




## Faculty Details proforma for DU Web-site

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<b>Educational Qualifications</b>						
<b>Degree</b>		<b>Institution</b>			<b>Year</b>	
<b>Ph.D.</b>		<b>University of Kalyani</b>			<b>1990</b>	
<b>M.Phil. / M.Tech.</b>						
<b>PG</b>		<b>University of Burdwan</b>			<b>1985</b>	
<b>UG</b>		<b>University of Burdwan</b>			<b>1983</b>	
<b>Any other qualification</b>						
<b>Career Profile</b>						
2008-present		Professor, Department of Zoology, University of Delhi, Delhi				
2000-08		Reader, Department of Zoology, University of Delhi, Delhi				
1996-2000		Senior Lecturer, Department of Zoology, University of Delhi, Delhi				
1992-96		Lecturer, Department of Zoology, University of Delhi, Delhi				
1990-92		Guest Lecturer, Department of Zoology, Vidyasagar University, West Bengal				
<b>Administrative Assignments</b>						
<b>Associated with Various Departmental Committees</b>						
<b>Areas of Interest / Specialization</b>						
<p>The area of my research interest is freshwater Aquaculture. I have broadly focused on two aspects of aquaculture - environmental and nutritional. I have standardized the technique of Recirculating aquaculture with reference to the use of filter bed materials and optimization of stocking density for carp larvae. Presently, we are working on the molecular characterization of ammonia oxidizing microbes</p>						

(bacteria and archaea) involved in the Recirculating system.

We have studied the impact of abiotic stressors like temperature, dissolved oxygen and UV-B radiation on the physiology (immune system, anti-oxidant enzymes, DNA damage, and expression of various stress related genes) of carp and catfish and its mitigation through enriched (supplemented with plant ingredients, specific amino acids, vitamins C and E) diets.

Immunostimulatory and disease resistance properties of seeds of *Achyranthes aspera* (Family: Ameranthaceae) have been evaluated in various carps in laboratory conditions. Dietary supplementation of seeds enhanced the growth rate of fishes. **Presently, we are evaluating the immunostimulatory properties of seeds and leaves of *Achyranthes aspera* in pond conditions using rohu as model species.**

We have developed the technique for mass production of zooplankton using organic manures.

We have studied the digestive enzyme profiles of carp larvae during ontogenic development. We have studied the digestive enzyme profiles of cold water species - Snow trout, Golden mahseer and Hill-trout in their natural habitat. **The culture technique of snow trout has been standardized.**

Trypsin from digestive systems (discarded part of fishery industry) of various carps has been purified. This purified enzyme has been characterized using biochemical and molecular techniques. The purified enzyme has immense application in food processing and detergent industries.

For the preparation of cost-effective feed for fish, we have studied the *in vitro* digestibility of various plant ingredients by different fish species using pH-stat method.

**Large scale production of freshwater macrophytes - *Lemna minor* and *Spirodela polyrrhiza* is successful in ponds.**

We are engaged in the preparation of cost-effective and easily digestible diets (sinking/floating) for fishes using Extrusion technique (to reduce/remove anti-nutritional factors) with freshwater macrophytes.

#### Subjects Taught

**Fish Biology: Fish Physiology, Limnology, Fisheries, Aquaculture**

**Ecology**

#### Research Guidance

1. Supervision of awarded Doctoral Thesis - 20
2. Supervision of Doctoral Thesis, under progress -7
3. Supervision of awarded M. Phil dissertations -14
5. Post-Doctoral students/ supervision - 3

## Publications Profile

### Books

1. Chakrabarti, R. 2013. Species Profile: catla (*Catla catla* Hamilton, 1822). In Aquaculture Feed and Fertilizer Resources Information System Rome, FAO ([www.fao.org/fishery/affris/en/](http://www.fao.org/fishery/affris/en/)).
2. Hasan, M. R. and Chakrabarti, R. 2009. Use of algae and aquatic macrophytes as feed in small-scale aquaculture: A review. FAO Fisheries Technical Paper No. 531, FAO, Rome, Italy, 123 pp. (<http://www.fao.org/docrep/012/i1141e/i1141e.pdf>)
3. Chakrabarti R. and Sharma, J. G. 2008. Aquahouse: New Dimension of Sustainable Aquaculture. Indian Council of Agricultural Research, I.C.A.R., New Delhi, India.

### Book Chapters

1. Chakrabarti, R. 2017. Culture of zooplankton and aquatic macrophytes as non-conventional livelihood. In: Aquaculture for Nutritional and Livelihood Security. Dhanze, R., Ninawe, A. S. and Dhanze, J. R. Narendra Publishing House, New Delhi, India, pp.189-203.
2. Chakrabarti, R. and Sharma, J. G. 2014. Digestive enzyme profile of carps: A overview. In: Advances in Fish Research (Ed. Goswami, U. C.), Vol. V. Narendra Publishing House, New Delhi, India, pp. 59-75.
3. Verma, N., Tripathi, S. K., Chakrabarti, R., Das, R. H. and Gautam, H. K. 2009. Partial characterization of a novel *Micrococcus* specific antimicrobial substance purified from a newly isolated bacterium: *Bacillus subtilis* RH 124. In: Antimicrobial Resistance: from Emerging Threat to Reality (Eds. Lawrance, R., Gulati, A. K. and Abraham, G.). Narosa Publishing House Pvt. Ltd. pp. 276-289.

