SCIENCE AND CULTURE

MARCH-APRIL 2025/VOLUME 91/NO. 3-4

Nation's Pride Ganga and Bengal's Pride Hilsa

— Basanta Kumar Das and Amiya Kumar Sahoo ... 153

EDITORIAL

A JOURNAL OF NATURAL AND CULTURAL SCIENCES

PUBLISHED BY THE

INDIAN SCIENCE

NEWS ASSOCIATION

		ARTICLE		
EDITORIA <i>Editor-in</i> Professor Sud h	ı-Chief	A Joint Initiative Towards Research and Development in Hilsa Fisheries by ICAR-CIFRI — Basanta Kumar Das, Srikanta Samanta, Amiya Kumar Sahoo and Poonam Majumder		156
Edit	ors	Seasonal Catch Dynamics and Trends of Hilsa (<i>Tenualosa Ilisha</i>) in the Downstream Region of the Farakka Barrage		
Dr. Satyabrata Professor Arnab		 Adipta Chakraborty, Saurav K. Nandy, 		
Mem		Basanta Kumar Das, Sanatan Paul, Sanatan Bera, Naba Kumar Acharya,		
Professor Av	ijit Banerji	Mitesh H. Ramteke and Santhana Kumar V.	•••	161
Professor Syam	al Chakrabarti	Tagging of Hilsa: An Approach to Study Migration Pattern Upstream of the Ganga River		
Professor Mana Dr. Sabyasachi (Dr. Amit K	Chattopadhyay	 Arghya Kunui, Basanta Kumar Das, Poonam Majumder, Naba K. Acharya, Karmveer Singh, Amiya K. Sahoo and Dharmendra K. Meena 		166
Professor Prabi Dr. T.V. Venl COLLABO	kateswaran	Effects of Dissolved Oxygen Levels on the Behavior of Hilsa (<i>Tensualosa ilisha</i>) Under Controlled Conditions — Arghya Kunui, Basanta Kumar Das, Saurav K. Nandy, Adipta Chakravorty,		
Kelvin Brown (Australia)	Deepak Kumar	Debasmita Mohanty and Manoj K. Pati	•••	173
D. P. Chattopadhyaya (Kolkata)	(<i>New Delhi</i>) Abhijit Lahiri	Plankton Dynamics and its Influence on Hilsa Availability in the Estuarine Region of Ganga — Arka Mondal, Basanta Kumar Das, Trupti Rani Mohanty and Mitesh H. Ramteke		178
A. D. Choudhuri (Kolkata) Mrinal K. Dewanjee (USA)	(New Delhi) Monoj K. Patairiya (New Delhi) B.K. Pattnaik (Kanpur)	Effect of Ecosystems on Gut Enzymes in Age and Sex-Dependent of Anadromous Hilsa, <i>Tenualosa ilisha</i> (HAM, 1822) — Hena Chakraborty, Basanta Kumar Das, Arghya Kunui, Amiya Kumar Sahoo,		176
R. Gadagkar (Bangaluru)	V. Ravichandran	Joydev Maity, Abhilash Wodeyar K. Naba Kumar Acharya, Mala Kumari		187
Ajoy Ghatak (New Delhi) Irfan Habib (New Delhi) Amiya K. Hati (Kolkata)	(Kolkata) Amit Roy (Kolkata) Satyesh Chandra Roy (Kolkata)	Extraction, Characterization and Evaluation of Acid- soluble Collagen from Hilsa (<i>Tenualosa ilisha</i>) Scales: An Approach Towards Bioresource Valorization — <i>Mitali Maity, Basanta Kumar Das,</i> Anjon K. Talukder, Biswajit Mandal,		
Mridul Hazarika (Guwahati) S. Kailas (Mumbai) Punam Kakkar	Nimai Chandra Saha (Burdwan) Rajinder Singh (Germany) Srinivasan Srikanthan	Debasmita Mohanty and Amiya K. Sahoo Length-Weight Relationship and Relative Condition Factor of Tenualosa ilisha (Hamilton, 1822) from Farakka, in River Ganga, West Bengal, India — Poonam Majumder, Basanta Kumar Das, Sourav Nandy, Archisman Ray, Arghya		191
(Lucknow)	(Chennai)	Kunui, Susmita Jana and Santhana Kumar V.		201

- Contd. next page.



