



Dr. P. Jayasankar

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Institute/ University	Central Institute of Freshwater Aquaculture (<i>Indian Council of Agricultural Research</i>)
Address	Central Institute of Freshwater Aquaculture (CIFA) Kausalyaganga, Bhubaneswar, Orissa, INDIA
Date of Birth	8 th October 1959
Sex	Male
Tel Off	+91+674 2465446, 2465421, 2465890
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Languages known	English, Hindi, Malayalam & Tamil.
Computer literacy	Windows MS Office, Photoshop, phylogeny software, PCA software etc.

Educational Qualifications

Degree/ Course	Name of the University/ Institute	Year	Major subject	Marks/ Class/ Rank
Bachelor's Degree (BSc)	Univ of Kerala, India	1980	Zoology	78.2% First Class & Distinction
Master's Degree (MSc)	Cochin Univ of Science & Technology, Kochi, India	1982	Mariculture	71.44% First class
Doctorate (PhD)	Cochin Univ of Science & Technology, Kochi, India	1990	Marine Sciences (fish reproduction)	--

Details of employment record

Employer/ Institution	Designation & Place of work	Period	Scale of pay
ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Scientist - Cochin	Mar 1986 to Aug 1986	Rs. 8000-275-13500
ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Scientist-Mandapam Camp	Sep 1986 to Mar 1991	Rs. 8000-275-13500
ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Scientist (Senior Scale) - Mandapam Camp	Mar 1991 to Nov 1996	Rs. 10000-325-15200
ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Scientist (Senior Scale) - Cochin	Nov 1996 to Jul 1998	Rs. 10000-325-15200
ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Senior Scientist - Cochin	Jul 1998 to Jul 2006	Rs. 12000-420-18300

ICAR, New Delhi. Central Marine Fisheries Research Institute (CMFRI)	Principal Scientist - Cochin	Jul 2006 to Dec 2007	Rs. 37400-67000
ICAR, New Delhi. Central Institute of Freshwater Aquaculture (CIFA)	Principal Scientist and Head, Fish Genetic and Biotechnology Division	Jan 2008 to 2 th Jan 2011	Rs. 37400-67000
ICAR, New Delhi. Central Institute of Freshwater Aquaculture (CIFA)	Acting Director (Vide Council order F.No. 61(1)/2007-Per.III dated 2 Jun 2011)	3 Jun 2011 – 11 th Jan 2012	Rs. 37400-67000
ICAR, New Delhi. Central Institute of Freshwater Aquaculture (CIFA)	Director	12 Jan 2012 - present	Rs. 37400-67000

Research Experience

1	M.Sc.	Dissertation topic entitled ‘Studies on the effect of ammonia, nitrate and nitrite on the larvae of <i>Penaeus indicus</i> ’- studied the relative toxicity of these nitrogenous compounds to the various larval stages for rationalizing the water management practices in larval rearing.
2	Doctoral	‘Studies on the reproduction of Indian sand whiting <i>Sillago sihama</i> (Forsskal) (Percoidei, Sillaginidae)’. Studied the taxonomy of the sand whittings from the Palk Bay and Gulf of Mannar, histological, histochemical and biochemical aspects on reproduction and experiments on induced spawning.

Institutional research

- Selected for the Agricultural Research Service (ARS) to work as Scientist at the Central Marine Fisheries Research Institute (CMFRI), Kochi, and Kerala, India from March 1986.
- 1987-1996: Studied the resources leading to stock assessment of few commercially exploited demersal finfish groups in the Gulf of Mannar and Palk Bay.
- 1990-92 and 1994-95: worked on a project on the broodstock development of seabass, groupers and snappers.

