

Biodata

Personal Details

Name: Hema Singh

Father's Name: Professor J.S. Singh

Date of Birth: 23 November 1966

Designation& Affiliation: Professor
Department of Botany
Banaras Hindu University
Varanasi 221005

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Academic Qualifications

Degree	Institution	Year
B.Sc.	Kumaun University, Nainital	1985
M.Sc. (Botany)	Allahabad University, Allahabad	1987
Ph. D. (Botany)	Banaras Hindu University	1992

Qualified GATE (1990) in Life Sciences

Work History

- Worked as Research Associate (CSIR) from 1994-1999
- Worked as DST Fast Tract Research Scientist from 2001-2003
- Lecturer/Assistant Professor from June 2006 to September 2017
- Associate Professor since September 2017

Training Programmes

- Special Summer School (Equivalent to Orientation/Refresher course)-Academic Staff College, BHU (2008)
- Refresher Course on ICTA-Academic Staff College, BHU (2012)
- Refresher Course in Environmental Studies at DU (2014)
- Short Term Course in Reading Strategies-ASC, BHU (2017)

Area of Specialization

Ecology of agroecosystems: ecology and management of weed flora, nutrient dynamics, microbial manipulation of soils for fertility management, carbon flux from soils, ecophysiology of crops and weed.

Projects Undertaken as PI/ Co-PI

1. DST Fast Track Project for Young Scientists “Impact of *Parthenium* Invasion on Ecological Processes in Agroecosystems”. (as Principal Investigator, **completed**).
2. ISRO, SAC-Ahmedabad Project ‘Carbon Cycle Assessment for Terrestrial Biosphere of India’. (as Co-Principal Investigator, **completed**).
3. ISRO, SAC-Ahmedabad Project ‘Energy and Mass Exchange in Vegetation System’. (as Co-Principal Investigator, **completed**).
4. DST, “Impact and Vulnerability of Agriculture in different Agroclimate Regions of Uttar Pradesh to Climate Variability and Changes: A Pilot Study using Simulation Models”. (as Co- Principal Investigator, **completed**).

List of Publications

Journal Papers

1. **Singh, Hema** and Singh, K.P. (1993) Effect of residue placement and chemical fertilizer on soil microbial biomass under tropical dryland cultivation. *Biology and Fertility of Soils* 16: 275-281.
2. **Singh, Hema** (1993) Effect of crop residue management on microbial biomass accumulation in the soil. *Current Science* 65: 487-488.
3. **Singh, Hema**, Raghubanshi, A.S., Singh, K.P. and Singh, J.S. (1994) Reduced tillage for sustainable dryland farming. *Tropical Ecology* 35: 1-23.
4. **Singh, Hema** and Singh, K.P. (1994) Nitrogen and phosphorus availability and mineralization in dry land reduced tillage cultivation: effects of residue placement and chemical fertilizer. *Soil Biology and Biochemistry* 26: 695-702.
5. **Singh, Hema** and Singh, K.P. (1995) Effect of plant residue and fertilizer on grain yield of rice under dryland reduced tillage cultivation. *Soil and Tillage Research* 34: 115-125.

