Hiralal Chaudhuri (1921–2014)

Hiralal Chaudhuri, former FAO Expert and Senior Scientist at ICAR-Central Inland Fisheries Research Institute (CIFRI), Kolkata, passed away on 12 September 2014. Chaudhuri was born on 21 November 1921 at Sylhet in the then Bengal (now in Bangladesh). He passed his B Sc and M Sc (zoology), both in first class first, from Bangladesh; M S from Auburn University, Alabama, USA and was conferred D Sc by the Central Institute of Fisheries Education (Deemed University), Mumbai in 2010. Chaudhuri started his career as a lecturer in Murari Chand College, Sylhet in 1947; later following a brief association with the Indian Veterinary Research Institute, Izatnagar as Research Assistant, he joined CIFRI, Barrackpore as a Junior Research Assistant on 1 June 1948. His long and eventful journey at CIFRI was spread over 28 years, both at the Headquarters in Barrackpore and its regional centre in Cuttack, Odisha, where he worked as Junior Research Assistant (1948–50), Senior Research Assistant (1950–55), Fishery Extension Officer (1959–60), Fish Breeding-in-Charge (1960–63), Officer-in-Charge, Cuttack Research Station (1964), Senior Scientist and Officer-in-Charge CIFRI Station and Head, Fish Culture Division (the Cuttack station later shifted to Bhubaneswar and grew multifold becoming the present Central Institute of Freshwater Aquaculture at Kausalyaganga, Bhubaneswar; 1971–75). He also officiated as Director, CIFRI on several occasions.

Chaudhuri was a fish breeder par excellence. In the initial stage of his research career in CIFRI, he was successful in breeding a small mud goby (*Gobioptures chuno*, Hamilton). This triggered his interest in fish breeding. At that point he was shifted to then Pond Culture Section of CIFRI in Cuttack, where he continued to work on fish breeding and culture under the leadership of another fisheries stalwart K. H. Alikunhi (1918–2010)[1]. At that point of time, despite the development of technology for higher production of Indian major carps (IMCs), the non-availability of quality fry and fingerlings in sufficient quantity was a constraint in large-scale adoption of the technology by the entrepreneurs. Chaudhuri started working in this direction and took up research programmes on captive breeding of IMCs.

He went to USA in 1954 for specialized training under the mentorship of the internationally acclaimed fisheries expert H. S. Swingle at Auburn University. He mastered the technique and successfully extracted the pituitary hormone from the pituitary gland of common carp. He also acquired a M S degree from Auburn University in 1954. On his return to

India, Chaudhuri further sharpened his skills and was able to successfully breed the small indigenous fish *Esomus danricus* in 1955 and *Pseudeutropis atherinoides* in 1956, using pituitary extracts. On 10 July 1957, he succeeded in induced breeding of the minor carp *Cirrhinus reba* in an aquarium (in captivity) and could successfully produce spawns within 18 h of hatching from eggs. Until then, breeding of this fish in confinement was not successful anywhere in the world. Following this, the simultaneous breeding of IMCs *Cirrhinus mrigala* (mrigal), *Labeo rohita* (rohu) and minor carp *Puntius sarana* was added to the list of his success stories[2]. At this point several countries around the globe, including Burma, Lao PDR, Fiji, Sudan, Malaysia and the Philippines sought his expertise for successful fish-breeding programmes.

Once his expertise and technical acumen in fish breeding and aquaculture became internationally known, Chaudhuri was one of the most sought after for many international assignments. During 1967–76, he served as Fishery Advisor, Food and Agricultural Organization/United Nations Development Programme (FAO/UNDP) at Myanmar. In 1976, he took voluntary retirement from active government service to take up international assignments as Regional Coordinator (FAO/UNDP), SEAFDEC/SARCA and Deputy Director of Aquaculture (1976–79). He also worked for development of fish breeding and aquaculture in Fiji, Sudan, Nigeria, Malaysia, Bangladesh, Singapore, Indonesia, Taiwan and Israel. He was Chief Technical Advisor (CTA) and Coordinator for Aquaculture Development in Lao PDR under FAO/UNDP (1979–84) and Senior Technical Advisor SEAFDEC in the Philippines (1985–88). During 1988–93, he was visiting Professor at UPLB, LOS BANOS in the Philippines.