	<ul style="list-style-type: none"> ➤ 1992 to 1995: Studied the impact of bottom trawling on the benthic resources with special reference to the inedible biota in the Gulf of Mannar and Palk Bay. ➤ 1997-2007: Study on genetic stock discrimination in Indian mackerel, oil sardine, threadfin breams, Bombay duck and rock lobsters using Truss network analysis, protein polymorphisms and DNA-level markers. DNA barcoding of fish and molecular taxonomy of marine mammals. ➤ 2008-till date: DNA barcoding of freshwater fish, DNA marker application in rohu and giant freshwater prawn for genetic linkage mapping & QTL and transgenics of freshwater ornamental fish.
<p>Sponsored project research</p>	<ul style="list-style-type: none"> ➤ 1997– 2001: PI of a project entitled “Studies on the impact of bottom trawling on the ecology of fishing grounds and living resources of the Palk Bay and Gulf of Mannar”, funded by MoEF. ➤ 2001-2005: PI of APCESS project “Evaluation of genetic heterogeneity in marine ornamental fishes using molecular genetic markers”. ➤ 2002-2007: Co PI of DOD-sponsored project “Studies on the marine mammals from the Indian EEZ and contiguous seas”. ➤ 2009-2010: PI of Chilika Development Authority (CDA)-sponsored (contractual mode) project “Genetic study of Irrawaddy dolphin” ➤ 2009- Continuing: Co-PI of DBT-funded project “First generation linkage map in <i>labeo rohita</i> (rohu): a potential genomic resource for identification of trait associated genes” ➤ 2009– Continuing: Co-PI NAIP-funded project “Bioprospecting of genes and allele mining for abiotic stress tolerance”. ➤ 2011– Continuing: PI of DST-sponsored project “Development of molecular marker-based seed identification system of cultured carps (Cyprinidae)”.
<p>Teaching/ Guidance/ Paper setting & evaluation</p>	<p>Actively associated with the Post Graduate Studies in Mariculture (PGPM) since 1996 for teaching/guiding M.F.Sc and Ph. D students.</p> <p>B.F.Sc, M.F.Sc and Ph. D question papers setter & evaluator for CIFE, Mumbai, Kerala Agricultural Univ., Cochin Univ. of Science & Technology, College of Fisheries, Berhampur, Tamil Nadu Animal</p>

	Sciences and Veterinary University etc. Major subjects taught include DNA markers & their application in fisheries research, genetic engineering and transgenics.
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Research supervised

1	MFSc Dissertation	<ol style="list-style-type: none"> 1. 'Electrophoretic patterns of the general proteins of four species belonging to the family Carangidae' 2. 'Intraspecific and interspecific studies in <i>Nemipterus</i> (Pisces: Perciformes: Nemipteridae) using truss network analysis and protein gel electrophoresis. 3. 'Genetic profiling of groupers of the genus <i>Epinephelus</i> (Family: Serranidae) using DNA-level markers' 4. 'DNA Barcoding – Molecular tool for species identification' 5. 'Molecular identification of hybrids in carps (Cyprinidae)'
2	Ph D thesis (Mariculture)	<ol style="list-style-type: none"> 1. 'Molecular and cytogenetic studies of sex inversion in groupers (Genus: <i>Epinephelus</i>, Family: Serranidae)' 2. 'Molecular identification of marine mammals (Order Cetacea) along the Indian coast'

Awards/ distinctions/ Overseas research	<ul style="list-style-type: none"> ➤ ICAR Junior Research Fellowship ➤ ICAR Senior Research Fellowship ➤ Biotechnology National Associateship 1994-95 awarded by the Department of Biotechnology, Government of India ➤ Biotechnology Overseas component 1996-97 awarded by the Department of Biotechnology, Government of India – 3 months training at Department of Aquatic Biosciences, Tokyo University of Fisheries, Japan ➤ NR Menon Award (year 2003) for the best M.F.Sc thesis instituted by the Professional Fisheries Graduate Forum (PFGF) for Shri G.S. Govindaraju for the study entitled "Genetic profiling of groupers of the genus <i>Epinephelus</i> (Family Serranidae) using DNA-level markers" – the idea and work conceived and partly executed by me as his Chairman and Major Advisor
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	<ul style="list-style-type: none"> ➤ Deputed for a pilot expedition in Southern Ocean on board <i>ORV Sagar Kanya</i> from Mauritius during 20th January to 12th March 2004 – Recorded sightings of whales and dolphins in the southern ocean between 20°S and 56°S latitudes and between 45°E and 57°E longitudes ➤ Best Annual Report of ICAR, 2004-05 (editorial board member) ➤ IUCN assessor for the 'red list' data (grouper, <i>Epinephelus diacanthus</i>) ➤ Member of the Indian Regional Working Group of Fish Barcode of Life Initiative (FISH-BOL), a global effort to coordinate assembly of standardized reference sequence library of all fish species ➤ Best division award of CIFA for Fish Genetics and Biotechnology Division (Head of division) ➤ Best poster award for mitochondrial genome sequence of Indian major carp, <i>Labeo rohita</i>. Poster ID XASC368 - Xth Agricultural Science Congress at NBFGR, Lucknow ➤ Honorary Fellowship of Society of Biological Sciences & Rural Development ➤ Scroll of Honour from Orissa Krushak Samaj ➤ Best Annual Report of ICAR for large institutes category for 2010-11 (Chief Editor and Director) ➤ Fellowship of the Academy of Science, Engineering and Technology (F. ASET)
<p>Important trainings undergone</p>	<ul style="list-style-type: none"> ➤ National Associateship Scheme at the School of Biotechnology Madurai Kamaraj University, Madurai, India, sponsored by the Department of Biotechnology during Sep1995-Aug1996 on DNA-level polymorphisms in scombroid fishes ➤ National Associateship Scheme, Overseas component at Department of Aquatic Biosciences, Tokyo University of Fisheries, Tokyo, Japan, sponsored by the Department of Biotechnology during Jan - Apr 1999 on AFLP polymorphisms and Cloning & characterization of Smad4 cDNA in common carp ➤ Workshop on "DNA profiling" – conducted by the School of Biotechnology, Madurai Kamaraj University & Bureau of Police Research & Development, Govt. of India during Jun 19 to Jul 20, 1995