Indian Science News Association

٨	A	F	N	4	R	F	R	C	•	ı	=	Т	H	I		C		ì	ı	N	J	C	П	
I٧	1	L	I٧	N	D	L	N	J		71				ш	_	┖	u	ж	J	יו	N	v.	ш	_

President

Dr. K. Muraleedharan

Vice-Presidents

Professor S. K. Talapatra Professor (Mrs.) Julie Banerji Professor Bikas K. Chakrabarti Professor Dhrubajyoti Chattopadhyay Professor Basab Chaudhuri Dr. Anil K. Rajyanshi

Honorary Secretaries

Professor Manas Chakrabarty Dr. Amit Krishna De

Honorary Treasurer

Professor Prabir Kumar Saha

Editors, Science and Culture

Professor Sudhendu Mandal, Editor-in-Chief Dr. Satyabrata Chakrabarti Professor Arnab Rai Choudhuri

Members

Professor Avijit Banerji Shri Prasanta K Bose Dr. Manoj Kumar Chakrabarti Professor Syamal Chakrabarti Dr. Sabyasachi Chattopadhyay Dr. (Mrs.) Sumitra Chaudhuri Dr. Manas Pratim Das Dr. D. P. Duari Dr. S. P. Gon Chaudhuri Shri Pathik Guha Dr. Balaram Majumder Professor Partha P. Majumder Dr. Sitendu Mandal Professor Shankarashis Mukherjee Professor Devaprasanna Sinha Dr. D. K. Srivastava Professor (Mrs.) Bani Talapatra Dr. T.V. Venkateswaran

Cover:

A: Page 237, Fig. 2 B: Page 170, Fig. 10 C: Page 168, Fig. 1 D: Page 174, Fig. 1

Growth Trends and Forecasting of Hilsa (<i>Tenualosa ilisha</i>) Landing at Farakka, Godhakhali, and Diamond		
Harbour in River Ganga, India: Insights Using Auto- Regressive Integrated Moving Average (Arima) Model		
— Sanatan Paul, Basanta Kumar Das,		
Hena Chakraborty, Sanatan Bera, Amiya K.		
Sahoo, Arghya Kunui and Saurav K. Nandy	•••	207
Conservation Strategies Towards Hilsa Fisheries Restoration in India and Bangladesh		
— Sanatan Bera, Basanta Kumar Das, Amiya K.		
Sahoo, Dharmendra K. Meena, Arghya Kunui, Saurav K. Nandy and Adipta Chakraborty		215
Unraveling the Growth and Economic Significance of Hilsa, A Seven Year Study at Godakhali: A Major Hotspo — Saurav Kumar Nandy, Poonam Majumder, Basanta Kumar Das, Hena Chakraborty,	t	
Mala Kumari, Shreya Bhattacharya,		
Arghya Kunui and Amiya K. Sahoo		219
Delineating the Spatio-Temporal Variation in Otolith Microchemistry and Migratory <i>Tenualosa ilisha</i>		
(Hamilton, 1822) from Brahmaputra River, India		
— Simanku Borah, Amiya Kumar Sahoo, Dharmendra Kumar Meena. Birendra Kumar		
Bhattacharjya, Neeraj Kumar and		
Basanta Kumar Das		224
Assessing Vulnerability and Promoting Sustainability: A Study of Hilsa Fisheries in West Bengal		
— Shreya Bhattacharya, Basanta Kumar Das,		
Prateep K. Nayak, Arun Pandit, Sisit K. Pradhan and Naba K. Acharya		233
•	•••	233
Expression Kinetic Study of HSP70 Gene Associated Transportation Stress of <i>Tenualosa ilisha</i> (Hamilton 18:	22)	
 Soumya P. Panda, Saurav K. Nandy, Arghya Kunui, Amiya K. Sahoo, Dharmendra K. Meena 		
and Basanta Kumar Das	ı	240
OPINION		
The Initiative of G. Swarup and V.G. Bhide Behind the Establishment of IISERS: An Untold Story		
— Arnab Rai Choudhuri and S. Ananthakrishnan.		244
RESEARCH COMMUNICATION		
Impact of Noise Pollution on Environment: An		
Exploratory Study		
— Rituparna Basak and Saikat Kumar Basu	•••	253
Assessment of the Nutritional Status by Anthropometry and MNA-SF: A Study in Bengali Older Adults		
— Sambaran Mondal, Enakshi Chakraborty,		
Sandipan Chatterjee, Neepa Banerjee and Shankarashis Mukherjee		258
NOTES AND NEWS	•••	230
i) Biofortification: A Gateway to Nutritional Securi	tv	263
ii) ISNA XXXVII Training Programme (Online): Certificate Course on Advanced Training on	cy	203
Science Communication and Media Practice for the 2024-2025		264
iii) Release of Special Cover with Mystamp on	•••	∠04