6. **Singh, Hema** (1995) Nitrogen mineralization, microbial biomass and crop yield under dryland conditions as affected by straw and fertilizer application. *Journal of Applied Ecology* 32: 588-595.
7. **Singh, Hema**, Singh, S.K., Singh, A.N. and Raghubanshi, A.S. (1999). Impact of plant residue quality on the size of the microbial biomass pool and net N-mineralization. *Tropical Ecology* 40: 157-162.
8. **Singh, Hema** and Raghubanshi, A.S. (2003) Effect of variable quality residue on a tropical dryland rice soil. *Journal of Sustainable Agriculture* 22: 3-17.
9. Pandey, S.K., **Singh, Hema** and Singh, J.S. (2009) Species and site effects on leaf traits of woody vegetation in a dry tropical environment. *Current Science* 968: 1109-1114.
10. Singh, V., **Singh, Hema**, Sharma, G.P. and Raghubanshi, A.S. (2011) Eco-physiological performance of two invasive weed congeners (*Ageratum conyzoides* L. and *Ageratum houstonianum* Mill.) in the Indo-Gangetic plains of India. *Environmental Monitoring and Assessment*. 178: 415- 418.
11. **Singh, Hema**, Pathak, P., Kumar M. and Raghubanshi, A.S. (2011) Carbon sequestration potential of Indo-Gangetic agroecosystem soils. *Tropical Ecology* 52: 223-228.
12. **Singh, Hema**, Menka, Srivastava, P. and Singh, V. (2011) Effect of nitrogen addition on the architecture and biomass allocation of two invasive plant species (*Ageratum conyzoides* L. and *Parthenium hysterophorus* L.). *Proceedings of the National Academy of Science, India Biological Sciences* 81: 348-358.
13. Pandey, S.K. and **Singh, Hema** (2011) A simple, cost-effective method for leaf area estimation. *Journal of Botany* 2010, Article ID 658240, 6 pages, 2011, doi :10.1155/2011/658240.
14. Chaturvedi, R.K., Prasad, S., Rana, S., Obaidullah, M., Pandey, V. and **Singh, Hema** (2012) Effect of dust load on the leaf attributes of the tree species growing along the roadside. *Environmental Monitoring and Assessment* 185: 383- 391.

15. Singh, V., **Singh, Hema** (2012) Leaf construction cost and related ecophysiological parameters of rice crop and its important weeds. *Rice Science* 19: 233-240.
16. Shukla, R.K., **Singh, Hema**, Rastogi, N. and Agarwal, V.M. (2013) Impact of abundant Pheidole ant species on soil nutrients in relation to the food biology of the species. *Applied Soil Ecology* 71: 15-23.
17. Singh, V., **Singh, Hema** and Raghubanshi, A.S. (2013) Competitive interactions of wheat with *Phalaris minor* or *Rumex dentatus*: A replacement series study. *International Journal of Pest Management* 59: 245-258.
18. Pandey, S.K., **Singh, Hema** and Singh, J.S. (2014) Effect of environmental conditions on decomposition in eight woody species of a dry tropical forest. *Plant Biosystems* 148: 410-418
19. Pandey, S.K., **Singh, Hema** and Singh, J.S. (2014) Contrasting leaf phenology of woody species of dry tropical forest. *Plant Biosystems* 148: 655-664.
20. Singh, V., Gupta, S., **Singh, Hema** and Raghubanshi, A.S. (2015) Ecophysiological characteristics of five weeds and wheat crop in the Indo-Gangetic Plains, India. *Weed Biology and Management* 15: 102-112.
21. Srivastava, P., Singh, P.K., Singh, R., Bhadouria, R., Singh, D.K., Singh, S., Afreen, T., Tripathi, S.N., Singh, P., **Singh, Hema** and Raghubanshi, A.S. (2016) Relative availability of inorganic N-pools shifts under land use change: An unexplored variable in soil carbon dynamics. *Ecological Indicators* 64: 228-236.
22. Srivastava, P., Singh, R., Tripathi, S.N., **Singh, Hema** and Raghubanshi, A.S. (2016) Soil carbon dynamics and climate change: current agro-environmental perspectives and future dimensions. *Energy, Ecology and Environment* 1: 315-322.
23. Mall, R.K., Singh, Neha and **Singh, Hema** (2016) Evaluation of CERES-Wheat model for different wheat cultivars at Varanasi. *Journal of Agrometeorology* 18: 149-152.