	<ul style="list-style-type: none"> ➤ Summer School on "Aquaculture Biotechnology" - CIFA, Bhubaneswar during 12 Jun to 3 Jul 2000 ➤ Attended a human resource management training program "FEEL Research Manager" facilitated by CLHRD under the consultancy of Aim Insights at Mangalore during 9th – 15th December 2002 – the program gave tips for improvement of personal skills which could be effectively utilized in the institutional build up, organizational behaviour and management ➤ Training programme on "GIS-based atlas on potential mariculture sites along Indian coasts" during 6 – 10 Oct 2003 at CMFRI, Kochi – Received hands-on experience on the application of <i>Manifold system 5.5</i> ➤ Training on fish germplasm exploration and taxonomy at NBFGR, Lucknow during 29th January – 1st February 2006 ➤ National Workshop on "Functional genomics and proteomics" – Institute of Life Sciences, Bhubaneswar during 18 – 20 November 2009 ➤ "Management Development Programme" of Intellectual Property at IIM, Indore - 8th to 10th February 2010 ➤ "Developing Managerial Competencies" under MDP at Xavier Institute of Management, Bhubaneswar – 7th – 9th July 2010
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International exposure				
Country	Purpose/ Subject Title	Year	Duration	Sponsor
Japan	Overseas component of Biotechnology National Associateship Scheme	1999	3 months	Department of Biotechnology
Mauritius	Pilot expedition to Southern Ocean as a part of a multidisciplinary cruise	2004	51 days	Department of Ocean Development
Malaysia	Workshop on Empowering Vulnerable Stakeholder Groups in Aquaculture	2012	6 days	Universiti Putra, Malaysia

Areas of current research	Phenotypic/ genotypic stock structure analysis, evaluation of genetic heterogeneity and molecular taxonomy/DNA barcoding (fish, shellfish and cetaceans), genetic linkage mapping & QTL and transgenics in ornamental fish
Research Management	Freshwater aquaculture production, genetics & biotechnology, fish nutrition & physiology, fish health management and social sciences.
Memberships/ Positions/ Referee	<ul style="list-style-type: none"> ➤ Since 2002, serving as referee for screening project proposals from Dept of Biotechnology, ICAR, etc. ➤ Since 2003, serving as referee for screening research papers in <i>Indian journal of Fisheries</i>, <i>Journal of Marine Biological Association of India</i> and <i>Journal of Inland Fisheries Society of India</i> ➤ Life member, Marine Biological Association, India ➤ Member, FISHBOL (Fish barcoding of life) ➤ Member, Asian Fisheries Society, Inc, Philippines ➤ Life member, Aquatic Biodiversity Conservation Society, Lucknow

