



CURRICULAM-VITÆ



Title	Dr.	First Name	Seema	Last Name	Makhija	Photograph
Designation	Associate Professor					
Address	Department of Zoology, Acharya Narendra Dev College, University of Delhi, Govindpuri, Kalkaji, New Delhi-110019					
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Educational Qualifications						
Degree	Institution				Year	
B. Sc. (H) Zoology	University of Delhi				1992	
M. Sc. Zoology	University of Delhi				1994	
Ph.D.	University of Delhi				1998	
Career Profile						
Name of Institution	Position Held	Duration	Total Experience			
Acharya Narendra Dev College	Associate Professor (Permanent)	2007 to till date	13 Years			
Acharya Narendra Dev College	Assistant Professor	2003 to 2007	4 Years			
S.G.T.B. College	Assistant Professor (Ad-hoc)	July, 1997 to February, 1998 November, 2000 to March, 2003	3 Years			
Miranda House	Assistant Professor (Ad-hoc)	September, 1996 to November, 1996; July, 1998 to November, 2000	1 Year and 2 Months			
Administrative Assignments						

- Coordinator of DBT-STAR college
- Member of Editorial Committee for the college magazine, annual report and prospectus
- Teacher In-charge from 2010–2012
- Enthusiastic member of the College Editorial Committee (2005-2010, 2012-2014).
- Active member of the College Proctorial Committee (2008-2010)
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Areas of Interest / Specialization

Ciliates/ Cell Biology

Subjects Taught

Evolutionary biology, Cell biology & Molecular biology

Research Guidance

Guided various undergraduate students for the college research projects under IEDC, ELITE.

Ph.D. supervision

- Supervisor for two Ph.D. students
- Co-Supervisor for two Ph.D. students

Ph.D. topics:

- Taxonomy, phylogeny and molecular systematics of ciliates from Delhi, India
- Ciliates as cellular tool to assess heavy metal toxicity
- Microorganisms as bioindicators in diverse environment
- Use of ciliates in ecotoxicological studies

Publications Profile

PAPER PUBLICATIONS

1. **Seema Arora**, Renu Gupta, Swati Machwe and Gulshan Rai Sapra. (1999) Influence of cadmium on development of surface ciliary structures in the ciliate *Stylonychia mytilus* (Ciliophora, Oxytrichidae). European Journal of Protistology 35, 281-289.
2. **Seema Arora**, Renu Gupta, Komal Kamra and Gulshan Rai Sapra. (1999) Characterization of *Paraurostyla coronata* sp. n. including a comparative account of other members of the genus. Acta Protozoologica 38, 133-144.
3. Renu Gupta, Komal Kamra, **Seema Arora** and Gulshan Rai Sapra. *Stylonychia ammermanni* sp. n. a new oxytrichid (Ciliophora, Hypotrichida) ciliate from the river Yamuna, Delhi, India. Acta Protozoologica 40, 75-82 (2001).
4. Swati Machwe, **Seema Arora**, Renu Gupta and G.R. Sapra. (2001) Cisplatin induces modifications in the development of cell surface patterns of ciliates. Cell Biology

International 25 (11), 1131-1138.

5. **Arora, S.**, Gupta, R., Sapra, G. R. (2002). Developmental toxicity of lithium in the ciliate, *Stylonychia*. The Japanese Journal of Protozoology Vol. 35 (suppl.), 42.
6. Gupta, R., **Arora, S.**, Kamra, K., Sapra, G. R. (2002). Biodiversity of genus *Oxytricha* in Delhi region of the Indian Subcontinent. The Japanese Journal of Protozoology, Vol. 35 (suppl.), 30.
7. Renu Gupta, Komal Kamra, **Seema Arora** and Gulshan Rai Sapra (2003). *Pleurotricha curdsi* (Shi, Warren and Song 2002) nov. comb. (Ciliophora: Hypotrichida): morphology and ontogenesis of an Indian population; redefinition of the genus. European Journal of Protistology 39, 275-285.
8. **Seema Makhija**, Renu Gupta and Ravi Toteja (2015) Lithium-induced developmental anomalies in the spirotrich ciliate, *Stylonychia mytilus* (Ciliophora, Hypotrichida). European Journal of Protistology, 51: 290–298.
9. **Seema Makhija**, Renu Gupta, Ravi Toteja, Jeeva Susan Abraham and Sripoorna Somasundaram (2015) Cadmium induced ultrastructural changes in the ciliate, *Stylonychia mytilus* (Ciliophora, Hypotrichida). Journal of Cell and Tissue Research, 15 (3): 5151–5157.
10. Sripoorna Somasundaram, Jeeva Susan Abraham, Renu Gupta, **Seema Makhija** and Toteja R (2015) Diverse freshwater spirotrich ciliate fauna from Okhla Bird Sanctuary, Delhi, India. Global Journal for Research Analysis, 4 (9): 37–41.
11. Jeeva Susan Abraham, Sripoorna Somasundaram, Shiv Jangra, Khushi Yadav, Simran Singh, Siddhant Zutshi, Bhupender Singh, Jyoti Dagar, Anit Kumar, Anusha Goyal, Muskaan Bhatnagar, Upadhaya M., Ashish Choudhary, Ravi Toteja, Renu Gupta, Geetu Gambhir, **Seema Makhija** (2016) Biodiversity and community structure of soil ciliates collected from three different sites of Delhi, India to assess soil quality. Protistology, 10 (2), 5.
12. **Seema Makhija**, Jeeva Susan Abraham, Sripoorna Somasundaram, Ravi Toteja, Renu Gupta (2016). Mapping the hidden diversity of free living fresh water ciliates from Delhi region, India. Protistology, 10 (2), 43.
13. Sripoorna Somasundaram, Jeeva Susan Abraham, Ravi Toteja, Renu Gupta, **Seema Makhija** (2016). Molecular defence mechanisms in spirotrich ciliates to prevent heavy metal toxicity. Protistology, 10 (2), 76.
14. Sripoorna Somasundaram, Jeeva Susan Abraham, Ravi Toteja, **Seema Makhija**, Renu Gupta (2016). Evaluation of acute toxicity of heavy metals and the activity of antioxidant enzymes in freshwater ciliates. Protistology, 10 (2), 77.
15. Ravi Toteja, **Seema Makhija**, S. Sripoorna, Jeeva Susan Abraham and Renu Gupta (2017) Influence of Copper and Cadmium Toxicity on the Activity of an Antioxidant Enzyme, Superoxide Dismutase in Freshwater Ciliates. Indian Journal of Experimental Biology, 55: 694–701.
16. Ashish Choudhary, Jeeva Susan Abraham, S. Sripoorna, Manu Sankar, Vikas Ahlawat,