### Research papers published in Refereed/Peer Reviewed Journals

1. Khangembam, B. K. and Chakrabarti, R. 2018. Viscera of *Labeo rohita*: a potential source of trypsin for industrial application. Journal of Aquatic Food Product Technology (*Taylor & Francis*, accepted).
2. Khangembam, C. D., Sharma, J. G. and Chakrabarti, R. 2017. Diversity and abundance of ammonia-oxidizing bacteria and archaea in a freshwater recirculating aquaculture system. Hayati Journal of Biosciences (*Elsevier*) 24: 215-220.
3. Sharma, J. G., Khan, N. A. and Chakrabarti, R. 2017. Effect of light intensity on the physiology of *Catla catla* larvae. In: Larvi'17, Fish and Shellfish Larviculture Symposium (Hendry, C. I. ed.), Book of Abstract and Short Communication pp.396-398.
4. Chakrabarti, R., Ngasainao, M. R. and Sharma, J. G. 2017. Embryonic and larval development of snow trout *Schizothorax richardsonii*. In: Larvi'17, Fish and Shellfish Larviculture Symposium (Hendry, C. I. ed.), Book of Abstract and Short Communication pp. 87-90.
5. Sharma, J. G., Singh, S.P. and Chakrabarti, R. 2017. Effect of temperature on digestive physiology, immune-modulatory parameters, and expression level of Hsp and LDH genes in *Catla catla* (Hamilton, 1822). Aquaculture (*Elsevier B.V.*) 479: 134-141.
6. Ngasainao, Nilssen, K. J. and Chakrabarti. 2017. Effect of dietary supplementation of vitamin C

- and seeds of *Achyranthes aspera* on physiology of snow trout *Schizothorax richardsonii*. Madridge Journal of Aquaculture Research & Development (*Madridge Publishers*). doi: 10.18689/mjard.2017-105
7. Khangembam, B. K., Ninawe, A. S. and Chakrabarti, R. 2016. Effect of cortisol and triiodothyronine bath treatments on the digestive enzyme profile and growth of *Catla catla* larvae during ontogenic development. *Aquaculture Research (John Wiley & Sons Ltd.)* 1-13 doi:10.1111/are.13054
  8. Sharma, J. G., Kumar, A., Saini, D., Targay, N. L., Khangembam, B. K. and Chakrabarti, R. 2015. *In vitro* digestibility study of some plant protein sources as aquafeed for carps *Labeo rohita* and *Cyprinus carpio* using pH-Stat method. *Indian Journal of Experimental Biology (NISCAR, CSIR)* 54: 606-611.
  9. Nilssen, K. J., Ngasainao, M. R., Sharma, J. G., Srivastava, S. K., Chandra, S., Moiranthem, K. S., Khangembam, B. K., Kumar, S. and Chakrabarti. 2015. Activities of digestive enzymes in relation to ingested natural food in three carp species of the Himalayan River Ladhiya, northern India. *Aquaculture Nutrition (Blackwell Science Ltd.)* 22: 1369-1373. doi: 10.1111/anu.12351
  10. Singh, S. P., Sharma, J. G., Ahmad, T. and Chakrabarti, R. 2015. Oxygen stress: Impact on innate immune system, antioxidant defence system and expression of HIF-1 $\alpha$  and ATPase 6 genes in *Catla catla*. *Fish Physiology & Biochemistry (Springer)*. DOI 10.1007/s10695-015-0168-0
  11. Basu, M., Paichha, M., Lenka, S. S., Chakrabarti, R. and Samanta, M., 2015. Hypoxic stress: impact on the modulation of TLR2, TLR4, NOD1 and NOD2 receptor and their down-stream signalling genes expression in catla (*Catla catla*). *Molecular Biology Reports (Springer)*. DOI 10.1007/s11033-015-3932-4
  12. Dimri, M., Joshi, J., Shrivastava, N., Ghosh, S., Chakrabarti, R. and Ndrakanti, P. K. 2015. Prilocaine hydrochloride protects zebrafish from lethal effects of ionizing radiation: role of hematopoietic cell expansion. *The Tokai Journal of Experimental and Clinical Medicine (Tokai Medical Association, accepted)* 40: 8-15.
  13. Basu, M., Paichha, M., Sain, B., Lenka, S. S., Singh, S., Chakrabarti, R. and Samanta, M. 2015. Modulation of TLR2, TLR4, TLR5 and NOD2 receptor gene expressions and their downstream signaling molecules following thermal stress in the Indian major carp catla (*Catla catla*), 3 Biotech (Springer). DOI 10.1007/s13205-015-0306-5
  14. Singh, K. M., Sharma, J. G. and Chakrabarti, R. 2015. Simulation study of natural UV-B radiation on *Catla catla* and its impact on physiology, oxidative stress, Hsp70 and DNA fragmentation. *Photochemistry and Photobiology (Elsevier B.V.)* 149: 156-163.
  15. Sharma, J. G., Singh, M. K. and Chakrabarti, R. 2015. Physiological responses of *Catla catla* larvae fed with *Achyranthes aspera* seed enriched diet and exposed to UV-B radiation. *Indian Journal of Biochemistry & Biophysics* 52: 155-160 (*CSIR*).
  16. Khangembam, B. K. and Chakrabarti, R. 2015. Trypsin from the digestive system of carp *Cirrhinus mrigala*: Purification, Characterization and its potential application. *Food Chemistry* 175: 386-394. (*Elsevier B.V.*, DOI: 10.1016/j.foodchem.2014.11.140).
  17. Chakrabarti, R., Srivastava, P., Verma, N. and Sharma, J. G. 2014. Effect of seeds of *Achyranthes aspera* on the immune responses and expression of some immune-related genes in carp *Catla catla*. *Fish & Shellfish Immunology (Elsevier B.V., DOI: 10.1016/j.fsi.2014.03.007)* 41: 64-69.
  18. Lukram, M. I., Ninawe, A. S. and Chakrabarti, R. 2014. Influence of feeding regimes on the digestive enzyme profile and ultrastructure of digestive tract of first feeding *Catla catla* (Hamilton) larvae. *Aquaculture Research and Development* 5:4 (*OMICS Publishing Group, <http://dx.doi.org/10.4172/2155-9546.1000243>*).
  19. Sharma, J. G., Singh, S., Mittal, P. and Chakrabarti, R. 2014. Impact of temperature gradient on the Indian major carp *Catla catla* larvae. *Proceedings of National Academy of Sciences, India*

Section B 86: 269-273 (*Springer*, DOI 10.1007/s40011-014-0419-3).