List of Research publications

Referred articles	<ol style="list-style-type: none"> 1. Jayasankar, P. and M.S. Muthu 1983. Toxicity of ammonia to the larvae of <i>Penaeus indicus</i> H. Milne Edwards. <i>Indian Journal of Fisheries</i> 30(1): 1-12. 2. Jayasankar, P. and M.S. Muthu 1983. Toxicity of nitrite to the larvae of <i>Penaeus indicus</i>. <i>Indian Journal of Fisheries</i> 30(2): 231-240. 3. Jayasankar, P. 1989. Some observations on the biology of the blotched croaker <i>Nibea maculata</i> (Schneider, 1801) from Mandapam. <i>Indian Journal of Fisheries</i> 36(4): 299-305. 4. Jayasankar, P. 1989 & 1990. On the skeletal deformity in <i>Scomberomorus commerson</i> (Lacepede, 1801) from the Palk Bay, Mandapam. <i>Matsya</i> 15 & 16: 197-199. 5. Jayasankar, P. and N. Ramamoorthy 1989 & 1990. Occurrence of a malformed specimen of <i>Tachysurus caelatus</i> (Valenciennes, 1840) from the Palk Bay, Mandapam. <i>Matsya</i> 15 & 16: 196-197. 6. Jayasankar, P. 1990. Length-weight relationship and relative condition factor in <i>Otolithes ruber</i> (Schneider, 1801). <i>Indian Journal of Fisheries</i> 37(3): 262-263.
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7. Jayasankar, P. 1990. Some aspects of biology of the white-spotted spine foot *Siganus canaliculatus* (Park, 1797) from the Gulf of Mannar. *Indian Journal of Fisheries* 37(1): 9-14.
8. Jayasankar, P. 1991. On the sillaginid fishes of the Palk Bay and Gulf of Mannar with an account on the maturation and spawning of sand whiting *Sillago sihama* (Forsskal) from Mandapam region. *Indian Journal of Fisheries* 38(1): 13-25.
9. Jayasankar, P. 1991. Length-weight relationship and relative condition factor in *Sillago sihama* (Forsskal) from Mandapam region. *Indian Journal of Fisheries* 38(3): 183-186.
10. Grace Mathew, Jayasankar, P., S. Sivakami and J. Narayanaswamy 1993. Observations on the distribution and biology of a few bathypelagic fishes from the south-west coast of India. *Indian Journal of Fisheries* 40(4): 207-212.
11. Jayasankar, P. 1994. Observations on the biology of some sciaenid fishes from Mandapam region. *Indian Journal of Fisheries* 41(2): 80-86.
12. Jayasankar, P. and K. Alagarwami 1994. Histological and histochemical observations on the oocytes in the sand whiting *Sillago sihama* (Forsskal). *Proceedings of the Indian National Science Academy* B60: 173-182.
13. Jayasankar, P. and S. Krishnapillai 1994. Observations on the fishery of croakers (Sciaenidae) in the trawling grounds off Rameswaram island. *Marine Fisheries Information Service Technical & Extension Series* 131: 11-15.
14. Jayasankar, P. 1995. Population dynamics of big-eye croaker *Pennahia macrophthalmus* and blotched croaker *Nibea maculata* (Pisces/Perciformes/Sciaenidae) in the trawling grounds off Rameswaram island, east coast of India. *Indian Journal of Marine Sciences* 24: 153-157.
15. Jayasankar, P. 1997. Population parameters of *Pennahia anea* and *Nibea maculata* in the Palk Bay/Gulf of Mannar area, India. *Naga ICLARM Q.*, 20(2): 46-48.
16. Jayasankar, P. and K. Dharmalingam 1997. Potential application of RAPD and RAHM markers in genome analysis of scombroid fishes. *Current Science* 72(6): 383-390.
17. Jayasankar, P. and K. Dharmalingam 1997. Analysis of RAPD polymorphisms in Indian mackerel *Rastrelliger kanagartha* (Cuvier) *Naga ICLARM Q.*, 20(3&4): 52-56.