- Renu Gupta, **Seema Makhija**, Ravi Toteja (2016) Evaluation of the cytotoxic effect of pesticide malathion on freshwater ciliate, *Tetmemena* sp. DU Journal of undergraduate research and innovation, 2 (1): 20–30.
17. Ilmas Naqvi, Renu Gupta, **Seema Makhija**, Ravi Toteja, Jeeva S Abraham, S. Sripoorna and Hameed A.El-Serehy (2016) Morphology and morphogenesis of a new oxytrichid ciliate, *Notohymena limus* n. sp. (Ciliophora, Oxytrichidae) from Delhi, India. Saudi Journal of Biological Sciences, 23 (6): 789-794.
 18. Alan Warren, David J. Patterson, Micah Dunthorn, John C. Clamp, Undine E.M. Achilles-Day, Erna Aesch, Saleh A. Al-Farraj, Saleh Al-Quraishy, Khaled Al-Rasheid, Martin Carr, John G. Day, Marc Dellinger, Hamed A. El-Serehy, Yangbo Fan, Feng Gao, Shan Gao, Jun Gong, Renu Gupta, Xiaozhong Hu, Komal Kamra, Gaytha Langlois, Xiaofeng Lin, Diana Lipscomb, Christopher S. Lobban, Pierangelo Luporini, Denis H. Lynn, Honggang Ma, Miroslav Macek, Jacqueline Mackenzie-Dodds, **Seema Makhija**, Robert I. Mansergh, Mercedes Martín-Cereceda, Nettie McMiller, David Montagnes, Svetlana Nikolaeva, Geoffrey Odhiambo Ong'ondo, Blanca Pérez-Uz, Jasmine Purushothaman, Pablo Quintela-Alonso, Johana Rotterová, Luciana Santoferrara, Chen Shao, Zhuo Shen, Xinlu Shi, Weibo Song, Thorsten Stoeck, Antonietta La Terza, Adriana Vallesi, Mei Wang, Thomas Weisse, Krzysztof Wiackowski, Lei Wu, Kuidong Xu, Zhenzhen Yi, Rebecca Zufall, Sabine Agatha (2016) Beyond the “Code”: A Guide to the Description and Documentation of Biodiversity in Ciliated Protists (Alveolata, Ciliophora). Journal of Eukaryotic Microbiology, 64: 539–554.
 19. Jeeva Susan Abraham, S. Sripoorna, Ashish Choudhary, Ravi Toteja, Renu Gupta, **Seema Makhija** and Alan Warren (2017) Assessment of Heavy Metal Toxicity in Four Species of Freshwater Ciliates (Spirotrichea; Ciliophora) from Delhi, India. Current Science, 113 (11): 2141–2150.
 20. Renu Gupta, Jeeva Susan Abraham, Sripoorna Somasundaram, Ravi Toteja, **Seema Makhija** and Hamed A El-Serehy (2017) Taxonomic and Morphogenetic description of freshwater ciliate *Aponotohymena isoautralis* n. sp. (Ciliophora; Oxytrichidae) isolated from Sanjay Lake, Delhi, India. *Acta Protozoologica*, 56: 93-107.
 21. Sripoorna Somasundaram, Jeeva Susan Abraham, Swati Maurya, **Seema Makhija**, Renu Gupta and Ravi Toteja (2018) Cellular and molecular basis of heavy metal-induced stress in ciliates. Current Science, 114: 1858–1865.
 22. S. Sripoorna, Jeeva Susan Abraham, Swati Maurya, Hritik Kadian, Juhi Jaiswal, **Seema Makhija**, Ravi Toteja (2017) Ultraviolet B induced protection strategies in unicellular eukaryotic microbes *Blepharisma* sp. and *Notohymena* sp. (Protista). DU Journal of undergraduate research and innovation, 3:60–73.
 23. Jeeva Susan Abraham, S. Sripoorna, Swati Maurya, **Seema Makhija**, Renu Gupta, Ravi Toteja (2019) Techniques and tools for species identification in ciliates: A review. *International Journal of Systematic and Evolutionary Microbiology*, 003176.
 24. Jeeva Susan Abraham, Sripoorna Somasundaram, Shiv Jangra, Anit Kumar, Khushi

Yadav, Simran Singh, Anusha Goyal, Swati Maurya, Geetu Gambhir, Ravi Toteja, Renu Gupta, Dileep K. Singh, Hamed A. El-Serehy, Fahad A. Al-Misned, Saleh A. Al-Farraj, Khaled A. Al-Rasheid, Saleh A. Maooda **and Seema Makhija (2019)** Soil ciliates of the Indian Delhi Region: Their community characteristics with emphasis on their ecological implications as sensitive bio-indicators for soil quality. *Saudi Journal of Biological Sciences*, 26(6): 1305-1313.

25. Sripoorna Somasundaram, Jeeva Susan Abraham, Swati Maurya, Ravi Toteja, Renu Gupta and **Seema Makhija (2019)** Expression and molecular characterization of stress-responsive genes (*hsp70* and *Mn-sod*) and evaluation of antioxidant enzymes (CAT and GPx) in heavy metal exposed freshwater ciliate, *Tetmemena* sp. *Molecular Biology Reports*, 46: 4921-4931.
26. Komal Karma, Harpreet Kaur, Jeeva Susan Abraham, Sripoorna Somasundaram, **Seema Makhija**, Ravi Toteja, Alan Warren and Renu Gupta (2020). Symposium Report: International Symposium on Ciliate Biology, India Habitat Centre, New Delhi, India, 04–06 April 2018. *Journal of Eukaryotic Microbiology*, 67: 296-299.
27. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Swati Maurya, Ravi Toteja, **Seema Makhija**, Fahad A. Al-Misned, Hamed A. El-Serehy (2020). Description of a new species of *Tetmemena* (Ciliophora, Oxytrichidae) using classical and molecular markers. *Journal of King Saud University-Science* (in press).