20. Ahmad, T., Singh, S. P., Khangembam, B. K., Sharma, J. G. and Chakrabarti, R. 2013. Food consumption and digestive enzyme activity of *Clarias batrachus* exposed to various temperatures. *Aquaculture Nutrition (Blackwell Science Ltd., doi: 10.1111/anu.12072)* 20: 265-272.
21. N. Radhakrishnan, N., Rullah, K., Chakrabarti, R. and Gnanamani, A. 2013. Inhibition of UVB induced oxidative stress in *Catla catla* & glutamate pyruvate transaminase (GPT) activities by embelin using molecular docking tool. *Journal of Chemical and Pharmaceutical Research* 5: 1094-1099.
22. Singh, K. M., Sharma, J. G. and Chakrabarti, R. 2013. Impact of UV-B Radiation on the physiology of freshwater carp *Labeo rohita* larvae and evaluation of UV-B protective properties of seeds of *Achyranthes aspera* and vitamin C. *Agricultural Research (Springer)* 2: 166-171.
23. Singh, K. M., Sharma, J. G. and Chakrabarti, R. 2013. Effect of UV-B radiation on the defense system of *Labeo rohita* (Cyprinidae) larvae and its modulation by seed of *Achyranthes aspera*. *Acta Ichthyologica et Piscatoria (Scientific Society of Szczecin)* 43: 119-126.
24. Singh, S. P., Sharma, J. G., Ahmad, T. and Chakrabarti, R. 2013. Effect of water temperature on the physiological responses of Asian catfish *Clarias btrachus*. *Asian Fisheries Science (Asian Fisheries Society)* 26: 26-38.
25. Khangembam, B. K., Sharma, K. Y. V. R. and Chakrabarti, R. 2012. Purification and characterization of trypsin from the digestive system of carp *Catla catla* (Hamilton) *International Aquatic Research (Springer, <http://www.intaquares.com/content/4/1/9>)* 4:9.
26. Srivastava, P. K. and Chakrabarti, R. 2012. Effect of dietary supplementation of *Achyranthes aspera* seed on *Labeo rohita* larvae challenged with *Aeromonas hydrophila*. *Journal of Aquatic Animal Health (Taylor & Francis, DOI:10.1080/08997659.2012.694834)* 24: 213-218.
27. Srivastava, P. K. and Chakrabarti, R. 2012. Effect of dietary supplementation of seed of *Achyranthes aspera* on the immune system of *Labeo rohita* fry. *Israeli Journal of Aquaculture - Bamidgeh (IJA: 64.2012.786)*.
28. Verma, N., Chakrabarti, R., Das, R. H. and Gautam, H. K. 2012. Anti-inflammatory effects of Shea butter through inhibition of iNOS, COX-2 and cytokines via the Nf-Kb pathway in Lps-activated J774 macrophage cells. *Journal of Complementary and Integrative Medicine (The Berkely Electronic Press, DOI: 10.1515/1553-3840.1574)*.
29. Chakrabarti, R. and Rao, V. Y. 2012. *Achyranthes aspera* enhances the immunity and antigen clearance in common carp *Cyprinus carpio*. *Journal of Fish Diseases (Wiley-Blackwell)* 35: 389-392.
30. Chakrabarti, R., Srivastava, P. K., Kundu, K., Khare, R.S. and Banerjee, S. 2012. Evaluation of immunostimulatory and growth promoting effect of seed fractions of *Achyranthes aspera* in common carp *Cyprinus carpio* and identification of active constituents. *Fish & Shellfish Immunology (Elsevier B.V.)* 32: 839-843.
31. Chakrabarti, R. and Rathore, R. M. 2010. Ontogenic changes in the digestive enzyme pattern and characterization of proteases in Indian major carp *Cirrhinus mrigala*. *Aquaculture Nutrition (Blackwell Science Ltd.)* 16: 569-581.
32. Sharma, J. G., Rao, Y. V., Kumar, S. and Chakrabarti, R. 2010. Impact of UV-B radiation on the digestive enzymes and immune system of larvae of Indian major carp *Catla catla*. *International Journal of Radiation Biology (Informa Healthcare)* 86: 181-186.
33. Sharma, J. G. and Chakrabarti, R. 2009. Comparative growth performance and proteolytic enzyme activity of Indian major carp *Catla catla* larvae fed with live food and refrigerated plankton food. *Indian Journal of Animal Sciences (Indian Council of Agricultural Research, I.C.A.R.)* 79: 1185-1188.

