

**RGCA organized an international Seminar on GENETICS AND SUSTAINABLE AQUACULTURE 2015- during the third edition of Dr. E.G. Silas Annual Endowment Lecture**



*Inauguration of the 3<sup>rd</sup> edition of Dr. E. G. Silas Annual Endowment lecture by Ms. Leena Nair, IAS Chairman MPEDA & President RGCA*

The Rajiv Gandhi Centre for Aquaculture (RGCA) has organized a one-day International seminar on *Genetics and Sustainable Aquaculture* (GSA-2015) as part of the 3<sup>rd</sup> Dr. E.G. Silas Annual Endowment Lecture on 10<sup>th</sup> August 2015 at Chennai, Tamil Nadu.

The seminar was an outstanding effort by MPEDA-RGCA to instill awareness on the crucial role of genetics and selective breeding in aquaculture systems among the stakeholders of the aquaculture industry of the country. It provided an interactive platform for the researchers and scientific community who attended the programme as internationally acclaimed Aquaculture Geneticists

were invited to deliver talks on various aspects of aquaculture genetics during this event.

Project Director of RGCA, Shri Y.C. Thampi Sam Raj welcomed the gathering and recalled the enormous contributions made by Dr. E.G. Silas towards Indian aquaculture sector and mentioned about his invaluable and unparalleled contributions to all the projects of RGCA.

The event was inaugurated by Ms. Leena Nair IAS, President, RGCA and Chairman, MPEDA by lighting the traditional lamp. In her inaugural address, President RGCA lauded the effort of RGCA-MPEDA in the field of applied research and for addressing the current National and International needs of the aqua farmers and fisheries sector. She stressed the importance of the theme of the seminar and the role of Central Aquaculture Genetics Laboratory (CAGL) of RGCA in the field of aquaculture genetics. The benefits acquired through genetic improvement, importance of selective breeding and the commendable research work done by the Organization in the field of aquaculture genetics with reference to traceability and sustainability for the Indian aquaculture industry were highlighted during her speech.



*Shri Y.C. Thampi Sam Raj, Project Director RGCA welcoming the gathering*

The Guest of honour of the event, Dr. E.G. Silas, former Director of the Central Marine Fisheries Research Institute, former Vice Chancellor of the Kerala Agricultural University and the present Chairman of the Scientific Advisory Committee of RGCA delivered the visionary Key Note address on the importance and opportunities of the wide spectrum of Aquaculture Genetics and biotechnology that could sustain our aquaculture industry. Dr. Silas mentioned about the rapid advances made in the field of genetics that has taken the mankind far beyond the genes, proteins and enzymes. In his speech, Dr. Silas highlighted few strategies that could strengthen several research programmes in aquaculture genetics such as ‘genomics in combination with traditional breeding practices’, ‘hatchery management and seed certification guidelines’, ‘hatchery escapes and its consequences’, ‘species prioritization’, ‘sex determination’ and ‘gene silencing’. In his concluding remarks, Dr. Silas highlighted about the role of genetics in production of *in vitro fish* (FACTORY FISH) meat and the futuristic need for the development of *In vitro Fish* flesh Production System (IFPS) in the Country. He also appreciated the

work done by the Organization in the field of Aquaculture Genetics and the manner in which the application of Genetics is infused and implemented into the various on-going programmes of RGCA



*Dr. E.G. Silas, Chairman of the Scientific Advisory committee of RGCA delivering the key note address*

The dignitaries who felicitated the event were the Chief Executive Officer of the National Fisheries Development Board (NFDB) Shri K.N. Kumar, IAS, Dr. S. Vijayakumar, IAS, the Secretary, Department of Animal Husbandry, Dairying & Fisheries, Govt. of Tamil Nadu; Dr. P. Ravichandran the Member Secretary of the Coastal Aquaculture Authority (CAA) of India,; Dr. J.K. Jena Director of the National Bureau of Fish Genetics Resources,; Dr. P. Jayasankar Director of the Central Institute of Freshwater Aquaculture, and Dr. K.K. Vijayan, Director of the Central Institute of Brackish water Aquaculture.

In his felicitation address, Shri K.N. Kumar, IAS complimented RGCA for organizing such an event with a futuristic theme 'Genetics and Sustainable Aquaculture' which is highly relevant

and essentially required for addressing the current scenario of aquaculture. He also mentioned about the target given by Honourable Prime Minister of India for a comprehensive and holistic 'Blue Revolution' through species improvement, species domestication and species diversification.