GENEBANK SUBMISSIONS

1. Abraham, J. S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2015) *Notohymena* sp. SL1 18S rRNA gene, partial sequence. Acc no. KP336402.1.
2. Abraham, J. S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2015) *Pseudourostyla cristata* strain SL2 18S ribosomal RNA gene, partial sequence. Acc. No. KT731104.
3. Abraham, J. S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2015) *Gastrostyla* sp. Y2 18S ribosomal RNA gene, partial sequence. Acc. No. KT780432.
4. Somasundaram, S., Abraham, J. S., Gupta, R., Makhija, S. and **Toteja, R.** (2015) *Tetmemena* sp. Y1 18S rRNA gene, partial sequence. Acc no. KP336401.1.
5. Somasundaram, S., Abraham, J. S., Gupta, **R., Toteja, R.** and Makhija, S. (2015) *Tetmemena* sp. Y1 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, internal transcribed spacer 2, complete sequence; 28S ribosomal gene, partial sequence. Acc. No. KT731103.
6. Somasundaram, S., Abraham, J. S., **Toteja, R.**, Makhija, S. and Gupta, R. (2016) *Tetmemena* sp. Y1 histone H4 gene, partial cds. **Acc. No. KU761846.**
7. Abraham, J. S., Somasundaram, S., Makhija, S., **Toteja, R.** and Gupta, R. (2016) *Oxytricha granulifera* 18S ribosomal RNA gene, partial sequence. **Acc. No. KU715983.**
8. Makhija, S., Gupta, R., **Toteja, R.**, Abraham, J. S. and Somasundaram,

- S. (2016) *Paraurostyla coronata* 18S ribosomal RNA gene, partial sequence. **Acc. No. KU715982.**
9. Abraham, J. S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2017). *Gastrostyla* sp. Y2 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, internal transcribed spacer 2, complete sequence; 28S ribosomal gene, partial sequence. **Acc. No. KX589056.**
 10. Abraham, J.S., Somasundaram, S., Makhija, S., Gupta, R. and **Toteja, R.** (2017). *Euplotes aediculatus* strain SL3 small subunit ribosomal RNA gene, partial sequence. **Acc. No. KX867113.**
 11. Abraham, J.S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2017). *Euplotes woodruffi* strain WB2 small subunit ribosomal RNA gene, partial sequence. **Acc. No. KX867114.**
 12. Somasundaram, S., Abraham, J.S., **Toteja, R.**, Makhija, S. and Gupta, R. (2017). *Tetmemena* sp. Y1 heat shock protein 70 (hsp70) gene, partial cds; macronuclear. **Acc. No. KY038460.**
 13. Abraham, J.S., Somasundaram, S., Gupta, R., Makhija, S. and **Toteja, R.** (2017) *Notohymena australis* small subunit ribosomal RNA gene, partial sequence. **Acc. No. MF804419.**
 14. Somasundaram, S., Abraham, J.S., **Toteja, R.**, Makhija, S. and Gupta, R. (2017) *Euplotes aediculatus* heat shock protein 70 (hsp70) gene, partial cds. **Acc. No. MF804420.**
 15. Abraham, J.S., Somasundaram, S., Makhija, S., Gupta, R. and **Toteja, R.** (2017) *Oxytricha granulifera* 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence. **Acc. No. MG206235.**
 16. Abraham, J.S., Somasundaram, S., Gupta, R., **Toteja, R.** and Makhija, S. (2017) *Sterkiella* sp. small subunit ribosomal RNA gene, partial sequence. **Acc. No. MG206236.**
 17. Abraham, J.S., Somasundaram, S., Maurya, S., Makhija, S., **Toteja, R.** and Gupta, R. (2018) *Notohymena australis* small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MG827399.**
 18. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Makhija, S. and **Toteja, R.** (2018). *Paraurostyla coronata* strain SL6 small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1 and 5.8S ribosomal RNA gene, complete sequence; and internal transcribed spacer 2, partial sequence. **Acc. No. MG827375.**
 19. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., **Toteja, R.** and Makhija, S. (2018) *Euplotes* sp. strain SLS1 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MG827339.**
 20. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Makhija, S. and **Toteja, R.** (2018) *Colpoda* sp. strain ANDCS1 small subunit ribosomal RNA gene, partial

sequence. **Acc. No. MG827338.**

21. Somasundaram, S., Abraham, J.S., Maurya, S., **Toteja, R.**, Makhija, S. and Gupta, R. (2018) *Tetmemena* sp. Y1 superoxide dismutase gene, partial sequence. **Acc. No. MG859289.**
22. Gupta,R., Abraham,J.S., Somasundaram,S., Rizvi,S., Bhayana,T., Kajal,K., Dadhich,P., Singh,M., Thakur,S., Yadav,A., Maurya,S., Makhija,S. and **Toteja,R.** (2018). *Blepharisma* sp. small subunit ribosomal RNA gene, partial sequence. **Acc. No. MG832820.**
23. Gupta,R., Abraham,J.S., Somasundaram,S., Rizvi,S., Bhayana,T., Kajal,K., Dadhich,P., Singh,M., Thakur,S., Yadav,A., Maurya,S., Makhija,S. and **Toteja,R.** (2018). *Blepharisma* sp. small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1 and 5.8S ribosomal RNA gene, complete sequence; and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MG832821.**
24. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Dexiotricha* sp. isolate OBS small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK354012.**
25. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Pseudourostyla cristata* isolate OBS4 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK.354016**
26. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Diaxonella* sp. isolate OBS3 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK354015.**
27. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Uroleptus gallina* isolate OBS2 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK354014.**
28. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Blepharisma sinuosum* isolate OBS1 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK354013.**
29. Abraham, J.S., Somasundaram, S., Maurya, S., **Toteja, R.**, Gupta, R. and Makhija, S. (2019) *Anteholosticha* sp. isolate RJ small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 2, partial sequence. **Acc. No. MK354021.**
30. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., **Toteja, R.** and Makhija, S. (2019) *Spirostomum minus* isolate OBS7 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK968523.**
31. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., **Toteja, R.** and Makhija, S. (2019) *Cryptomonas paramecium* isolate OBS6 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MK968522.**
32. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., **Toteja, R.** and Makhija, S. (2019) *Euplotes* sp. OBS1 small subunit ribosomal RNA gene, partial sequence; internal

- transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MK990562.**
33. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Euplotes aediculatus* isolate FW small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MK990563.**
34. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Euplotes* sp. OBS2 small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MK990564.**
35. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Pseudourostyla cristata* isolate OBS FW small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence. **Acc. No. MN006033.**
36. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Euplotes* sp. isolate OBS2 small subunit ribosomal RNA gene, partial sequence. **Acc. No. MN038061.**
37. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Makhija, S. and Toteja, R. (2019) *Tetmemena* sp. Y1 cytochrome c oxidase subunit 1 (COI) gene. **Acc. No. MN027505.**
38. Abraham, J.S., Somasundaram, S., Maurya, S., Makhija, S., Toteja, R. and Gupta, R. (2019) *Euplotes aediculatus* cytochrome c oxidase subunit 1 (COI) gene. **Acc. No. MN027506.**
39. Abraham, J.S., Somasundaram, S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Euplotes* sp. OBS1 cytochrome c oxidase subunit 1 (COI) gene. **Acc. No. MN027507.**
40. Somasundaram, S., Abraham, J.S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Euplotes aediculatus* catalase gene. **Acc. No. MN044623.**
41. Somasundaram, S., Abraham, J.S., Maurya, S., Gupta, R., Toteja, R. and Makhija, S. (2019) *Tetmemena* sp. Y1 catalase gene. **Acc. No. MN207909.**
42. Abraham, J.S., Somasundaram, S., Maurya, S., Makhija, S., Gupta, R. and Toteja, R. (2019) *Euplotes* sp. OBS2 cytochrome c oxidase subunit 1 (COI) gene. **Acc. No. MN243924.**

BOOK:

Renu Gupta, **Seema Makhija** and Ravi Toteja (2018). *Cell Biology Practical Manual*. Prestige Publishers.

BOOK CHAPTER:

Jasmine Purushothaman, Bindu, L, **Seema Makhija**, Ravi Toteja and Renu Gupta (2017). Protozoa: Ciliophora (Ciliates). In K. Chandra, K.C. Gopi, D.V. Rao, K. Valarmathi and J.R.B. Alfred (Eds.), *Current Status of Freshwater Faunal Diversity in India* (pp 37-54). Zoological survey of India, Kolkata.

Conference / Presentations /Workshops

CONFERENCE PAPERS

1. **Makhija S**, Gupta R and Sapra G.R. (2000) Inhibition of membrane associated cellular functions by cadmium chloride in unicellular ciliates – **International Congress on Differentiation and Cell Biology** held in Goldcoast, Australia.
2. Gupta, R., Kamra, K., **Arora, S.**, Sapra, G.R. (2001) *Pleurotricha yamunii* n. sp., a new hypotrich ciliate: description and systematic relationships. **Proc. XI International Congress of Protozoology**, Salzburg, Austria, p.46.
3. **Arora, S.**, Gupta, R., Machwe, S., Sapra, G.R. (2001) Lithium chloride induces alteration in the ciliary pattern of ciliated protozoa, *Stylonychia*. **Proc. XI International Congress of Protozoology**. Salzburg, Austria, p.59.
4. Gupta, R., **Arora, S.**, Kamra, K., Sapra, G.R. (2001) Characterization of nine species of *Stylonychia* (including three new descriptions) from Delhi, India. **Proc. XI International Congress of Protozoology** Salzburg, Austria, p.83.
5. **Arora, S.**, Gupta, R., Sapra, G.R. (2002) Developmental toxicity of lithium in the ciliate *Stylonychia*. **Proc. VI Asian Conference on Ciliate Biology**. Tsukuba, Japan, p.47.
6. Gupta, R., **Arora, S.**, Kamra, K., Sapra, G.R. (2002) Biodiversity of genus *Oxytricha* in Delhi region of the Indian Subcontinent. **Proc. VI Asian Conference on Ciliate Biology**. Tsukuba, Japan, p.25.
7. **Makhija, S.**, Gupta, R. and Sapra, G.R. (2007) Ultrastructural changes in *Stylonychia* (Hypotrichida; Oxytrichidae) exposed to cadmium. **International Symposium on Ciliate Biology**, S.G.T.B. College, University of Delhi.
8. **Makhija, S.**, Gupta, R. and Sapra, G.R. (2007) Modification of the cortical pattern by metals in the ciliate, *Stylonychia lemnae*. **International Symposium on Ciliate Biology**, S.G.T.B. College, University of Delhi.
9. **Makhija, S.**, Gupta, R. and Sapra, G.R. (2007) Inhibition of Membrane Associated cellular functions by cadmium in unicellular ciliates. **International Symposium on Ciliate Biology**, S.G.T.B. College, University of Delhi.
10. Gupta, R., **Makhija, S.** and Sapra, G.R. (2007) Occurrence of a new oxytrichid genus

(Ciliophora, Hypotrichida) from Moradabad, UP, India, **International Symposium on Ciliate Biology**, S.G.T.B. College, University of Delhi.