Chaudhuri was a recipient of several prestigious national and international awards, including the Chandrakala Hora Memorial Gold Medal (1961), Rafi Ahmed Kidwai Award of the Indian Council of Agricultural Research, and the Gamma–Sigma Delta and Golden Key Award of the Auburn University, USA. In 1994, the University of California, Bogdega Marine Laboratory, Pacific Rim Aquaculture honoured him with World Aquaculture Award for his pioneering studies on reproductive hormone of fin fishes. In 2002, he was given an award by the Asiatic Society for his contribution to the field of zoology in Asia. He was associated with many professional scientific societies including the Inland Fisheries Society of India, Barrackpore, the oldest one in the country in its field.

Owing to his pioneering research in 'induced breeding of fish', Chaudhuri is regarded as the 'father of induced breeding' in the country. To honour this great achievement, which in fact was the harbinger of the 'first blue revolution' in the country, the Government of India has declared 10 July as the 'National Fish Farmers' Day' (commemorating the 'first induced breeding' of *Cirrhinus reba* in captivity on 10 July 1957 by Chaudhuri). Thus, Chaudhuri has been immortalized by his outstanding original research contribution. The Government is now calling for the second blue revolution for augmenting fish production not only for

supplying quality animal protein to millions of countrymen, but for meeting the projected target of 22.4 million tonnes of fish for feeding the 1.7 billion population by 2060. It would not have been possible to achieve the present level of fish production (9.54 million tonnes) had the induced breeding technology not been developed by Chaudhuri and his associates. Indian major carps rohu, catla and mrigal could not have contributed to the tune of 85% of the fish production from freshwater aquaculture in India, had the induced breeding technology not been developed by Chaudhuri.

Chaudhuri's demise is a great loss to the entire fisheries fraternity, aquaculture world and his family. He is survived by a son and a daughter.

1. Vivekanandan, E. and Pandian, T. J., *Curr. Sci.*, 2011, **100**(6), 935.
2. Chaudhuri, H. and Alikunhi, K. H., *Curr. Sci.*, 1957, **26**(12), 381.

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Brian F. C. Clark (1936–2014)

Brian F. C. Clark, one of the pioneering researchers in molecular biology passed away on 6 October 2014. Clark obtained M A, Ph D and Sc D from the University of Cambridge, UK. He went on to do his postdoctoral works at MIT, NIH and later worked for MRC Laboratory of Molecular Biology, Cambridge, UK before joining as a professor at Aarhus University, Denmark in the early 1970s. His research converged on the molecular mechanisms leading to protein biosynthesis and later he took up ageing as one of his primary research areas. His work focused on the tRNA-binding proteins which are an overture for G-protein coupled receptors (GPCR), a remarkable modular system inside the cells and a drawing card for a Nobel Prize outside. What is more engrossing is that he had collaborators who won Nobel Prizes. Notable among them was Francis Crick, who joined his laboratory for a brief stint in Aarhus University. Clark served as a Vice President of the European Federation of Biotechnology (EFB) and board member of a host of organizations, besides actively organizing several symposia and workshops which benefited many researchers. He received esteemed accolades for his works from different academies, societies and institutes. Nevertheless, his greatness attribute to mentoring young researchers and graduates in formulating a solid problem. The excerpt in a review about the 3D structural determination of a tRNA shows how much integrity and respect Clark had for science and his fellow scientists[1]: 'Although it did not gain anyone a Nobel Prize, possibly because too many people were involved and the methods used turned out to be relatively standard, but it gave us enormous satisfaction at the time. And, I am happy to add that Aaron Klug, who led the crystallographic analysis at the LMB, did win the Nobel prize for the year 1982.'

In August 2004, we attended a functional genomics workshop organized by Clark in Aarhus University[2]. It was through discussions with him that we got to learn the involution of making a problem formulation for protein biology studies as a part of our Ph D beholden to use salutations, which he smilingly renounced. Apart from his humble esteem, Clark had a great sense of humour. The discussions with him ranged from our acclimatization to a new place to the research topics we have chosen. We also got acquainted with wide range of topics that included tRNA, crystallography, mitochondria and ageing.

Though we did not have the luck of sitting in his class, we had learnt so much about Clark from his rattling list of publications, mentees and colleagues, that we could easily imagine him to be the best educators besides one of the best scientists. The couple of hours we spent with him changed our thought process and one could overtly imagine what would it be like for those who finished graduate school and Ph D in the laboratory of Brian Clark. With his demise, we have indeed lost a great scientist.

1. Clark, B. F., *J. Biosci.*, 2006, **31**(4), 453–457.
2. http://scitech.au.dk/aktuelt/nyheder/vis/artikel/international-workshop-applied-functional-genomics/

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