Dr. S. Vijayakumar, IAS appreciated the Organization for providing 1<sup>st</sup> batch of GIFT broodstock to the Department of Fisheries, Govt. of Tamil Nadu and for signing a MoU for hatchery establishment and seed production of GIFT at Krishnagiri District for the augmentation of quality tilapia farming in Tamil Nadu.

Dr. P. Ravichandran highlighted the importance of construction of breeding centres for genetically improved indigenous variety of fish and shellfish in the country and mentioned about RGCA's breeding programme for Domestication of the Tiger Shrimp Project (DTSP) for achieving self-sufficiency in broodstock production.

Dr. J.K. Jena emphasized the need for 'cooperation, collaboration and convergence' to translate 'input-based production' into 'knowledge-based production' for sustainable growth in aquaculture. He mentioned about 'genetic contamination' which arises through unplanned ranching programmes and the deleterious effect of 'back-crosses' conducted by hatcheries

Dr. P. Jayasankar applauded the untiring efforts of RGCA for promoting mariculture in the country and possibility of 'vertical expansion' of productivity in the country through genetic research.

Dr. K.K. Vijayan emphasized the need for a balance between finfish and shellfish aquaculture system for sustainability and advocated for interaction and sharing of quality knowledge between aquaculture institutes, industries, policy makers and other stake holders which is vital for the sustainability of Indian aquaculture.

The seminar GSA 2015 turned out to be more markedly significant with the release of inaugural issue of RGCA Quarterly Newsletter and the first batch of Genetically Improved Farmed Tilapia (GIFT) broodstock.

Ms. Leena Nair, IAS chairman MPEDA and President RGCA released and presented the first copy of the Newsletter to Dr. E. G. Silas and the first batch of GIFT broodstock to Dr. S. Vijayakumar IAS, Secretary, Department of Fisheries, Tamil Nadu.

While the newsletter of the Organization was launched with an objective of providing first-hand information on aquaculture sector of the Country besides providing insights on RGCA project activities the release of GIFT broodstock marked the beginning of initiatives to popularize tilapia culture in the Country, which essentially serves in food security. The first batch of broodstock was supplied to the Country's first Satellite Breeding Centre at Krishnagiri, TN.





*Release of the inaugural issue of RGCA Quarterly Newsletter*



*GIFT Broodstock being handed over to Dr. S. Vijayakumar IAS, Secretary, Dept. of Fisheries Tamil Nadu by Ms. Leena Nair, IAS Chairman MPEDA and President RGCA*

The technical sessions of the GSA-2015 were unique and the lectures were delivered by renowned aquaculture geneticists and selective breeding experts.

The session started with the 3<sup>rd</sup> Dr. E.G. Silas Endowment Lecture by Dr. Roger W. Doyle, President, Gene Computation Limited, Canada. In his lecture on *“The relationship between management, inbreeding, and susceptibility to disease and environmental stress in aquaculture”*, the chief speaker Dr. Doyle enlightened the

audience with information on the adverse effect of inbreeding and the importance of knowledge sharing at national level networking for sustainable aquaculture.

The lecture highlighted the positive feedback loop that connects current disease-control policies to inbreeding, and the relation between inbreeding to increased susceptibility to diseases etc. The main consequence of inbreeding which renders animals more susceptible to disease and environmental stress was illustrated during the lecture.

Dr. Doyle also explained the main policy recommendation for controlling the disease by imposing trans-border restrictions, use of Specific Pathogen Free (SPF) stocks and so on. Policy changes that offer a possible way to break the destructive pathways, invoke positive feedback loop and make aquaculture more sustainable over the long term were suggested. The main recommendations suggested were to follow the example of terrestrial animal husbandry practices by establishing "breed networks" of loosely interconnected, independent breeding programmes, such as a National Broodstock Improvement Network, or NBIN which would minimize inbreeding and help to keep the inbreeding magnitude to low levels.





*Dr. R.W. Doyle interacting with the participants during the lecture event*

The technical sessions included presentations from the Experts from Oceanic Institute of Hawaii Pacific University (OI), Hawaii, USA. Dr. Shaun Moss, Executive Director, OI, delivered a lecture on *“Observations from an optimist: The future of shrimp farming and making the right decisions”*

In his lecture, he explained about the legacy of a Public–Private Partnership: A Case Study of the U.S. Marine Shrimp Farming Program (1985–2011). The main goal of the programme was to identify and solve problems which constrain the profitability and expansion of U.S. Marine Shrimp Farming Industry with programmatic objectives such as Stock Improvement, Disease Control and Sustainable Culture Technology. He highlighted the consequences of uncontrolled environment (water & shrimp seed) and genetic inbreeding which is currently prevailing in the shrimp industry.