18. Bindhu Vergheese and P. Jayasankar 1999. Electrophoretic patterns of sarcoplasmic proteins in carangid fishes. *Indian Journal of Fisheries* 46(4): 383-389
19. Wang, Z., P. Jayasankar, S.K. Khoo, N. Nakamura, K. Sumantadinata, O. Carman and N. Okamoto 2000. AFLP fingerprinting reveals genetic variability in common carp stocks from Indonesia. *Asian Fisheries Science* 13:139-147.
20. Juliet Joseph and P. Jayasankar 2001. Morphometric and genetic variations in the threadfin bream *Nemipterus mesoprion*. *J. mar. biol. Ass. India* 43 (1&2): 217-221
21. Govindaraju, G.S. and P. Jayasankar 2004. Taxonomic relationship among seven species of groupers (Genus *Epinephelus*; Family Serranidae) as revealed by RAPD fingerprinting. *Marine Biotechnology* 6(3): 229-237.
22. Jayasankar, P. 2004. RAPD fingerprinting resolves species ambiguity of domesticated clownfish (Genus: *Amphiprion*, Family: Pomacentridae) from India. *Aquaculture Research* 35: 1006-1009.
23. Jayasankar, P., P.C. Thomas, M.P. Paulton and Jasmin Mathew 2004. Morphometric and genetic analyses of Indian mackerel (*Rastrelliger kanagurta*) from peninsular India. *Asian Fisheries Science* 17(3&4): 201-215.
24. Jayasankar, P. 2006. Survival of trawl-caught fish in experimental fishing in the Gulf of Mannar and Palk Bay off southeast coast of India. *Indian Journal of Fisheries*, 53(2): 211-217.
25. Jayasankar, P., B. Anoop, Reynold Peter, V.V. Afsal and M. Rajagopalan 2007. Species of a whale and an unknown fish sample identified using molecular taxonomy. *Indian Journal of Fisheries*, 54(3): 339-343.
26. Jayasankar, P., Anoop A Krishnan, M. Rajagopalan and P.K. Krishnakumar 2007. A note on observations on cetaceans in the western Indian sector of the Southern Ocean (20-56°S and 45-57°30'E), January to March 2004. *Journal of Cetacean Research and Management*, 9(3): 263-267.
27. Anoop A. Krishnan, K.S. Yousuf, P.L. Kumaran, N. Harish, B. Anoop, V.V. Afsal, M. Rajagopalan, E. Vivekanandan, P.K. Krishnakumar and P. Jayasankar 2008. Stomach contents of cetaceans incidentally caught along Mangalore and Chennai coasts of India. *Estuarine, Coastal and Shelf Science*, 76(4): 909-913.
28. Jayasankar, P., B. Anoop and M. Rajagopalan 2008. PCR-based sex

determination of cetaceans and dugong from the Indian seas. *Current Science*, 94 (11): 1513-1516.

29. Yousuf, K.S.S.M., A.K. Anoop, B. Anoop, V.V. Afsal, E. Vivekanandan, R.P. Kumarran, M. Rajagopalan, P.K. Krishnakumar, and P. Jayasankar 2008. Observations on incidental catch of cetaceans in three landing centres along the Indian coast. *Journal of Marine Biological Association UK* 2 Biodiversity records, online publication (Ref no. 6254) pp.6.
30. Jayasankar, P., B. Anoop, E. Vivekanandan, M. Rajagopalan, K.M.M. Yousuf, P. Reynold, P.K. Krishnakumar, Pl. Kumaran, V.V. Afsal and Anoop A. Krishnan 2008. Molecular Identification of Delphinids and Finless Porpoise (Cetacea) from the Arabian Sea and Bay of Bengal. *Zootaxa* 1853: 57–67.
31. Shripathi Bhat , Alok Patel, Paramananda Das, Prem K. Meher, Bindu R. Pillai and P. Jayasankar 2008. Isolation and characterization of microsatellite loci in giant freshwater prawn, *Macrobrachium rosenbergii*. *Conserv Genet.*, 10:1473–1475.
32. A. Patel, P. Das, S.K. Swain, P.K. Meher, P. Jayasankar and N. Sarangi 2008. Development of 21 new microsatellite markers in *Labeo rohita* (rohu). *Animal Genetics*. 40(2): 254-255.
33. Jayasankar, P., B. Anoop, M. Rajagopalan, K. M. M. Yousuf, P. Reynold, P.K. Krishnakumar, V.V. Afsal and Anoop A. Krishnan 2009. Indian efforts on the inventorization of marine mammal species for their conservation and management. *Asian Fisheries Science*, 22: 143-155.
34. Patel, A., Das, P., Barat, A., P.K. and P. Jayasankar 2010. Utility of cross-species amplification of 34 rohu microsatellite loci in *Labeo bata*, and their transferability in six other species of the cyprinidae family. *Aquaculture Research*, 41: 590-593..
35. Chinmayee Mohapatra, C., H.K. Barman, R. P. Panda, Sunil Kumar, V. Das, R. Mohanta, S. D. Mohapatra and P. Jayasankar 2010. Cloning of cDNA and prediction of peptide structure of Plzf expressed in the spermatogonial cells of *Labeo rohita*. *Marine Genomics*, 3: 157-163.
36. Barman, H.K., V. Das, R. Mohanta, C. Mohapatra, R.P. Panda and P. Jayasankar 2010. Expression analysis of β -actin promoter of rohu (*Labeo rohita*) by direct injection to muscle. *Current Science*, 99(8): 1030-1032.
37. Jayasankar, P., A. Patel, M. Khan, P. Das and S. Panda 2011. Mitochondrial DNA diversity and PCR-based sex determination of