24. Pandey, S.K. and **Singh, Hema** (2016) Effect of ecological conditions on woody litter decomposition pattern in eight woody species of a dry tropical forest in Vindhyan Highlands. *Journal of Scientific Research and Advances* 3: 198-215.
25. Shukla, R.K., **Singh, Hema** and Rastogi, N.K. (2016) How effective are disturbance-tolerant agroecosystem-nesting ant species in improving soil fertility and crop yield. *Applied Soil Ecology* 108: 156-164.
26. Kumar, M., Singh, V. and **Singh, Hema** (2016) An assessment of soil carbon efflux between agroecosystem and forest ecosystem at Indo-Gangetic Plains and Vindhyan Highland, India. *Research and Reviews: Journal of Botany* 5: 27–35.
27. Srivastava, P., Singh, R., Bhadouria, R., Tripathi, S.N., Singh, P., **Singh, Hema** and Raghubanshi, A.S. (2016) Organic amendment impact on SOC dynamics in dry tropics: A possible role of relative availability of inorganic-N pools. *Agriculture, Ecosystems and Environment* 235: 38-50.
28. Kumari, S., **Singh, Hema** and Rastogi, N.K. (2016) Influence of the sugar loving ant, *Camponotus compressus* on soil physico-chemical characteristics. *Halteres* 7: 163-174.
29. Singh, R., **Singh, Hema**, Singh, S., Afreen, T., Upadhyay, S., Srivastava, P., Singh, A., Bhadouria, R. and Raghubanshi, A.S. (2017) Riparian land uses affect the dry season soil CO₂ efflux under dry tropical ecosystems. *Ecological Engineering* 100: 291-300.
30. Bhadouria, R., Srivastava, P., Singh, R., Tripathi, S., **Singh, Hema** and Raghubanshi, A.S. (2017) Tree seedling establishment in dry tropics: an urgent need of interaction studies. *Environmental Systems and Decisions* 37: 88-100.
31. Singh, R., Singh, S., Srivastava, P., Singh, P., **Singh, Hema** and Raghubanshi, A.S. (2017) Overpopulation–food security–agriculture productivity–climate change nexus: Challenges for agricultural sustainability. *International Journal on Environmental Sciences* 8: 18-26.

32. Neha and **Singh, Hema** (2017) Impact of climate change on wheat productivity and physiology at mid and end of the century under RCP 6.0 over Varanasi region. *International Journal on Environmental Sciences* 8: 41-49.
33. Singh, R., Srivastava, P., Singh, P., Bhadouria, R., **Singh, Hema** and Raghubanshi, A.S. (2017) Biochar-residue integrated approach as a conservation agriculture strategy for climate smart farming. *Agricultural Research and Technology* DOI:10.19080/ARTOAJ.2017.06.555693.
34. Singh,V., Kumar, M. and **Singh, Hema** (2017)Competitive interactions between rice and *Caesulia axillaris* or *Echinochloa crus-galli*: a replacement series study. *Annals of Agricultural & Crop Sciences* 2: 1-17.
35. Srivastava, P., Singh., R., Tripathi, S., **Singh, Hema**, Raghubanshi, A.S. and Mishra, P.K. (2017) A new insight into the warming potential of organically amended agro-ecosystems. *Organic Agriculture*. DOI 10.1007/s13165-017-0188-4.
36. Singh, V., **Singh, Hema** and Raghubanshi, A.S. (2017) Effect of N application on emergence and growth of weeds associated with rice. *Tropical Ecology* 58: 807-822.
37. Srivastava, P., Singh, R., Tripathi, S., Singh, P., Singh, S., **Singh, Hema**, Raghubanshi, A.S. and Mishra, P.K. (2017). Soil carbon dynamics under changing climate – a research transition from absolute to relative roles of inorganic- nitrogen pools and associated microbial processes: A review. *Pedosphere* 27: 1-15.
38. Chaturvedi, P., Singh, Shivum, **Singh, Hema** and Raghubanshi, A.S. (2017) Assessment of allometric models for leaf area index estimation of *Tectona grandis*. *Tropical Plant Research* 4: 274- 285.
39. Shukla, R.K., **Singh, Hema**, Rastogi, N. (2017) Contribution of the nutrient-enriched ant nest debris soil to growth and yield of Kalmegh (*Andrographis paniculata*) under natural and experimental field conditions. *Biological Agriculture and Horticulture* DOI:10.1080/01448765.2017.1408492