Dr. U.N. Brahmachari

265

Members of the Advisory Committee of Indian Science News Association

Professor Padmanabham Balaram	Bengaluru			
Professor D. Balasubramanian	Hyderabad			
Professor Uday Bandyopadhyay	Kolkata			
Professor Basudeb Barman	Kolkata			
Professor Ashoke Nath Basu	Kolkata			
Dr. Balaram Bhargava	New Delhi			
Dr. Srivari Chandrasekharan	New Delhi			
Dr. Purnendu Chatterjee	Kolkata			
Professor Suranjan Das	Kolkata			
Professor Santa Datta (De)	Kolkata			
Dr. Rajesh S. Gokhale	New Delhi			
Dr. (Mrs.) N. Kalaiselvi	New Delhi			
Professor Abhay Karandikar	New Delhi			
Dr. K. Kasturirangan	Bengaluru			
Dr. R.A. Mashelkar	Pune			
Professor Goverdhan Mehta	Hyderabad			
Dr. Himanshu Pathak	New Delhi			
Professor Ashoke Sen	Allahabad			

SCIENCE & CULTURE ADVERTISEMENT

RATE

	Single I	nsertion
	(Full Page)	(Half Page)
COVER (Back)	Rs. 20,000/-	×
COVER (Front Inside)	Rs. 15,000/-	×
COVER (Back Inside)	Rs. 15,000/-	×
OTHER PAGES	Rs. 10,000/-	×

N.B.: For colour or any other special types of advertisement—rates may be negotiated.

A discount of 20% for insertions in all issues in a year and of 15% for atleast three insertions will be allowed.

TO OUR READERS

Your appreciation of the journal makes us bold to suppose that some of your friends would also like to read SCIENCE AND CULTURE, the premier scientific bi-monthly of India devoted to the publication of the progress in pure and applied sciences. The Indian Science News Association has been conducting the journal for 91 years with the editorial co-operation of eminent scientists of India with the object of promoting and diffusing knowledge laying special stress on the progress of scientific studies here and abroad, and advocating methodical application of science to problems of national regeneration.

Editorial correspondence should be sent to the Editor-in-Chief, *Science and Culture*, 92, Acharya Prafulla Chandra Road, Kolkata-700 009, E-mail: editorial.scienceandculture@gmail.com/chiefeditorscienceandculture@gmail.com. Manuscripts prepared in accordance with the 'Instruction to Authors' should be submitted through e-mail.

Correspondence relating to subscription, advertisement and other matters should be addressed to the Honorary Secretary, Indian Science News Association, 92, Acharya Prafulla Chandra Road, Kolkata - 700 009, Phone: 2350-2224. E-mail: editorial.scienceandculture@gmail.com Website: scienceandculture-isna.org

MEMBERSHIP FEE

Life Member (India)	Rs.	7,000.00*+
Life Member (Foreign)	\$	600.00
Ordinary Member (without journal)	Rs.	100.00
Ordinary Member (with journal)	Rs.	1,000.00
(Including	Post	age charge)

ANNUAL SUBSCRIPTION

Inland (Institution)	Rs. 3,000.00
Foreign	U.S.\$ 125.00
Inland (Individual)	Rs. 1,000.00
Foreign (Individual)	US.\$ 60.00
Single Copy (Inland)	Rs. 200.00
Single Copy (Foreign)	\$ 20.00

^{*} Entitles to receive Science and Culture for 15 years

⁺ Rs. 1000/- towards the cost of delivery of the journal for 5 years

Past Special Issues (Sponsored)

