Completed**
5. Phytoremediation of toxic metal ions (Cd, As, Pb, and Ni) through phytochelatin synthase activity from metal polluted environment. **Completed**
6. Effect of Fly-Ash pollution on Mango orchards around NTPC, Unchahar, Raebareilly. (NTPC, Unchahar, Raebareilly). **Completed**
7. Heavy metal pollution in Lake Nanitale: Metal monitoring and Bioremediation potential of aquatic macrophytes. (GBPIHED, Almora, MOEF, New Delhi).

Completed

(R D Tripathi)

DATE: 27/08/2012

PLACE:

Books

Plant Response to Environmental Stress

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Inorganic and Organic Lead Compounds

LYON, FRANCE
2006

IARC WORKING GROUP ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS: INORGANIC AND ORGANIC LEAD COMPOUNDS

Lyon, 10–17 February 2004

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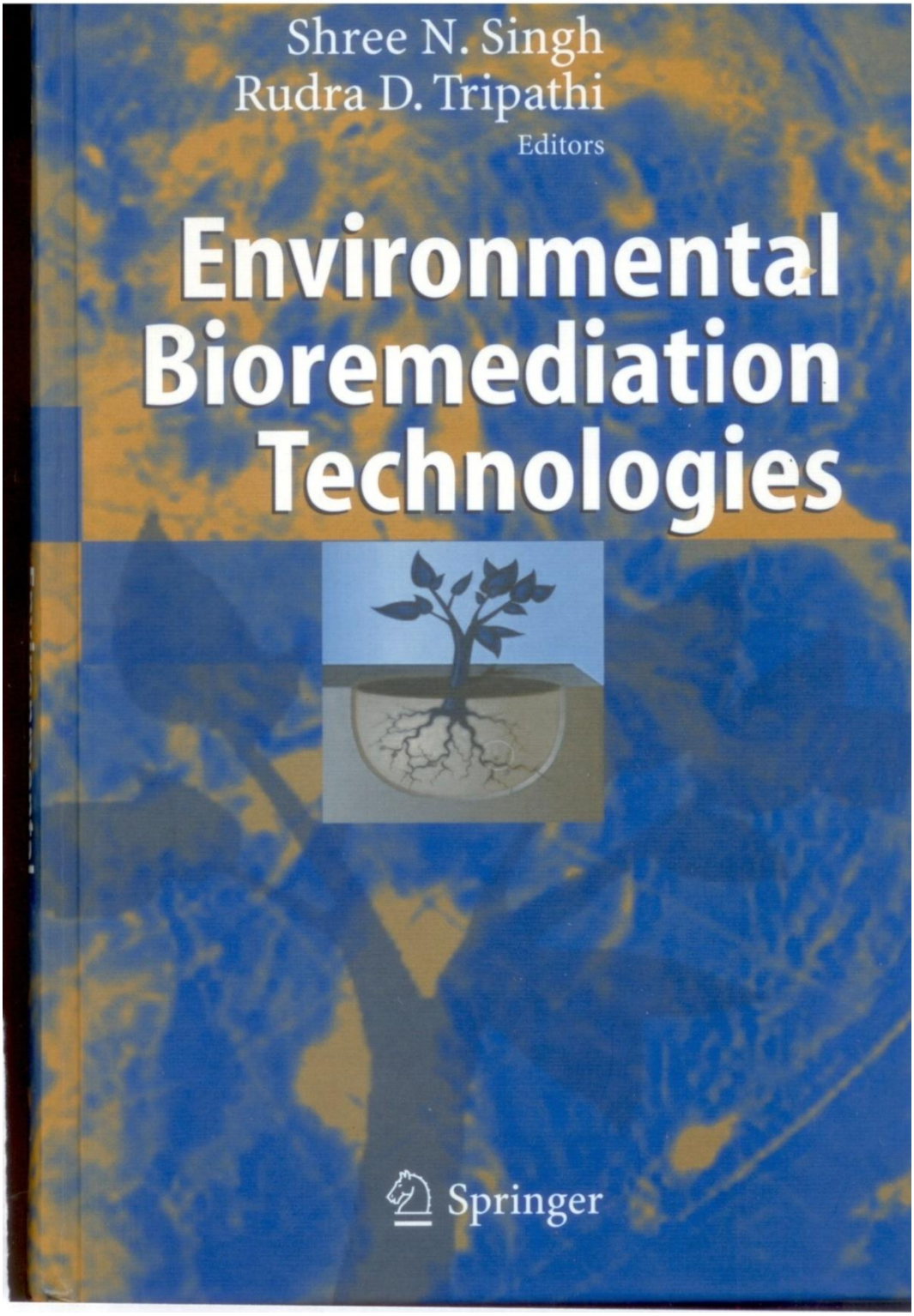
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ISBN 10 3-540-34790-9 **Springer Berlin Heidelberg New York**
ISBN 13 978-3-540-34790-3 **Springer Berlin Heidelberg New York**