40. Mishra, S., Afreen, T. and **Singh, Hema** (2018) Effect of precipitation and nitrogen input on soil respiration in grasslands. *International Journal of Plant and Environment* 4: 23-33. DOI:10.18811/ijpen.v4i01.11611
41. Pandey, S. K. and **Singh, Hema** (2018) Effects of environmental factors on soil respiration in dry tropical deciduous forest. *Tropical Ecology* 59: 445-456.
42. Singh, S., Singh, R., Mishra, A. K., Upadhyay, S., **Singh, Hema** and Raghubanshi A. S. (2018). Ecological perspectives of crop residue retention under the conservation agriculture systems. *Tropical Ecology* 59: 589-604.
43. Singh, A. K., **Singh, Hema** and Singh, J. S. (2018) Plant diversity in cities: call for assessment and conservation. *Current Science* 115: 428-435.
44. Afreen, T., Srivastava, P., **Singh, Hema** and Singh, J.S. (2018) Effect of invasion by *Hyptis suaveolens* on plant diversity and selected soil properties of constructed tropical grassland. *Journal of Plant Ecology* 11: 751-760.
45. Singh, R., Srivastava, P., Singh, P., Sharma, A.K., **Singh, Hema** and Raghubanshi, A.S. (2019). Impact of rice-husk ash on the soil biophysical and agronomic parameters of wheat crop under a dry tropical ecosystem. *Ecological Indicators* 105: 505-515.
46. Singh, R., Singh, A.K., Singh, S., Srivastava, P., **Singh, Hema** and Raghubanshi, A.S. (2019). Geomorphologic heterogeneity influences dry-season soil CO₂ efflux by mediating soil biophysical variables in a tropical river valley. *Aquatic Sciences* 81: 43.
47. Singh, R., **Singh, Hema** and Raghubanshi, A.S. (2019). Challenges and opportunities for agricultural sustainability in changing climate scenarios: a perspective on Indian agriculture. *Tropical Ecology* 60: 1-19.
48. Singh, A. K., **Singh, Hema** and Singh, J. S. (2019) Contribution of street trees to carbon sequestration: A case study from Varanasi, India. *International Journal of Plant and Environment*. doi.org/10.18090/samriddhi.v11i01.5

49. Afreen, T. and **Singh, Hema**. (2019) Does change in precipitation magnitude affect the soil respiration response? A study on constructed invaded and uninvaded tropical grassland ecosystem. *Ecological Indicators* 102: 84-94.
50. Singh, R., Srivastava, P., Bhadouria, R., Yadav, A., **Singh, Hema**, and Raghubanshi, A.S. (2020). Combined application of biochar and farmyard manure reduces wheat crop eco-physiological performance in a tropical dryland agro-ecosystem. *Energy, Ecology and Environment* 5: 171-183.
51. Afreen, T., Singh, V., Yadav, V.K., Singh, R.P., and **Singh, Hema** (2020). Impact of rainfall variability on the ecophysiology of *Hyptis suaveolens*: a study in the constructed tropical grassland. *Environmental Monitoring and Assessment* 192: 1-11.
52. Ekka, P. A., Rastogi, N., **Singh, Hema**, Singh, H. B., and Ray, S (2020). Lycaenid-tending ants can contribute to fitness gain of the infested host plant by providing nutrients. *Arthropod- Plant Interactions* 14: 745-757