34. Chakrabarti, R. and Labh, S. N. 2009. Effects of vitamin C (L-ascorbate 2-triphosphate calcium) on the growth, biochemical composition, and tissue ultrastructure of hybrid carp. In: Larvi'09 – Fish & Shellfish Larviculture Symposium (Eds. Hendry, C. I., Stappen, G. V., Wille, M. and Sorgeloos, P.). European Aquaculture Society, Special Publication No. 38, Oostende, Belgium, pp. 41-44.
35. Lukram, I. M., Hamre, K., Ronnestad, I., Chakrabarti, R., Nordgreen, A., Mangor-Jensen, A. and Saele, O. 2009. Uptake and metabolism of predigested lipid in the Atlantic cod, *Gadus morhua*. Larvi'09 – Fish & Shellfish Larviculture Symposium (Eds. Hendry, C. I., Stappen, G. V., Wille, M. and Sorgeloos, P.). European Aquaculture Society, Special Publication No. 38, Oostende, Belgium. pp. 238-241.
36. Sharma, J. G. and Chakrabarti, R. 2009. Machli ka praktik bhogan: jantuplabak (Hindi). Kheti (*Indian Council of Agricultural Research, I.C.A.R.*): 61: 5-7.
37. Srivastava, A., Roy, D. and Chakrabarti, R. 2009. Phospholipids assay of *Daphnia carinata* using 1-D and 2-D NMR techniques. *Journal of Biotechnology and Biochemistry (Research India Publications)* 5: 117-114.
38. Sharma, J. G. and Chakrabarti, R. 2008. Development of survivorship model for UV-B irradiated *Catla catla* larvae. *Aquatic Ecology (Springer)* 42: 17-23.
39. Kumar, S., Fernando, L. G., Chakrabarti, R., del Toro, M. A. N. and Cordova-Murueta, J. H. 2007. Characterization of digestive proteases of three carps *Catla catla*, *Labeo rohita* and *Hypophthalmichthys molitrix* and *in vitro* digestibility study. *Aquaculture Nutrition (Blackwell Science L.td.)* 13: 1-9.
40. Kumar, S., Sharma, J. G. and Chakrabarti, R. 2007. Acute toxicity of ammonia to a freshwater teleost, *Labeo bata* larvae. *Toxicology & Environmental Chemistry (Taylor & Francis)* 89: 327-336.
41. Sharma, J. G., Gwak, W-S, Masuda, R., Tanaka, M. and Chakrabarti, R. 2006. Survival, growth and RNA/DNA ratio of *Pagrus major* cultured under three different feeding regimes during early development. *Asian Fisheries Science (Asian Fisheries Society)* 19: 389-400.
42. Sharma J. G. and Chakrabarti, R. 2006. Effects of UV-B radiation on the gills of *Catla catla* during early development. *Toxicology & Environmental Chemistry (Taylor & Francis)* 82: 367-371.
43. Srivastava, A. Hemre, K., Stoss, J., Chakrabarti, R., Tonheim, K. S. 2006. Protein content and amino acid composition of the live feed rotifer (*Brachionus plicatilis*): with emphasis on the water soluble fraction. *Aquaculture (Elsevier B.V.)* 254: 534-543.
44. Chakrabarti, R., Rathore, M. S., Kumar, S. and Mittal, P. 2006. Functional changes in digestive enzymes and characterization of proteases of silver carp (male) and bighead carp (female) hybrid, during ontogeny. *Aquaculture (Elsevier B. V.)* 253: 694-702.
45. Chakrabarti, R. and Vasudeva Rao, Y. 2006. *Achyranthes aspera* stimulate the immunity and enhances the antigen clearance in *Catla catla*. *International Immunopharmacology (Elsevier B. V.)* 6: 782-790.
46. Anand, C., Akolkar, P. and Chakrabarti, R. 2006. Bacteriological water quality status of River Yamuna in Delhi. *Journal of Environmental Biology (Triveni Enterprises)* 27: 97-101.
47. Chakrabarti, R., Rathore, R. M. and Kumar, S. 2006. Study of digestive enzymes and characterization of related proteases during early ontogeny of *Labeo rohita*. *Aquaculture Nutrition (Blackwell Science L.td.)* 12: 35-43.
48. Srivastava, A., Rathore, R. M. and Chakrabarti, R. 2006. Effects of four different doses of organic manures in the production of *Ceriodaphnia cornuta*. *Bioresource Technology (Elsevier Ltd.)* 97: 1036-1040.
49. Vasudeva Rao, Y., Das B. K., Jyotirmayee. P. and Chakrabarti, R. 2006. Effect of *Achyranthes aspera* on the immunity and survival of *Labeo rohita* infected with *Aeromonas hydrophila*. *Fish*



- & Shellfish Immunology (*Elsevier Science Publishers B. V.*) 20: 263-273.
50. Chakrabarti, R. and Sharma, J. G. 2005. Digestive physiology of fish larvae during ontogenic development: A brief overview. *Indian Journal of Animal Sciences (Indian Council of Agricultural Research, I.C.A.R.)* 75: 1337-1347.
  51. Rathore, R. M., Kumar, S. and Chakrabarti, R. 2005. Digestive enzyme patterns and evaluation of protease classes in *Catla catla* (Family: Cyprinidae) during early developmental stages. *Comparative Biochemistry and Physiology B (Elsevier Inc.)* 142: 98-106.
  52. Rao, V. Y. and Chakrabarti, R. 2005. Dietary incorporation of *Achyranthes aspera* seed influences the immunity of common carp *Cyprinus carpio*. *The Indian Journal of Animal Sciences (Indian Council of Agricultural Research, I.C.A.R.)* 75: 1097-1102.
  53. Rathore, R. M., Kumar, S. and Chakrabarti, R. 2005. Digestive enzyme profile of *Cyprinus carpio* during ontogenic development. *World Aquaculture (World Aquaculture Society)* 36: 37-39.
  54. Kumar, S., Srivastava, A. and Chakrabarti, R. 2005. Study of digestive proteinases and proteinase inhibitors of *Daphnia carinata*. *Aquaculture (Elsevier B. V.)* 243: 367-372.
  55. Rao, V. Y. and Chakrabarti, R. 2005. Stimulation of immunity in Indian major carp *Catla catla* with herbal feed ingredients. *Fish & Shellfish Immunology (Elsevier Ltd.)* 18: 327-334.
  56. Chakrabarti, R. and Rao, Y. V. 2005. *Achyranthes aspera* enhances the efficiency of antigen clearance from the host *Labeo rohita*. Larvi'05 – Fish & Shellfish Larviculture Symposium (Eds. Hendry, C. I., Stappen, G. V., Wille, M. and Sorgeloos, P.). European Aquaculture Society, Special Publication No. 36, Oostende, Belgium. pp. 83-85.
  57. Anand, C., Akolker, P. and Chakrabarti, R. 2004. Benthic macro-invertebrates of river Yamuna in Delhi stretch at various levels of physico-chemical water quality parameters. *Research Journal of Chemistry and Environment*. 8: 15 -23.
  58. Rao, V. Y., Singh, M. R., Singh, A. and Chakrabarti, R. 2004. Potentiation of antibody production in Indian major carp *Labeo rohita*, rohu, by *Achyranthes aspera* as an herbal feed ingredient. *Aquaculture (Elsevier B. V.)* 238: 67-73.
  59. Sharma, J. G., Kumar, S. and Chakrabarti, R. 2004. Optimization of stocking density of *Labeo rohita* and *Cirrhinus mrigala* spawn in relation to water quality, survival and growth under recirculating system. *Indian Journal of Animal Sciences (Indian Council of Agricultural Research, I.C.A.R.)* 74: 686-689.
  60. Rao, V. Y. and Chakrabarti, R. 2004. Enhanced anti-proteases in *Labeo rohita* fed with diet containing herbal ingredients. *Indian Journal of Clinical Biochemistry (Indian Council of Medical Research, I.C.M.R.)* 19: 132-134.
  61. Sharma, J. G. and Chakrabarti, R. 2003. Role of stocking density on growth and survival of catla, *Catla catla*, and rohu, *Labeo rohita*, larvae and water quality in a recirculating system. *Journal of Applied Aquaculture (The Haworth Press, Inc.)* 14: 171-178.
  62. Anand, C., Akolkar, P. and Chakrabarti, R. 2002. A comparative bio-assessment of water quality on east and west banks of River Yamuna in Delhi. In: *Water and Wastewater Perspective of Developing Countries* (Eds. Devi, R. and Ahsan, N.). 433-441 pp.
  63. Chakrabarti, R. and Kumar, S. 2001. Effect of feed protein manipulation on the survival, growth, and enzyme activities of *Cirrhinus mrigala* larvae. In: *Larvi 2001, Fish and Shellfish Symposium* (Eds. C.I. Hendry, G. V. Stappen, M. Wille M. and P. Sorgeloos). European Aquaculture Society, Special Publication No.30. Belgium, pp. 129-132.
  64. Chakrabarti, R., Sharma, J. G. and Kumar, S. 2001. Carp larviculture: A brief review. In: *Captive breeding for Aquaculture and Fish Germplasm Conservation* (Eds. Ponniah, A. G., Lal, K. K. and Basheer, V. S.). NBFGR- NATP Publication No.3, pp.c1 - 4.
  65. Kumar, S., Sharma, J. G. and Chakrabarti, R. 2000. Quantitative estimation of proteolytic enzyme and ultrastructural study of anterior part of intestine of Indian major carp (*Catla catla*) larvae