11. Gupta, R., **Makhija, S.**, Borgohain, P. and Sapra, G. R. (2007) Morphology and Morphogenesis of a new species of the genus *Sterkiella* (Ciliophora: Hypotrichida) from Delhi, India. **International Symposium on Ciliate Biology**, S.G.T.B. College, University of Delhi.
12. Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja, Renu Gupta and **Seema Makhija (2013) “Bio-Monitoring heavy metal pollution in fresh water bodies by single celled eukaryotic microorganisms”** in Annual Conference of Association of Microbiologists of India (AMI-2013) held at Maharshi Dayanand Univesity, Rohtak Haryana, November 17-20, 2013.
13. S. Sripoorna, Jeeva Susan Abraham, **Seema Makhija**, Renu Gupta and **Ravi Toteja (2013) “Ciliate microbial biodiversity at Sanjay Lake, Delhi”** in Annual Conference of Association of Microbiologists of India (AMI-2013) held at Maharshi Dayanand Univesity, Rohtak Haryana, November 17-20, 2013.
14. **Seema Makhija**, Renu Gupta and Ravi Toteja (2014) “Diverse freshwater ciliate Fauna from Okhla Bird Sanctuary, Delhi, India. 3rd IRCN-BC Workshop held at Royal Holloway, University of London, U.K.
15. Renu Gupta, **Seema Makhija** and Ravi Toteja (2014) Soil ciliate (Protozoa, Ciliophora) Diversity in and around Delhi, India. 3rd IRCN-BC Workshop held at Royal Holloway, University of London, U.K.
16. Jeeva Susan Abraham, Renu Gupta, S. Sripoorna, Ravi Toteja and **Seema Makhija (2014)** Morphology, Morphogenesis and Molecular Phylogeny of *Notohymena* sp. (Ciliophora; Oxytrichidae) isolated from Sanjay Lake, Delhi, India, 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India.
17. S. Sripoorna, **Seema Makhija**, Jeeva Susan Abraham, Renu Gupta and Ravi Toteja (2014) Inferring Phylogenetic Position of an Indian Isolate *Tetmemena* sp. (Ciliophora, Oxytrichidae) Using Morphological, Morphogenetic and Molecular Markers. 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India.
18. Ravi Toteja, **Seema Makhija**, S. Sripoorna, , Jeeva Susan Abraham and Renu Gupta and (2014) Influence of Copper and Cadmium Toxicity on the Activity of an Antioxidant Enzyme, Superoxide Dismutase in Freshwater Ciliates. 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India.
19. Renu Gupta, **Seema Makhija**, Ravi Toteja, Jeeva Susan Abraham and S. Sripoorna (2014) Oxytrichid ciliate biodiversity from the river Yamuna, Delhi, India. 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India.

20. S. Sripoorna, Jeeva Susan Abraham, Renu Gupta, Ravi Toteja and **Seema Makhija** (2015) Characterization of cadmium induced hsp70 gene in *Tetmemena* n. sp. and its use as a molecular marker for heavy metal toxicity. Ciliate Molecular Biology held at Camerino, Italy, July 10-16, 2015.
21. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja and **Seema Makhija** (2015) Morphology, morphogenesis and molecular phylogeny of two new species of class spirotrichea collected from Sanjay Lake in Delhi, India. Ciliate Molecular Biology held at Camerino, Italy, July 10-16, 2015.
22. Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja, Renu Gupta and **Seema Makhija** (2015) Metallothionein, TmMCd, induction in presence of cadmium in the spirotrich ciliate, *Tetmemena* n. sp. Ciliate Molecular Biology held at Camerino, Italy, July 10-16, 2015.
23. Jeeva Susan Abraham, S. Sripoorna, Renu Gupta, Ravi Toteja and **Seema Makhija** (2015) Phylogenetic relationships among the Spirotrich ciliates from the Indian Subcontinent inferred from small subunit rRNA gene sequence. 4th workshop sponsored by the International Research Coordination Network for Biodiversity of Ciliates held at Qingdao, China, October 19-21, 2015.
24. S. Sripoorna, Jeeva Susan Abraham, Renu Gupta, Ravi Toteja and **Seema Makhija** (2015) Taxonomic evaluation of *Tetmemena* sp. by morphological and multiple markers to assess its phylogeny. 4th workshop sponsored by the International Research Coordination Network for Biodiversity of Ciliates held at Qingdao, China, October 19-21, 2015.
25. Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja, Renu Gupta and **Seema Makhija**. A study on freshwater hypotrich ciliates using morphological and molecular markers: an evolutionary perspective. XL All India Cell Biology Conference and International Symposium on Functional Genomics and Epigenetics held at Jiwaji University, Gwalior, from November 17-19, 2016.
26. S. Sripoorna, Jeeva Susan Abraham, Ravi Toteja, Renu Gupta and **Seema Makhija**. Use of ciliates as bioindicators to assess heavy metal pollution in freshwater bodies. XL All India Cell Biology Conference and International Symposium on Functional Genomics and Epigenetics held at Jiwaji University, Gwalior from November 17-19, 2016.
27. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Sheeba, Tanya Bhayana, Kirti Kajal, Prachi Dadhich, Megha Singh, Sadhika Thakur, Anjali Yadav, **Seema Makhija** and Ravi Toteja. Insights into the phylogeny of *Blepharisma* sp. using small subunit ribosomal rRNA gene sequences. XL All India Cell Biology Conference and International Symposium on Functional Genomics and Epigenetics held at Jiwaji University, Gwalior, from November 17-19, 2016.
28. Jeeva Susan Abraham, Sripoorna Somasundaram, Renu Gupta, Ravi Toteja, Hamed A El-Serehy, **Seema Makhija**. Morphology and molecular taxonomy of ciliates from freshwater bodies in Delhi, India. 15th International congress of protistology held at