Papers Published in Proceedings

1. Singh, N., **Singh, Hema** and Mall, R.K. (2015). Impact of climate change on crops and adaptation strategies in India. *In: Proceedings of the National Conference on Climate Change: Impacts, Adaptation, Mitigation Scenario & Future Challenges in Indian Perspective*, New Delhi.
2. Pandey, S., Raizada, P. and **Singh, Hema** (2015) Impact of climate change and spatial variability on leaf traits and reproductive attributes of an invasive species, *Lantana camara* L. *In: Proceedings of the National Conference on Climate Change: Impacts, Adaptation, Mitigation Scenario & Future Challenges in Indian Perspective*, New Delhi.
3. Singh, V. and **Singh, Hema** (2015) Effect of nitrogen application on biomass and ecophysiology of *Phalaris minor* and *Rumex dentatus* in wheat field of Indo-Gangetic plains. *Proceedings, Volume III. 25th Asian-Pacific Weed Science Society Conference*, Hyderabad, India. Indian Society of Weed Science, Jabalpur.

4. Singh, R., Afreen, T., Singh, P., Srivastava, P., **Singh, Hema** and Raghubanshi, A.S. (2017) Impact of sole and combined amendment of rice-husk ash on soil CO₂ efflux and agronomic parameters of wheat crop in dry tropics. *In: Proceedings of the International Conference on Sustainable Soil Management (SOILS): Quality Soil Drivers Productivity*, Malaysia.

Book Chapters

1. **Singh, Hema** and Singh, J.S. (1991) A current thrust in soil ecology: Microbial biomass. *In: Recent Advances in Plant Biology* (Eds. C.P. Malik and Y.P. Abrol), Narendra Publishing House, New Delhi, pp. 251-258. **ISBN: 9788185375182.**
2. **Singh, Hema** and Singh, J.S. (1992) A continued thrust in soil ecology: seed bank. *In: Current Concepts in Seed Biology* (Eds. K.G. Mukerji, A.K. Bhatnagar, S.C. Tripathi, M. Bansal and M. Saxena), Naya Prokash, Calcutta, pp. 115-131. **ISBN: 9788185421124.**
3. Raghubanshi, A.S. and **Singh, Hema** (1992) Microbial management for restoring soil fertility. *In: Restoration of Degraded Land: Concepts and Strategies* (Ed. J.S. Singh), Rastogi Publications, Meerut, pp. 49-63. **ISBN: 9788171331635.**
4. Sharma, G.P., **Singh, Hema** and Singh J.S. (2012) Ecology of plant and animal invasion in India. *In: Biological Diversity: Principles & Processes.* (Eds. A.K. Sharma, D. Ray and S.N. Ghosh) Viva Books. **ISBN: 978-81-309-2 113-6.**
5. Srivastava, P., Singh, R., Tripathi, S., **Singh, Hema** and Raghubanshi, A.S. (2018) Understanding the complex interaction between soil carbon dynamics under changing climate conditions. *In: Soil Management and Climate Change: Effects on Organic Carbon, Nitrogen Dynamics, and Greenhouse Gas Emissions.* (Eds. Maria Munoz and Raúl Zornoza). Academic Press (Elsevier) **ISBN: 9780128121283.**
6. Srivastava, P., Singh, R., Bhadouria, R., Singh, P., Tripathi, S., **Singh, Hema**., Raghubanshi, A.S. and Mishra, P.K. (2018) Physical and biological processes controlling soil C dynamics. *In: Sustainable Agriculture Reviews 33* (Series Ed. E. Lichtfouse). Academic press (Springer) **ISBN: 978-3-319-99076-7.**

7. Afreen, T., **Singh, Hema**, and Singh, J.S. (2019). Influence of changing patterns of precipitation and temperature on tropical soil ecosystem. In: Tropical Ecosystems: Structure, Functions and Challenges in the Face of Global Change (pp. 11-26). Springer, Singapore. **ISBN: 978-981-13-8249-9.**