- during ontogenesis. *Current Science (Current Science Association & Indian Academy of Sciences)* 79: 1007-1011.
66. Sharma, J. G. and Chakrabarti, R. 2000. Seasonal occurrence of freshwater medusa *Limnocyclus indica* annandale (Cnidaria: Limnomedusae) in a lake associated with the River Yamuna, India. *Aquatic Ecology (Kluwer Academic Publishers)* 34: 205-207.
67. Sharma, J. G. and Chakrabarti, R. 2000. Replacement of live-food with refrigerated-plankton food for *Cyprinus carpio* (L) larvae cultured with three different types of biological filters. *Current Science (Current Science Association & Indian Academy of Sciences)* 79: 214-219.
68. Sharma, J. G. and Chakrabarti, R. 1999. Larval rearing of common carp *Cyprinus carpio*: A comparison between natural and artificial diets under three stocking densities. *Journal of the World Aquaculture Society (World Aquaculture Society)* 30: 490-495.
69. Chakrabarti, R. and Sharma, J. G. 1998. Influence of management protocols on carp growth under nursery conditions: relative importance of food and water quality. *Aquaculture International (Chapman and Hall Ltd.)* 6: 293-301.
70. Sharma, J. G. and Chakrabarti, R. 1998. Effects of different stocking densities on survival and growth of grass carp, *Ctenopharyngodon idella* larvae using recirculating system. *Journal of Applied Aquaculture (The Haworth Press, Inc.)* 8: 79-83.
71. Chakrabarti, R. and Jana, B. B. 1998. Effects on growth and water quality of feeding exogenous plankton compared to use of manure in the culture of mrigal, *Cirrhinus mrigala*, and rohu, *Labeo rohita*, fry in tanks. *Journal of Applied Aquaculture (The Haworth Press, Inc.)* 8: 87-95.
72. Kumar, S. and Chakrabarti, R. 1998. Ontogenic development of amylase activity in three species of Indian major carps, *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* in relation to natural diet. *Asian Fisheries Science (Asian Fisheries Society)* 10: 259-263.
73. Chakrabarti, R. and Sharma, J. G. 1997. Ontogenic changes of amylase and proteolytic enzyme activities of Indian major carp, *Catla catla* (Ham.) in relation to natural diet. *The Indian Journal of Animal Sciences (Indian Council of Agricultural Research, I.C.A.R.)* 67: 932 - 934.
74. Sharma, J. G. and Chakrabarti, R. 1997. Effects of filtration and aeration on survival and growth of *Ctenopharyngodon idella* fry in recirculation system. *Indian Journal of Experimental Biology (Council of Scientific and Industrial Research, C.S.I.R.)* 35: 56-58.
75. Jana, B. B. and Chakrabarti, R. 1996. Feeding spectrum in the rearing of fish larvae. In: *Advances in fish research* (Ed. Singh, B. R.). Vol. 2. Narendra Publishing House, Delhi, India.
76. Jana, B. B. and Chakrabarti, R. 1993. Life table responses of zooplankton (*Moina micrura* Kurz and *Daphnia carinata* King) to manure application in a culture system. *Aquaculture (Elsevier Science Publishers B.V.)* 117: 273-285.
77. Chakrabarti, R. 1993. Ox-bow lakes of India: Present Status. In: *Strategies for lake ecosystems beyond 2000* (Eds. G. Giussani and C. Callieri), pp. 257 -260. Proc. 5th International Conference of Management and Conservation of Lakes, Stresa, Italy.
78. Jana, B. B. and Chakrabarti, R. 1993. The effect of management protocols for juvenile carp (*Cyprinus carpio*) culture on life history responses of a zooplankton food source, *Moina micrura* (Kurz.). *Aquaculture (Elsevier Science Publishers B.V.)* 110: 285-300.
79. Chakrabarti, R. and Jana, B. B. 1992. Diversity and abundance of plankton as indices of management strategies of common carp culture. *Archiv für Hydrobiologie (E. Schweizerbart'sche Verlagsbuchhandlung)* 125: 499-509.
80. Chakrabarti, R. and Jana, B. B. 1992. Effects of different levels of exogenously introduced plankton on growth of common carp reared under favourable water quality. *Aquaculture (Elsevier Science Publishers B.V.)* 103: 331-339.
81. Chakrabarti, R. and Jana, B. B. 1991. Growth induction of common carp (*Cyprinus carpio* L.) fry as a function of plankton density and improve water quality. *Aquaculture and Fisheries*



Management 22: 295-307.

82. Chakrabarti, R. and Jana, B. B. 1991. Plankton intake as a function of body weight by common carp fry in different feeding conditions. *Aquaculture (Elsevier Science Publishers B.V.)* 93: 21-34.
83. Jana, B. B. and Chakrabarti, R. 1990. Exogenous introduction of live plankton -a better approach to carp growth than the direct manure system. *The Progressive Fish Culturist (American Fisheries Society)* 52: 252-260.
84. Chakrabarti, R. and Jana, B. B. 1990. Food preferences and selection by common carp (*Cyprinus carpio*) fry under different feeding regimes. *Journal of Applied Ichthyology (Verlag Paul Parey)* 6: 223-230.
85. Jana, B. B. and Chakrabarti, R. 1990. Comparison of Plankton intake by Indian carp fingerlings under different feeding conditions. *Journal of Applied Ichthyology (Verlag Paul Parey)* 6: 1-13.
86. Jana, B. B. and Chakrabarti, R. 1988. Some factors determining the feeding optima in carp fingerlings. *Archiv für Hydrobiologie (E. Schweizerbart'sche Verlagsbuchhandlung)* 113: 121-131.