	<p>Irrawaddy dolphin (<i>Orcaella brevirostris</i>) from Chilika Lagoon, India. <i>Molecular Biology Reports</i>, 38:1661–1668.</p> <p>38. Barman, H.K., S.K. Patra, V. Das, S.D. Mohapatra, P. Jayasankar, C. Mohapatra, R. Mohanta, R.P. Panda and N.S. Rath 2011. Identification and characterization of differentially expressed transcripts in gill of prawn (<i>Macrobrachium rosenbergii</i>) under salt stress. <i>The Scientific World Journal.</i>, Vol 2012doi: 10.1100/2011/149361.</p>
Books edited	<p>1. Vijayan, K.K., P. Jayasankar and P. Vijayagopal (Eds) 2007. <i>Indian Fisheries – A Progressive outlook</i>, Central Marine Fisheries Research Institute, Kerala, 203 pp.</p>
Books	<p>1. Jayasankar, P. and Anoop B 2010. <i>Identification of Marine Mammals of India</i>. Narendra Publishing House, Delhi. 124 p.</p>
Book chapters/ manuals	<p>1. Sivakami, S., E. Vivekanandan, P. Nammalwar, M. Feroz Khan, P.U. Zacharia, G. Mohanraj, Grace Mathew and P. Jayasankar 1998. The non-conventional finfish resources of the Indian EEZ. pp. 243-255. In: Hameed, M.S and Kurup, B.M. (Eds.). <i>Technological Advancements in Fisheries</i> Publ No.1, School of Industrial Fisheries, Cochin University of Science & Technology.</p> <p>2. Chakraborty, S.K., P. Devadoss, P.P. Manojkumar, M. Feroz Khan, P. Jayasankar, S. Sivakami, V. Gandhi, Y. Appanna Sastry, A. Raju, P. Livingston, K.M.S. Ameer Hamsa, M. Badrudin, P. Ramalingam, V.M. Dharieswar, C.V. Seshagiri Rao, K. Nandakumaran, B.B. Chavan and P.K. Seetha 2000. The fishery, biology and stock assessment of jew fish resources of India. In: <i>Marine Fisheries Research and Management</i>. VN Pillai and NG Menon (Editors), CMFRI, Cochin: 604-616.</p> <p>3. Bensam, P., P. Devadoss, Grace Mathew, K.M.S.A. Hamsa, V. Gandhi, S. Lazarus, P.U. Zachariah, M. Feroz Khan and P. Jayasankar 2000. Flatfishes, goatfishes and whitefishes. In: <i>Marine Fisheries Research and Management</i>. VN Pillai and NG Menon (Editors), CMFRI, Cochin: 617-635.</p> <p>4. Jayasankar, P. 2002. Molecular biological techniques in disease diagnosis. <i>Winter School on 'Recent Advances in diagnosis and management of diseases in mariculture'</i>, CMFRI, Kochi, 7th-27th November 2002.</p> <p>5. Jayasankar, P. 2003. DNA Taxonomy. In: ICAR sponsored short course manual on 'Taxonomy and biodiversity of fishes and crustaceans' organizers: College of Fisheries, KAU, Panangad. pp.</p>

79-85.