Seminars/Symposia attended

1. XIII IBS Botanical Conference, Department of Botany, BHU, 1990.
2. Annual meeting of ERC and MAB, Ministry of Environment and Forest, August 1992, Department of Botany, BHU.
3. National Seminar on Ecology: Current problems and future perspectives, March 10-12, 1995, Department of Botany, BHU.
4. National Seminar on Changing Scenario in Plant Sciences, October 13-15, 1995, Department of Botany, BHU.
5. National Seminar on Conservation of Endangered Species and Ecosystems: Biological and Ecological Approaches, December 5-7, 1996, Department of Botany, BHU.
6. National Symposium on Fifty Years of Botany in India: An assessment, February 27-28, 1998, Department of Botany, BHU.
7. National Symposium on Ecology in India: Retrospect and Prospects, March 12-13, 1999, Department of Botany, BHU
8. MoEn Workshop on Invasive Alien Species and Biodiversity in India, August 18-20, 2004, Department of Botany, BHU.
9. Plant Genome Biodiversity: Conservation and Management, 16-17 February 2007, Department of Botany, BHU.
10. Current Challenges in Plant Sciences: Gene to Ecosystems, 24-25 March, 2009, Department of Botany, BHU.
11. International Symposium on Phycological Research, 25-27 February, 2010, Department of Botany, BHU.
12. National Conference of Plant Physiology on Physiological and Molecular Approaches for Crop Improvement under Changing Environment, 25-27 November, 2010, Department of Physiology, IASc., BHU.
13. National Symposium on Emerging Trends in Plant Sciences, 3-4 March, 2011, Department of Botany, BHU.
14. National workshop on Role of Higher Education in Disaster Management in India: Issues & Challenges, 29- 30 April, 2011, Institute of Environment and Sustainable Development, BHU, Varanasi.
15. International Seminar on Technology, Energy and Sustainable Rural Environment, 23-25 February, 2011, Department of Geography, BHU, Varanasi.

16. International Symposium on Short Rotation Forestry: Synergies For Wood Production and Environmental Amelioration, 10-12 Feb, 2011, Department of Forestry and Natural Resources, Punjab Agricultural University, Ludhiana.
17. National seminar on Environmental Concerns and Sustainable Development: Issues and Challenges for India, 2-4 March, 2012, Institute of Environment and Sustainable Development, BHU, Varanasi.
18. National symposium on Current Status and New Horizons of Ecological Sciences and Environmental Biotechnology (ESEB-13), 1-3 March, 2013, Department of Botany, BHU, Varanasi
19. National seminar on Sustainable Water Resource Management in Era of Changing Climate, 10-11 January, 2014, Institute of Environment and Sustainable Development, BHU, Varanasi.
20. National workshop on Disaster management, 2 December, 2014, National Institute for Disaster Management, Delhi.
21. National symposium on Emerging Trends and Challenges in Plant Science Research, 19-20 February, 2015, Department of Botany, BHU, Varanasi
22. National conference on climate change: Impacts, Adaptation, Mitigation Scenario and Future challenges in Indian Perspective, 02-03 March, 2015, University of Delhi, Delhi.
23. Seminar on Science and Religion : Mahamanas's Vision, 23-24 November, 2015, BHU, Varanasi
24. National conference on Emerging Trends In Fungal Biology and Plant Protection, 16-18 February 2016, Department of Botany, BHU, Varanasi
25. National symposium on Issues and Challenges in Ecological Sciences 23-25 February, 2017, Department of Botany, BHU, Varanasi
26. National symposium on Advances in Biology of Algae and Cyanobacteria, 8-9 February, 2018, Department of Botany, BHU, Varanasi
27. National symposium on Current Trends and Future Prospects in Plant sciences, 1-3 February, 2019, Department of Botany, BHU, Varanasi
28. National seminar on Recent Advances in Fungal Diversity, Plant-Microbes interaction and Disease Management 28- 29 February, 2020, Department of Botany, BHU, Varanasi