#### **Other publications - Popular article**

1. Sharma, J. G. and Chakrabarti, R. 2009. मछली का प्राकृतिक भोजन: जंतुप्लवक (Hindi). *Kheti (Indian Council of Agricultural Research, I.C.A.R.):* 61: 5-7.

#### **Conference Organization/ Presentations (in the last three years)**

#### **Workshop, Special Lecture and Students' Interaction Meets Organized**

1. Organized an interactive program "Indo-Norwegian Students' Meet" between the students of Fish Biology, Department of Zoology, University of Delhi, India and Norwegian University of Science and Technology, Trondheim, Norway during March 31 - April 1, 2012.
2. Organized Dr. P. V. Dehadrai Memorial Lecture in the Department of Zoology, University of Delhi on September 16, 2011.
3. Organized a workshop on "Biofloc Technology: An Eco-friendly Technology for Intensive Production of Fish and Prawns" in the Department of Zoology, University of Delhi during September 13-16, 2011.
4. Organized an interactive program "Indo-Norwegian Students' Meet" between the students of Fish Biology, Department of Zoology, University of Delhi, India and Norwegian University of Science and Technology, Trondheim, Norway during April 20- 21, 2011.

#### **Presentation of Research Paper**

1. Attended and presented project report in the Second Annual Meeting of the International collaborative project of DBT, India & BBSRC, UK held at Sokoine University of Agriculture, Morogoro, **Tanzania** (March 1 - 2, 2018).
2. Attended and presented paper in Fish and Shellfish Larviculture Symposium "Larvi 2017" organized by Artemia Reference Centre, Ghent University held at Ghent, **Belgium** (September 4 - 7, 2017).
3. Attended and presented paper in "Asian Pacific - Aquaculture 2017" organized by World Aquaculture Society (WAS, USA) held at Kuala Lumpur, **Malaysia** (July 24 - 27, 2017).
4. Attended and presented paper in the conference "Aquaculture Europe 2016" held at Edinburgh,

**United Kingdom** (September 20 - 23, 2016).

5. Visited and delivered lecture on “Digestive Enzymes in Fishes” in the Institute of Aquaculture, University of Stirling, **Scotland, United Kingdom** under the Bilateral Exchange Programme of Indian National Science Academy (INSA), India and Royal Society of Edinburg (RSE), United Kingdom (June 21 - July 4, 2016).
6. Attended and presented paper in the conference “2nd International Conference on Fisheries and Aquaculture 2015” held at Colombo, **Sri Lanka** (August 25-26, 2015).
7. Attended, chaired a session and presented paper in the conference “World Aquaculture 2015” held at Jeju, **South Korea** (May 26-30, 2015).
8. Attended and presented paper in the conference “World Aquaculture Adelaide 2014” held at Adelaide, **Australia** (June 7 -11, 2014).
9. Attended and presented paper in the conference “Larvi 2013” held in Gent, **Belgium** (September, 2013).
10. Attended and presented paper in the conference “The First International Conference of Fish and Shellfish Immunology” held in Vigo, **Spain** (June 25 - 29, 2013).
11. Attended and presented paper in the workshop on “Fish Farming Development in Nepal” held in Kathmandu, **Nepal** (January 25-26, 2013).
12. Attended and presented paper in a seminar organized by Department of Biology, Norwegian University of Science and Technology, **Norway** (November 18-19, 2011).
13. Attended and presented paper in the conference “World Aquaculture 2011” held in Natal, **Brazil** (June 6-10, 2011).
14. Attended and presented paper in the workshop on “Sustainable Poverty Reduction in Nepal” held in Oslo, **Norway** (June 2-5, 2010).
15. Attended and presented paper in the Multicountry Observational Study Mission on “Application of Advanced Technologies in Aquaculture” organized by Asian Productivity Organization in Pingtung, **Republic of China** (October 19-23, 2009).
16. Attended and presented paper in the conference “Larvi 2009” held in Gent, **Belgium** (September 6-10, 2009).
17. Attended and presented paper in conference “Aquaculture Europe 2009” held in Trondheim, **Norway** (August 14 - 17, 2009).
18. Attended and presented paper in the workshop on “Sustainable Poverty Reduction in Nepal” held in Oslo, **Norway** (December 7-16, 2007).
19. Attended and presented paper in the conference “Aquaculture 2007” held in San Antonio, Texas, **USA** (February 26 - March 2, 2007).
20. Attended and presented paper in “Larvi 2005” held in Gent, **Belgium** (September 5-8, 2005).
21. Attended and presented paper in “7th Asian Fisheries Forum” held in Penang, **Malaysia** (November 30 - December 4, 2004).
22. Attended and presented paper in the conference “World Aquaculture 2002” held in Beijing, **People’s Republic of China** (April 23-27, 2002).

23. Attended and presented paper in the symposium "Larvi 2001: the Finfish and Shellfish Larviculture" held in Gent, **Belgium** (September 3-6, 2001).
24. Attended and presented paper in the conference "Aquaculture in the Third Millennium" held in Bangkok, **Thailand** (February 20-25, 2000).
25. Attended and presented paper in the conference "Aquaculture '98" held in Las Vegas, Nevada, **USA** (February 15-19, 1998).
26. Attended and presented paper in the 27th Annual Meeting of World Aquaculture Society held in Bangkok, **Thailand** (January 29 - February 2, 1996).