- Prague, Czech Republic, from 30th July- 4th August, 2017.
29. Sripoorna Somasundaram, Jeeva Susan Abraham, Ravi Toteja, Renu Gupta, **Seema Makhija**. Cellular and molecular mechanisms to assess heavy metal toxicity in the freshwater ciliate, *Euplotes aediculatus* from Delhi, India. 15th International congress of protistology held at Prague, Czech Republic, from 30th July- 4th August, 2017.
 30. Ravi Toteja, Jeeva Susan Abraham, Sripoorna Somasundaram, Geetu Gambhir, Dileep K Singh, **Seema Makhija**. Soil ciliate (Protozoa; Ciliophora) diversity in and around Delhi, India and its ecological implications. 15th International congress of protistology held at Prague, Czech Republic, from 30th July- 4th August, 2017.
 31. S. Sripoorna, Jeeva Susan Abraham, Swati Maurya, Ravi Toteja, **Seema Makhija** and Renu Gupta. Use of ciliates in biomonitoring heavy metal pollution. Indian Network for Soil Contamination Research International Conference, Department of Zoology, University of Delhi, Delhi from 26th-28th September, 2017.
 32. Renu Gupta, **Seema Makhija**, Jeeva Susan Abraham, Sripoorna Somasundaram and Ravi Toteja. Soil ecosystem – an insight into ciliate diversity from Delhi. Indian Network for Soil Contamination Research International Conference, Department of Zoology, University of Delhi, Delhi from 26th-28th September, 2017.
 33. Jeeva Susan Abraham, S. Sripoorna, Renu Gupta, Ravi Toteja, Swati Maurya, Geetu Gambhir, D. K. Singh and **Seema Makhija**. Physico-chemical and biological analysis of soil samples collected from different sites in and around Delhi, India. Indian Network for Soil Contamination Research International Conference, Department of Zoology, University of Delhi, Delhi from 26th-28th September, 2017.
 34. Jeeva Susan Abraham, S. Sripoorna, Swati Maurya, Ravi Toteja, **Seema Makhija** and Renu Gupta. Phylogenetic study of three spirotrich ciliates using modern biological techniques: an integrated approach. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 35. S. Sripoorna, Jeeva Susan Abraham, Swati Maurya, Ravi Toteja, Renu Gupta and **Seema Makhija**. Molecular characterization of heat-shock protein in ciliates. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 36. **Seema Makhija**, Swati Maurya, Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja and Renu Gupta and. Molecular characterization of heat-shock protein in ciliates. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 37. Jeeva Susan Abraham, Renu Gupta, S. Sripoorna, Swati Maurya, Shiv Jangra, Anit Kumar, Ravi Toteja and **Seema Makhija**. Biodiversity of soil ciliates from in and around Delhi, India. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 38. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Sheeba, Tanya Bhayana, Kirti Kajal,

- Anjali Yadav, Bhawana Kumari, **Seema Makhija** and Ravi Toteja. Molecular phylogeny of *Blepharisma* sp. based on sequence analysis of 18S rDNA and ITS gene. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
39. HarshVardhan Sahu, Vanya Garg, Khushboo, S. Sripoorna, Jeeva Susan Abraham, Swati Maurya, **Seema Makhija**, Ravi Toteja and Renu Gupta. A study on the process of regeneration in ciliate, *Tetmemena* sp. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 40. S. Sripoorna, Jeeva Susan Abraham, Swati Maurya, Hritik Kadian, Juhi Jaiswal, **Seema Makhija** and Ravi Toteja. Ultraviolet B (UVB) induced changes in eukaryotic microbe, ciliates. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 41. Swati Maurya, Jeeva Susan Abraham, S. Sripoorna, **Seema Makhija**, Renu Gupta and Ravi Toteja. Role of Ciliates to monitor the efficacy of Sewage Treatment Plant: A Review. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 42. Ravi Toteja, **Seema Makhija**, S. Sripoorna, Jeeva Susan Abraham, Swati Maurya and Renu Gupta. Transcriptomic analysis of heavy metal induced changes in gene expression in freshwater ciliates. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 43. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Swati Maurya, Ilmas Naqvi, Ravi Toteja **and Seema Makhija**. Faunistic study on the freshwater ciliates of Delhi, India. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 44. **Seema Makhija**, Ravi Toteja, S. Sripoorna, Jeeva Susan Abraham, Swati Maurya and Renu Gupta. An overview of progression of ciliate biology research at University of Delhi. International Symposium on Ciliate Biology (ISCB), University of Delhi from 4th-6th April (2018) at India Habitat Centre, New Delhi, Delhi, India.
 45. Sripoorna Somasundaram, Jeeva Susan Abraham, Swati Maurya, Ravi Toteja, **Seema Makhija**, Renu Gupta. Genetic and molecular mechanisms to cope oxidative stress in freshwater ciliates. 5th Joint meeting of PSA/ISOP from 29th July to 2nd August, 2018 at University of British Columbia, Vancouver, Canada.
 46. Jeeva Susan Abraham, Sripoorna Somasundaram, Swati Maurya, **Seema Makhija**, Ravi Toteja, Renu Gupta. Taxonomic description and molecular phylogeny of three species of genus *Euplotes*: First report from Delhi, India. 5th Joint meeting of PSA/ISOP from 29th July to 2nd August, 2018 at University of British Columbia, Vancouver, Canada.