- Aerospace and Allied Technologies, Vol. 91(1-2), January-February 2025, by CSIR-National Aerospace Laboratories, Bengalure.
- Antimicrobial Resistance (AMR), Vol. 90 (11-12), November-December 2024, by ICMR-National Institute for Research in Bacterial Infections, Kolkata (formerly ICMR-NICED)
- Natural Sciences and Engineering for Sustainable Development, Vol. 90 (7-8), July-August 2024, by Department of Physics, Kazi Nazrul University, Asansol, West Bengal
- Lifestyle Disorders and Ayurveda, Vol. 90 (5-6), May-June 2024, by Paschimbanga Ayurved Chikitsak Samity, Kolkata
- Non-Linear Dynamics, Vol. 89 (11-12), November-December 2023, by Durgapur Govt. College, Durgapur, West Bengal
- Interdisciplinary Research, Vol. 89(9-10), September-October 2023, by the Central University of Odisha, Koraput, Odisha
- Interdisciplinary Research, Vol. 89(7-8), July-August 2023, by the Central University of Odisha, Koraput, Odisha
- Environmental Toxicology, Vol.89 (3-4), March-April 2023, by The University of Burdwan, West Bengal
- Fisheries of River Ganga Under Changing Climate, Vol.88 (11-12), November-December 2022, by the ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata
- Fisheries of the Holy Ganga River, Vol.88 (9-10), September-October 2022, by the ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata
- Climate Crisis in India: Issues and Concerns, Vol.86 (1-2), January-February 2020, by Department of Atomic Energy through Raja Ramanna Fellowship Award to Prof. Alak Ray and partly by All India Peoples Science Network.
- A Quantum Jump in Computation, Vol.85 (5-6), May-June 2019, by the Department of Science and Technology through J.C. Bose Fellowship Award to Prof. Bikas K. Chakrabarti
- How Bose Statistics Changed Our Understanding of Matter, Vol.85 (1-2), January-February 2019, by S. N. Bose National Centre for Basic Sciences, Kolkata
- Meghnad Saha and the World of Plasmas, Vol.84 (11-12), November-December 2018, by the Department of Science and Technology through J. C. Bose Fellowship Award to Prof. Arnab Rai Choudhuri
- Cooperative Learning and Social Games: Kolkata Restaurant Problems, Vol.84 (1-2), January-February 2018, by the Department of Science and Technology, through its J. C. Bose Fellowship Research Grant, to Saha Institute of Nuclear Physics, Kolkata.
- J. C. Bose, Bose Institute and Scientific Legacy, Vol.83 (11-12), November-December 2017, by Bose Institute, Kolkata
- International Year of Light 2015, Vol.81 (11-12), November-December 2015, by CSIR-Central Glass and Ceramic Research Institute, Kolkata
- Nuclear Chemistry Research: Past, Present and Future, Vol.81 (9-10), September-October 2015, by Saha Institute of Nuclear Physics, Kolkata
- Communicating Science Through Science Museums, Science Centres and Planetaria towards Developing a Culture of Science, Vol.79 (11-12), November-December 2013, by National Council of Science Museum, Kolkata
- Atomic Energy in National Development, Vol.79 (1-2), January-February 2013, by Department of Atomic Energy, Govt. of India

- CSIR-NML on the March, Vol.78 (11-12), November-December 2012, by CSIR-National Metallurgical Laboratory (NML), Jamshedpur
- CSIR-CSIO: Instrumental in Scientific-eco System Measurements, Vol.78 (9-10), September-October 2012, by CSIR -Central Scientific Instruments Organisation, Chandigarh
- A Journey from Plant Physiology to Plant Biology, Vol.78 (5-6), May-June 2012, by Bose Institute, Kolkata
- New Science of Synthetic and Systems Biology, Vol.78 (3-4), March-April 2012, by CSIR-Indian Institute of Chemical Biology, Kolkata
- Impact of CSIR-NEIST in the North East Region, Vol.77 (11-12), November-December 2011, by CSIR - North East Institute of Science and Technology (NEIST), Jorhat, Assam
- Recent Trends in Tea Research, Vol.77 (9-10), September-October 2011, by Tea Research Association, Assam
- Emerging Trends in Genomics: Applications in Health and Disease, Vol.77 (1-2), January-February 2011, by CSIR-Genomics and Integrative Biology, New Delhi
- Fifteen years of Econophysics Research, Vol.76 (9-10), September-October 2010, by Saha Institute of Nuclear Physics, Kolkata
- Cholera: A Disease that Eludes Technological Advance, Vol.76 (5-6), May-June 2010, by ICMR-National Institute of Cholera and Enteric Diseases, Kolkata
- Geomagnetism and Aeronomy, Vol.75 (9-10), July-August 2009, by Indian Institute of Geomagnetism, Mumbai
- Origin of Species-A Revolutionary Argument, Vol.75 (3-4), March-April 2009, by University of Calcutta
- Scientific Legacy of Acharya J. C. Bose The Doyen of Indian Science, Vol.74 (11-12), November-December 2008, by Bose Institute, Kolkata
- Radio Science, Vol.74 (9-10), September-October 2008, by National Physical Laboratory, New Delhi
- Mysteries of the Earth's Interior, Vol.74 (5-6), May-June 2008, by National Centre of Experimental Mineralogy and Petrology, Allahabad
- Natural Products Chemistry, Vol.74 (1-2), January-February 2008, by Prof. Biswapati Mukherjee
- Forensic Science in Criminal Justice Delivery System, Vol.73 (11-12), November-December 2007, by Central Forensic Science Laboratory, Kolkata, Directorate of Forensic Science, Ministry of Home Affairs, Govt. of India
- Current Trends in Leishmania Research, Vol.73 (5-6), May-June 2007, by CSIR-Indian Institute of Chemical Biology, Kolkata
- Unconventional Applications of Physics, Vol.73 (3-4), March-April 2007, by Prof. Indrani Bose and Prof. Bikas K. Chakrabarti
- Water Resources in South Asia: An Assessment of Climate Change - Associated Vulnerabilities and Coping Mechanisms, Vol.71 (7-8), July-August 2005, by Asia-Pacific Network for Global Change Research
- Glass and Ceramic Research in India, Vol.71 (5-6), May-June 2005, by CSIR- Central Glass and Ceramic Research Institute, Kolkata