#### Research Projects (Major Grants/Research Collaboration)

1. ICAR sponsored research project on Digestive Enzyme Profile of Larvae and Early Fry of Indian Major Carp (*Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*): Responses to Natural and Artificial Diets, 1994-1997.
2. UGC sponsored research project on Responses of Indian Major Carp Larvae under Superintensive Culture in Recirculating System, 1994-1997.
3. ICAR sponsored research project on Intensification of Indian Major Carp (*Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*) Larvae Culture through Optimization of Stocking Density in the Recirculating System, 1998-2001.
4. ICAR sponsored research project on Mass Production and Storage of Live Food Organisms, 2000-2003.
5. DST-CIBNOR sponsored research project on Ontogeny and Biochemistry of Digestive System of Carp Larvae *Catla catla* and *Cirrhinus mrigala*, 2001-2004.
6. DST sponsored research project on Characterization of Digestive Enzymes of Indian Major Carp *Catla catla* (*catla*), *Labeo rohita* (*rohu*) and *Cirrhinus mrigala* (*mrigal*) during ontogenesis, 2002-2005.
7. ICAR sponsored research project on Digestive Physiology of Spawn and Fry of *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* under Various Feeding Regimes, 2005-2008.
8. DBT sponsored research project on Evaluation of Immunostimulatory and Disease Resistance Properties of an Indian Medicinal Plant *Achyranthes aspera* in Carps, 2008-2011.
9. DST sponsored research project on Characterization of Digestive Proteases of Indian Major Carps and Its Capacity to Digest Plant Protein, 2010-2013.
10. ICAR sponsored collaborative research project on The nature of impact of abiotic stresses on three diverse freshwater species of fishes, 2011-2014.

11. Norwegian University of Science and Technology (NTNU) sponsored collaborative research project on Fish Farming Development in Nepal: Production of Extruder Made Plant-based Diets, 2014-2018.
12. DBT sponsored research project on Development of Pelleted Diet for *Catla catla* and *Clarias batrachus* Using *Achyranthes aspera* and Evaluation of Its Immunostimulatory Properties in Pond Culture System, 2014-2018.
13. DBT (India) - BBSRC (UK) sponsored International collaborative research project on Development of alternative sustainable fish feeds to promote human health using novel non-conventional indigenous ingredients, 2015-2018.
14. DBT sponsored societal project on Dissemination and Demonstration of Fish Culture Technology among Women Self Help Groups in NCR Region of Delhi as a Self Employment Activity, 2017-2020.

#### Awards and Distinctions

1. Visiting Fellowship, India National Science Academy, India and The Royal Society of Edinburgh, Scotland, UK (June 21 - July 4, 2016).
2. Fellow of National Academy of Agricultural Sciences (NAAS), New Delhi (since January 1, 2007).
3. UGC Career Award, 1994-97.
4. DAAD (German Academic Exchange Service) Fellowship, 1992.
5. ICAR Jawaharlal Nehru Award for Best Thesis, 1990.

#### Awards Received by Research Students

1. Best Presentation Award received by Ph.D. Student Khangembam Cherita Devi in the "2nd International Conference on Fisheries and Aquaculture 2015" held at Colombo, Sri Lanka in August 2015.
2. Best Poster presentation award received by Ph.D. student Sunil Kumar in the UGC sponsored National Seminar "New Trends in Fishery Development in India" held at Chandigarh, India in February, 2005.
3. Young Scientist Award of U.P. Council of Science & Technology received by Ph.D. student JaiGopal Sharma on February 28, 2004 (National Science Day) for his contribution in the field of Science during Ph.D.
4. Young Scientist Award of Asian Fisheries Society (AFSIB) received by Ph.D. student JaiGopal Sharma

for his best presentation in the “International Conference of Asian Fisheries Society” held at Central Institute of Fisheries Education, Mumbai on December, 2002.

5. Best Poster presentation award received by Ph.D. student Sunil Kumar in “Indian Science Congress” held at Lucknow, India in January 2002.

#### Association With Professional Bodies

#### **EDITORIAL BOARD MEMBER OF SCIENTIFIC JOURNALS**

1. Reviews in Aquaculture (Blackwell)
2. Israeli Journal of Aquaculture–Bamidgeh (Society of Israeli Aquaculture and Marine Biotechnology, Israel)
3. Mediterranean Aquaculture Journal (Mediterranean Aquaculture and Environment Society)
4. International Journal of Pure and Applied Zoology (Allied Academics, USA)
5. International Journal of Fisheries and Aquaculture (Academic Journals)
6. Frontiers in Nutrition (Frontiers Open access journal)
7. Madridge Journal of Aquaculture Research & Development (MJARD).
8. Journal of the Inland Fisheries Society of India (Inland Fisheries Society of India, India)
9. Journal of Immune Research (Austin Publishing Group, USA)

#### **Reviewer of Scientific Journals**

**Elsevier Publications:** Aquaculture, Aquatic Research, Comparative Biochemistry and Physiology B, Environmental Research, Egyptian Journal of Aquatic Research, Fish & Shellfish Immunology, Photochemistry and Photobiology, Marine Environmental Research, Veterinary Immunology and Immunopathology

**Blackwell Publications:** Aquaculture and Nutrition, Aquaculture Research, Journal of Fish Biology

**American Chemical Society Publication:** Journal of Agricultural and Food Chemistry

**Springer Nature Publications:** Fish Physiology and Biochemistry, International Journal of Recycling Organic Waste in Agriculture, International Aquatic Research, Proceedings of the National Academy of Sciences India Section-B Biological Sciences