NATIONAL CONFERENCE PAPERS

47. Gupta R, **Arora S** and Sapra GR. (1994) Morphology and morphogenesis of *S. notophora* (Ciliophora, Hypotrichida) – All India Cell Biology Conference.
48. **Arora S**, Gupta R, Sapra GR, Mehra N.K. (1996) Ultrastructural changes induced by cadmium in *S. mytilus* – All India Conference on Electron Microscopy.
49. Gupta R, **Arora S** and Sapra GR. (1997) Morphic shifts induced by changes in food size and availability in *S. notophora* (Ciliophora, Hypotrichida) – All India Cell Biology Conference.
50. **Arora S**, Gupta R and Sapra GR. (1997) Cadmium induced cortical aberration in *S. mytilus* (Ciliophora, Hypotrichida) – All India Cell Biology Conference.
51. Machwe S, **Makhija S**, Gupta R and Sapra GR. (2000) Stress-induced proteins in *Stylonychia* exposed to the metals, cisplatin and cadmium. All India Cell Biology Conference.
52. **Makhija S.** and Gupta R. (2003) Relationship between sensitivity of enzymatic activities and survival to Cadmium in two species of the Ciliate Protozoan *Stylonychia* - All India Cell Biology Conference.
53. Prateek Kumar, Kritika Shukla, Parveen Atrish, Jeeva Susan Abraham, **Seema Makhija** and Ravi Toteja (2013) Use of Bioluminescent Ciliate Sensors as an Alternative Method for Measuring Heavy Metals in Fresh Water Samples. National Conference, Redefining Science Teaching: Future of Education held at University of Delhi South Campus, March 7-9, 2013.
54. Ashish Choudhary, Manu Sankar, Vikas Ahlawat, Jeeva Susan Abraham, S. Sripoorna, **Seema Makhija** and Ravi Toteja (2015). A low cost microbiotest for detecting insecticides by exploring behavioural and ecotoxicological response of freshwater ciliates. Recent trends in Biology organized by Department of Zoology, Maitreyi College, University of Delhi, New Delhi, India.
55. Renu Gupta, Jeeva Susan Abraham, S. Sripoorna, Bhawana Kumari, Shivangani Lohani, Divya Ojha, Ranjeeta Bhujbal, **Seema Makhija** and Ravi Toteja (2015) Elucidation of phylogenetic status of *Blepharisma* sp. from Delhi, India: Congruence of classical and molecular markers. Recent trends in Biology organized by Department of Zoology, Maitreyi College, University of Delhi, New Delhi, India.
56. Shiv Jangra, Khushi, Simran, Sidhanth Zutshi, Bhupender Singh, Jyoti Dagar, Anit Kumar, Anusha Goyal, Muskan Bhatnagar, Meenu Upadhaya, Jeeva Susan Abraham, S. Sripoorna, Ashish Choudhary, Ravi Toteja, **Seema Makhija**, Geetu Gambhir and Renu Gupta (2016) A Study on physico-chemical analysis of soil samples collected from various sites in and around Delhi. National Symposium on Man-Made diseases: an urban menace organized by Department of Zoology, Maitreyi College, University of Delhi, New Delhi, India.
57. Shiv Jangra, Khushi, Simran, Sidhanth Zutshi, Bhupender Singh, Jyoti Dagar, Anit Kumar, Anusha Goyal, Muskan Bhatnagar, Meenu Upadhaya, Jeeva Susan Abraham, S. Sripoorna, Ashish Choudhary, Ravi Toteja, **Seema Makhija**, Geetu Gambhir and Renu

- Gupta (2016) Ciliate diversity as a cellular tool to assess soil quality. National Symposium on Man-Made diseases: an urban menace organized by Department of Zoology, Maitreyi College, University of Delhi, New Delhi, India.
58. Shiv Jangra, Khushi, Simran, Sidhanth Zutshi, Bhupender Singh, Jyoti Dagar, Anit Kumar, Anusha Goyal, Muskan Bhatnagar, Meenu Upadhaya, Jeeva Susan Abraham, S. Sripoorna, Ashish Choudhary, Ravi Toteja, **Seema Makhija**, Geetu Gambhir and Renu Gupta (2016) Community characteristics of soil ciliates collected from three different sites in Acharya Narendra Dev College, University of Delhi. Proceedings on second national symposium on Environment: Greener Future and Awareness, Department of Zoology, Deshbandhu college, University of Delhi, New Delhi, India, March 19, 2016.
59. Pranjal Sharma, Deepika Joshi, Swati Maurya, Jeeva Susan Abraham, S. Sripoorna, Ravi Toteja, Renu Gupta, **Seema Makhija** (2019) Ciliates as bioindicators of Leachate at Health: Future Prespective. Biotechnology in present era: Impact on human life and environment held at Maitreyi College, University of Delhi.
60. Ruchika Bhardwaj, Deepanshu Vats, Rajanshi Mishra, Naeem Ahmed, Shushank ,MustabinAhmed , Swati Maurya, S. Sripoorna, Jeeva Susan Abraham, Ravi Toteja, Renu Gupta, **Seema Makhija** (2019) Insight into the Genome of ciliate, *Colpodaspto* assess its role in environmental biomonitoring at Health: Future Prespective. Biotechnology in present era: Impact on human life and environment held at Maitreyi College, University of Delhi.

CONFERENCES/WORKSHOPS/SYMPOSIUM ATTENDED AND ORGANIZED

61. Organized and Attended National Symposium on **Biotechnology: Expanding Horizons** organized by Acharya Narendra Dev College and held at INSA auditorium (2003).
62. Participated in the 5th Annual Symposium on **Frontiers in Biomedical Research** held at Dr. B.R. Ambedkar Centre for Biomedical Research, University of Delhi (2004).\
63. Attended the National Symposium **Biohorizons 2004** organized by Indian Institute of Technology, Delhi (2004).
64. Attended National Seminar on **Recent Trends in Chemistry** held at Maitreyi College University of Delhi (2004).
65. Attended one day **Workshop on Bioinformatics** in the Department of Botany, North Campus, University of Delhi (2005).
66. Attended one day workshop on **Delhi State Level Symposium on Forensic Science** organized by S.G.T.B. Khalsa College, University of Delhi (2005).
67. Joint Secretary and also presented papers in the International symposium on **Ciliate Biology Biodiveristy, ultrastructure, development, genome and parasitism** organized by SGTB Khalsa College, University of Delhi (2007).
68. Resource person in a ten day workshop **Understanding complexities of life from molecules to system: Concepts and tools** for undergraduate students of Biology in the

college (2008).