Dr. Shaun Moss suggested measures for strengthening future aquaculture industry including i) Implementation of better control of trans-boundary movement of crustacean pathogens via live shrimp and raw products, ii) Develop regional guidelines on how the shrimp farming industry can adapt to global climate change, iii) Development and support to an effective extension program to transfer current scientific knowledge to the farmer and iv) Investing a portion of profits into on-farm R&D activities which could promote cost-effective farming strategies.

Dr. Dustin Moss, Director, Shrimp Research Program, OI delivered the lecture on “*The role of genetic improvement programs in shrimp aquaculture*”.

He highlighted the common goal of aquatic breeding programmes and explained the attributes of shrimp that makes them ideal for genetic selection programmes. He described the history and types of selective breeding programmes, consequences of inbreeding, breeding structures and *pros and cons* of different types of selection. Dr. Dustin pointed out that the development and maintenance of specialized lines and genetic diversity are important along with the development and implementation of molecular and genetic tools like SNP chips.

Dr. Curtis E. Lind, Scientist, Aquaculture & Genetics Improvement, WorldFish, Penang, Malaysia lectured on “*Genetic diversity and effective population size in aquaculture, with a case study on the GIFT breeding program in India*”. With simple and

lucid illustrations, Dr. Curtis explained about the requirement of genetic diversity for selection in breeding programme. He highlighted the effective population size of a breeding programme and the necessity of satellite breeding nuclei by citing example of RGCA's GIFT project.

Participants cleared their doubts and shared their experience with the speakers after each presentation. In the concluding session of the event the speakers took several questions from the delegates and gave comprehensive and collective suggestions for each query. The theme of the session was 'The importance of multiple, independent breeding programmes in national aquaculture development' with general discussion. One of the participants, Mr. Y. Ravi from Vaisakhi group of Hatcheries, asked the panel, whether the SPF breeding programmes need to take lessons from shrimp breeding programmes of Ecuador for less susceptibility to disease? Answering the question, Dr. Dustin observed that the SPF programmes mainly linked with quality production and not aimed to address any local problems. To address the disease problems that arise locally, several issues like finance, facility, germplasm protection, logistic and trust, need to be considered.

A progressive fish farmer queried, about the performance of GIFT in different geographical locations of India. To which, Dr. Curtis explained that both RGCA and World Fish are working on this aspect and the joint efforts of these organizations is sure to produce GIFT varieties suitable for farming in different geographical locations in India.

The Secretary of the Pattukottai Shrimp Farmers Association, Mr. D. Balasubramanian raised the issue regarding the difficulties farmers are facing with non-SPF seeds and wanted to know from the panel how to identify the shrimp seed from SPF and non-SPF sources. Both Dr. Doyle and Dr. Dustin discussed this important issue and suggested that the molecular genetic markers could be developed to trace the seed source. He also stressed the need of industry's support to develop such markers based verifiable protection system which will be beneficial for the farmers and breeders.



*Participants on interaction with panel*

Director of CIFA, Dr. P. Jayasankar requested the panel for suggestions to identify improved variety of Jayanti Rohu. The panel observed that the external body colour may be misleading in identification particularly in fry or fingerling stages and suggested that the unique SNP markers may be useful for the identification.

Mr. Parasu Raman Iyer from Vels University, Chennai wanted to know how the genetic improvement programmes having edge over the immunostimulants or vaccination? Dr. Shaun Moss replied

that the shrimps having very less sophisticated immuno system compared to fishes and other terrestrial animals are less responsive to immunostimulants, probiotics or vaccines. Whereas, selective breeding programmes as a part of multiple approaches to combat the pathogens, have already shown the capability to produce SPF or SPR shrimp varieties. The entire event turned out to be highly educative, interactive and lively.



*Participants in rapt attention during GSA-2015*

Dr. Anup Mandal, Project Manager, Central Aquaculture Genetics Laboratory, of RGCA proposed vote of thanks.



*Participants at registration counter*

The event was a resounding success with substantial participation of aqua farmers, hatchery operators, exporters, aquaculturists, Govt officials, entrepreneurs, Academe scientists from National Institutes, University and research scholars across the country. s. A total of about 280 delegates attended the event from 11 states of the country along with the participants from Abu Dhabi and USA, which again underlines the importance of genetics in sustainable aquaculture.