**Taylor & Francis Publication:** Journal of Applied Aquaculture

**Public Library of Science:** *PLOS ONE*

**Frontiers:** Frontiers in Physiology

**Austin Publishing Group:** Austin Environmental Sciences

**CSIR Publications:** Indian Journal of Biochemistry and Biophysics, Indian Journal of Experimental Biology

**Members of Academic Committees**

1. Served as a member of Peer Review Team for Accreditation of Central Agricultural University, Imphal and its Constituent Colleges in March, 2016.
2. Served as an expert in the Panel Meeting "ICAR Awards" organized by Indian Council of Agricultural Research held in New Delhi, India on July 28, 2014.
3. Served as an expert in the Panel Meeting "Farmed Animal Disease and Health" organized by UK's Biotechnology and Biological Sciences Research Council (BBSRC) and India's Department of Biotechnology (DBT) held in London, UK during September 5-6, 2013.
4. Served as a member of SAP Grant Expert Committee, Department of Zoology, Visva Bharati University, Santiniketan, West Bengal during 2013-15.
5. Served as a member of DRS-SAP Grant Expert Committee, Department of Zoology, University of Burdwan, West Bengal during 2013-15.
6. Served as a judge for best oral presentation award of students in the International Conference "World Aquaculture 2011" held in Natal, Brazil during June 6-10, 2011.
7. Served as a panelist in the program "Management of Animal Genetic Resources - Current Scenario, Priorities and Road Map. National Consultation on Agro-biodiversity Management" organized by Indian Council of Agricultural Research during May 26-27, 2010.
8. Served as a judge for oral presentation of students in the International Conference "Aquaculture 2007" held in San Antonio, Texas, USA during February 26 - March 2, 2007.
9. Served as a validator of the e-book "Ecology and Environment Management" published by National Institute of Science Communication and Information Resources (NISCAIR), Council of Scientific and Industrial Research (CSIR), Govt. of India.
10. Member of Board of Research Studies, University of Delhi during 2013-15.
11. Chaired Chemicals and Glassware Committee, Contingency and Stationery Committee, Bills Committee and Library Committee, and served as a member in other committees in the Department of Zoology, University of Delhi.

**REVIEWER OF RESEARCH PROJECTS OF FUNDING AGENCIES**

1. Department of Science and Technology, DST, Govt. of India.
2. Department of Biotechnology, DBT, Govt. of India.
3. Indian Council of Agricultural Research, ICAR, Govt. of India.
4. Council of Scientific and Industrial Research, CSIR, Govt. of India.

**MEMBER OF SCIENTIFIC SOCIETIES**

1. Members of the Sectional Committee on Fisheries Sciences of the National Academy of Agricultural Sciences, NAAS (2017-2018), New Delhi, India
2. Elected Member, Asian Fisheries Society - Indian Branch (2011-2014)
3. Life Member, Indian Science Congress Association (India)
4. Life Member, Inland Fisheries Society of India (CIFRI, Barrackpore, India)



5. Member, Asian Fisheries Society (Philippines)
6. Member, World Aquaculture Society (USA)

#### **SERVING AS VALIDATOR OF E-BOOK**

1. Ecology and Environment Management Published by National Institute of Science Communication and Information Resources, NISCAIR, Council of Scientific and Industrial Research, CSIR, Govt. of India.

#### **SERVING AS PANEL MEMBER**

1. Served as an expert in the Panel Meeting “ICAR Awards” organized by Indian Council of Agricultural Research held in New Delhi, India on July 28, 2014.
2. Served as an expert in the Panel Meeting “Farmed Animal Disease and Health” organized by UK’s Biotechnology and Biological Sciences Research Council (BBSRC) and India’s Department of Biotechnology (DBT) held in London, UK during September 5-6, 2013.
3. Served as a member of SAP Grant Expert Committee, Department of Zoology, Visva Bharati University, Santiniketan, West Bengal during 2013-15.
4. Served as a member of DRS-SAP Grant Expert Committee, Department of Zoology, University of Burdwan, West Bengal during 2013-15.
5. Served as expert in the Panel Meeting “Management of Animal Genetic Resources - Current Scenario, Priorities and Road Map. National Consultation on Agro-biodiversity Management” organized by Indian Council of Agricultural Research during May 26-27, 2010.

#### **Special Session in International Conference**

Offered special session on “Digestive Enzymes in Fish” in the International Conference “WA2015”, organized by World Aquaculture Society held in **Jeju, Korea** during May 26-30, 2015.

#### **Invited lecture**

1. Delivered a talk on “Trends in Aquaculture Research” in the Refresher Course of Life Sciences held in the Department of Botany, University of Delhi on December 17, 2014.

#### **SERVING AS JUDGE**

1. Served as a judge for oral presentation of students in the International Conference “World Aquaculture 2011” held at Natal, Brazil during June 6-10, 2011.
2. Served as a judge for oral presentation of students in the International Conference “Aquaculture 2007” held at San Antonio, Texas, USA during February 26 - March 2, 2007.

Other Activities

### RADIO TALK

1. Ornamental Fish Culture, Indraprastha Channel, Delhi.

### TV PROGRAMMES

1. Participated as a panelist in the discussion on “Flying Fish” on the India TV channel.
2. Participated as an expert in discussions on different themes in the live show “Krishi Darshan (Agriculture Watch)” of DD National channel, Govt. of India eight times during 2011-2016.
  - Theme “Importance of Feed in Aqua Farming” on January 21, 2016.
  - Theme “Pond Management” on July 16, 2015.
  - Theme “Machli Utpadan se Jibeka Chalana (Aquaculture as livelihood)” on May 29, 2014.
  - Theme “Machli Utpadan ebong Bipanan (Fish Production and Marketing)” on October 31, 2013.
  - Theme “Barsat mein Machli Palan (Fish Culture in the Rainy Season)” on August 23, 2012.
  - Theme “Garmio mein Machli Palan (Fish Culture in the Summer)” on May 17, 2012.
  - Theme “Barsat mein Fish ki Dekhbhal (Caring for Fish in the Rainy Season)” on August 18, 2011.
  - Theme “Chota Machli ka Palan ebong Bhojan (Production of Fish Seed and their Feeding)” on February 17, 2011.
3. Participated as a Fishery expert in the discussion on “Animal Health Management in Rainy Season” on DD Kisan channel, Govt. of India on July 21, 2017.
4. Participated as a Fishery expert in the discussion on “Health Management of Fishes in Winter” on DD Kisan channel, Govt. of India on November 1, 2017.

### ACTIVITIES IN RURAL DEVELOPMENT (EXTENSION WORK)

1. Actively participated in “Kishan Sangosti aor Mela” organized by Ayurved Research Foundation in village Chidana, Haryana on May 8, 2015.
2. Engaged in training of fish culture for self employment generations of rural youths under the Rural Development Programme of Rajiv Gandhi Foundation using Navraspur, Ghaziabad, UP as a model village.
3. Actively participated in Kisan Mela (Fish Farmers’ Meet) held at Lahali, Rohtak, CIFE (ICAR) on November 11, 2000.
4. Supplied seed and feed to the farmers in the one day meeting the “Fishers’ meet”, organized in the Department of Zoology, University of Delhi in May, 2006.

Signature of Faculty Member