6. Jayasankar, P. 2004. Aquarium Fish Keeping (In Malayalam). Technology Diffusion – Training Program under IVLP. CMFRI Special Publication No.81: 50-56.
7. Jayasankar, P. 2005. Application of RAPD and AFLP to detect genetic variation in fish. In: *Fish Genetics and Aquaculture Biotechnology* (Eds T.J.Pandian, C.A.Strussmann & M.P.Marian). Science Publishers, Inc. pp. 29-36.
8. Jayasankar, P., 2006. Application of AFLP to Detect Genetic Variation in Fishes. Training Manual on DNA Fingerprinting. NBFGR, Cochin Unit, pp. 60-69.
9. Jayasankar, P., 2006. Recent Trends in Taxonomic identification of Marine Mammals Training Manual on DNA Fingerprinting. NBFGR, Cochin Unit, pp. 101-103.
10. Jayasankar, P. 2007. Application of AFLP to detect genetic variation. *Training Manual on “DNA marker technologies, principles & Applications*. Organized by NBFGR, Cochin Unit from 21st Feb to 3rd Mar 2007. pp. 61-70
11. Jayasankar, P. 2007. Recent trends in DNA-based conservation efforts of marine mammals. *Training Manual on “DNA marker technologies, principles & Applications*. Organized by NBFGR, Cochin Unit from 21st Feb to 3rd Mar 2007. pp. 118-122.
12. Vijayan, K.K., P.C. Thomas, P. Jayasankar and P. Vijayagopal 2007. Perspectives in Marine Biotechnology research and development in India. In: *Status and Perspectives in Marine Fisheries Research in India* (Eds Mohan Joseph Modayil and N.G.K. Pillai). Central Marine Fisheries Research Institute, Kerala, pp. 270-314.
13. Jayasankar, P. 2008a. DNA barcoding of fish for species identification. Training Manual – Hands on Training “Molecular Biology Techniques”. Organized by CIFA, Kausalyaganga from 31st January to 8th February 2008. pp. 9-13.
14. Jayasankar, P. 2008b. Mitochondrial DNA marker – Tool for molecular taxonomy. Training Manual – Hands on Training “Molecular Biology Techniques. Organized by CIFA, Kausalyaganga from 24th June to 3rd July 2008. pp. 9-15.
15. Jayasankar, P. and P. Das 2008. DNA barcoding of cultivable freshwater fishes. Training Manual – Hands on Training “Molecular Biology Techniques. Organized by CIFA, Kausalyaganga from 24th June to 3rd July 2008. pp. 48-50.

16. Jayasankar, P. 2008c. PCR and its applications in fish immunology. Winter School on Recent Advances in Fish and Shellfish Immunology and its Applications. Organized by CIFA, Kausalyaganga from 21st October to 10th November 2008. pp. 101-109.
17. Jayasankar, P. 2008d. Role of genetics and biotechnology in the development of aquaculture. International Training on “Genetic Upgradation of Carps through Selective Breeding and Biotechnology Tools”. Organized by CIFA, Kausalyaganga from 1st to 12th December 2008. pp. 1-6.
18. Jayasankar, P. 2008e. Mitochondrial DNA marker – tool for molecular taxonomy. International Training on “Genetic Upgradation of Carps through Selective Breeding and Biotechnology Tools”. Organized by CIFA, Kausalyaganga from 1st to 12th December 2008. pp. 61-65.
19. Jayasankar, P. 2008f. Transgenic technology – do we need it for genetic improvement? International Training on “Genetic Upgradation of Carps through Selective Breeding and Biotechnology Tools”. Organized by CIFA, Kausalyaganga from 1st to 12th December 2008. pp. 81-88.
20. Jayasankar, P. 2009a. Marine Aquarium – Setting and Maintenance. Short Course on “Recent Advances in Ornamental Fish Breeding and Culture. Organized by CIFA, Kausalyaganga from 12th to 21st January 2009.
21. Jayasankar, P. 2009b. Development and prospect of biotechnology in aqua farming. Summer School on “Recent Advances in Seed Production of Freshwater finfishes and shellfishes”. Organized by CIFA, Kausalyaganga from 18th February to 10th March 2009.
22. Jayasankar, P. 2009c. An Overview of Genetics and Biotechnology research in CIFA. National workshop-cum-training on “Bioinformatics and Information management in aquaculture”. Organized by CIFA, Kausalyaganga from 19th to 21st March 2009.
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