Library of Congress Control Number: 2006927433

Springer is a part of Springer Science+Business Media
springeronline.com

Cover design: E. Kirchner, Heidelberg
Production: A. Oelschläger
Typesetting: Camera-ready by the Editors

Printed on acid-free paper 30/2132/AO 54321

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In this technology, higher plants or microbes are used alone or in combination for phytoextraction of heavy metals from metal contaminated sites. Through microbial interventions, either the metals are immobilized or mobilized through redox conversions at contaminated sites. If mobilized, metal accumulating plants are put in place to accumulate metals in their body. Thenafter, metal-loaded plants are harvested and incernated to reduce the volume of waste and then disposed off as hazardous materials or used for recovery of precious metals, if possible. In case of immobilization, metals are no longer available to be toxic to organisms.

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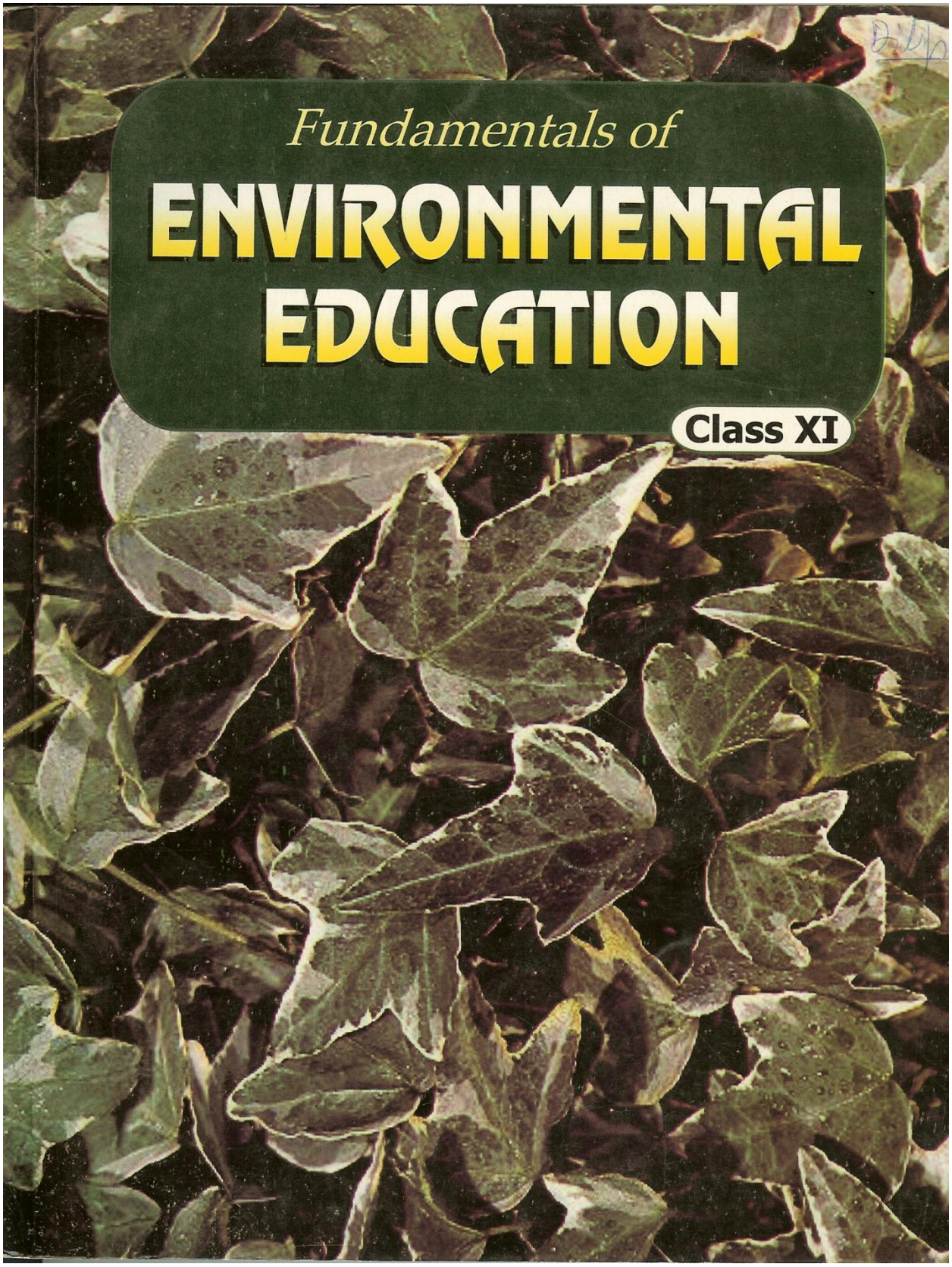
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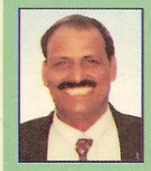