69. Resource person in four day **Biology Laboratory Course Workshop**, B.Sc. Programme LSIII, organized by Institute of Life Long Learning, University of Delhi and Acharya Narendra Dev College (2008).
70. Participated in five day **Wikied'09 Workshop**, organized by Acharya Narendra Dev College and CEMCA (2009).
71. **Preparation of online quizzes on Life Sciences subjects**, organized by Institute of Life Long Learning (ILLL), University of Delhi (2009).
72. Part of the Organizing Committee of two day National Symposium on **Chemistry in Biology: The Future of Life Sciences** organized by Acharya Narendra Dev College, University of Delhi at India International Centre, New Delhi (2010).
73. Participated in Three week workshop entitled "**Easy Now - A Course Material Preparation Module**" held at Acharya Narendra Dev College. The course material is uploaded on website <http://eduframe.net/andc> (2010).
74. Participated in six day **Easy Now Workshop on Multimedia Content Development**, organized by Acharya Narendra Dev College and CEMCA (2010).
75. Member of the organizing committee for organizing two day workshop on **Hands on Training, Molecular Phylogenetics: Understanding Evolutionary Histories**, (Workshop for Students) on organized in Acharya Narendra Dev College (2011).
76. Attended five day workshop on **Science Education and Research** co-organized by Vidya Bhavan Society and Acharya Narendra Dev College (2012).
77. Attended one day seminar on **Use of Animals in Education and Research** held at Department of Zoology, University of Delhi (2012).
78. Coordinator of one day workshop on practical related to paper **Evolutionary Biology** to be held at SGTB Khalsa College, University of Delhi (2013).
79. Member of the organizing committee of **9th Asian Congress on Ciliate Biology and 2nd Asian Congress of Protistology** to be held at University of Kalyani, West Bengal (2014)
80. Served as a member of the organizing committee in the **International Symposium on Ciliate Biology (ISCB)** and as coordinator in the Workshop on '**Tools and Techniques Used in Ciliate Studies**' held on 6th April 2018, at the India Habitat Centre, Delhi organized by Zoological Survey of India and ISCB 2018.
81. Organized a workshop on **Hands – on Training of ELISA Technique** on 13th February, 2019 at Acharya Narendra Dev College.
82. Served as a convener in six day interdisciplinary workshop on **Learning Science by Doing Science** from 18th to 24th June, 2019 at Acharya Narendra Dev College, University of Delhi.
83. Organized a three day workshop on **Learning Science in collaboration with National Bal Bhavan** from 17th to 19th July, 2019 at Acharya Narendra Dev College, University of Delhi.
84. Served as a resource person in two week national summer training – cum – workshop on

Fundamentals of Microbiology (Basic) from 27th to 12th July, 2019 at Deen Dayal Upadhyaya College, University of Delhi.

85. Organized a **Biar Initiative: A School Outreach Program for Enrichment** on 21st October, 2019 at government senior secondary school, Bani, Himachal Pradesh.

86. Organized a **Bani School Innovation Camp IV (Basic IV), 2019 Dream School** on 22nd October, 2019 at government senior secondary school, Bani, Himachal Pradesh.

87. Organized a workshop on **Molecular Biology Techniques** on 22nd November, 2019 at Acharya Narendra Dev College, University of Delhi.

88. Attended a **Global Bio- India 2019** from 21st to 23rd November, 2019 at Aerocity, New Delhi.

89. Participated in **ISW – 2020 International Summit on Women in STEM – “New Skylines”** from 23rd to 24th January, 2020 at Indian Habitat Centre, Lodhi Road, Delhi.

Research Projects (Major Grants/Research Collaboration)

1. “A study on heavy metal induced stress response at cellular and molecular level in ciliates for the development of a potential biosensor”. Sanctioned by Department of Science & Technology.
2. “Stress induced induction of metallothioneins (MTs) gene in ciliates and its use as biomarker to assess environmental pollution”. Sanctioned by University Grants Commission.
3. “Use of Bioluminescent Ciliate Sensors as an Alternative Method for Measuring Heavy Metals in Fresh Water Samples”. Sanctioned by Innovative Entrepreneurship Development Cell of Department of Science & Technology.
4. A low cost microbiotest for detecting insecticides by exploring behavioral and ecotoxicological response of fresh water ciliates. Submitted to Innovative Entrepreneurship Development Cell of Department of Science & Technology.

Awards and Distinctions

- Awarded **Meritorious Teachers’** award instituted by GNCT, Delhi in 2018.
- She has been a subject expert of the Committee constituted by University Grants Commission to evaluate B.Sc.(H) Zoology syllabus under CBCS with LOCF by UGC
- Co-authored a paper awarded as the **Best Poster Presentation** entitled, “Phylogenetic study of three spirotrich ciliates using modern biological techniques: an integrated approach” at International Symposium on Ciliate Biology (ISCB) organized by Delhi University colleges, Delhi, India (2018).
- Awarded the **Best Oral Presentation** for the research paper entitled “Inferring Phylogenetic Position of an Indian Isolate *Tetmemena* sp. (Ciliophora, Oxytrichidae) Using Morphological, Morphogenetic and Molecular Markers” at 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India (2014).

- Co-authored a paper awarded as the **Best Poster Presentation** entitled “Oxytrichid ciliate biodiversity from the river Yamuna, Delhi, India” at 2nd Asian congress of Protistology and Ninth Asian Conference on Ciliate Biology organized by Kalyani University, Kalyani, India (2014).
- Honoured and presented with “**DISTINGUISHED TEACHER AWARD**” by University of Delhi (2009).
- Council of Scientific and Industrial Research (CSIR)-**Research Associateship** (1999).
- German Science Federation - **Indian Council of Medical Research fellowship** to work in Germany (1995).
- CSIR-UGC-**NET** for Junior Research Fellowship (1993).
- Graduate Aptitude Test Examination (**GATE**) (1993)

Association With Professional Bodies

- Member of the organizing committee of **9th Asian Congress on Ciliate Biology and 2nd Asian Congress of Protistology** to be held at University of Kalyani, West Bengal (2014)
- Member of International Society of Protistologists (ISOP)
- Member of Indian Society of Cell Biology
- Member of Indian Network for Soil Contamination Research (INSCR)

Other Activities

- Member of Social Outreach Committee and NSS
- Member of Sashakt, a committee for female students. As a member of Sashakt, organized a self defense programme for female students
- Member of committee involved in restructuring the course contents of **Applied Biology and Biotechnology** for B.Sc. (Life Sci.) III year.

Signature of Faculty Member