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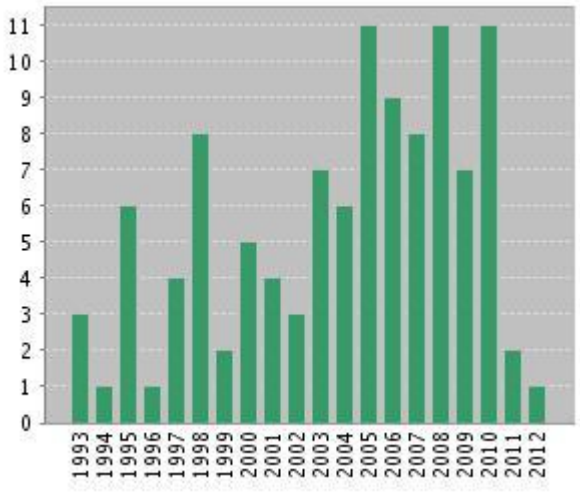

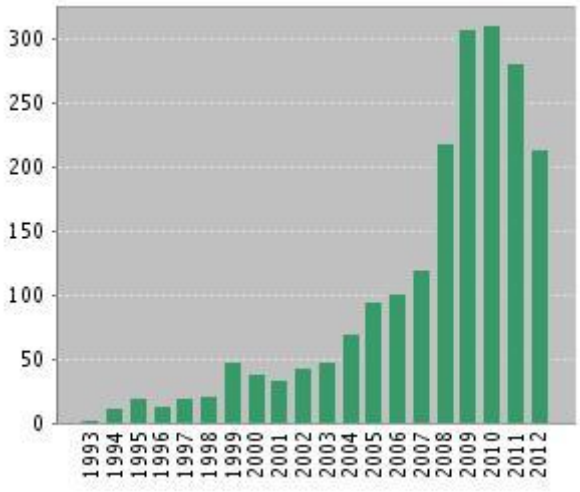

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