May 2013

Society of Marine Biologists (SOMB)

Newsletter

Dept. of Marine Biology, Microbiology & Biochemistry
School of Marine Sciences, Cochin University of Science & Technology, Cohin-16

SOCIETY OF MARINE BIOLOGISTS (SOMB) NEWSLETTER

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	Mr. Solly Solomon
	Mr. Mohamed Shafi

Message from President

The Society of Marine Biologists (SOMB) was formed in the year 2005 with a vision to unify and lead marine biologists through avenues of scientific knowledge, economic opportunity and social progress. The society runs from the Department of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences, Lakeside Campus, CUSAT. Avowed to "Explore beyond expeditions", SOMB is devoted to the study of all aspects of marine life, training of marine biologists and dissemination of information to the public.

The oceans, being under explored and to a great extent unexplored offer great potential for the young generation to develop an exciting career in this field. Having tremendous impact on modulating the global weather, world ocean are gaining lot of importance in this era of rapid climate change. They are also looked at as a panacea of food for the ever burgeoning human population on earth. However, the coastal oceans being plundered by numerous mechanised and sophisticated vessels resulting in dwindling fish catches all over the world. It is now increasingly realised that the seemingly endless resources of the oceans are in fact limited and an unsustainable exploitation of the resources will spell doom for the entire humanity. In this regard, SOMB has a great role to play in disseminating the knowledge on sustainable way of dealing with marine resources. With this in mind we had organised a series of events during last year (2012-13), some of them especially targeting the youth, such as 'Youth's role in conservation of Marine Ecosystem' by Dr. K.K. Joshi, retired Principal Scientist from Central Marine Fisheries Research Institute. The topics varied from debates on GM Foods to Environmental Genomics with special reference to marine environment.

A newsletter at regular intervals was long cherished ambition of SOMB, which is coming to fruition now. We invite all our members to go through the contents and give feedback on this modest effort. SOMB office bearers and well-wishers contributed significantly in realising this task. I thank everyone on behalf of SOMB and invite active

involvement from the members in all activities of our society. Let us all strive harder to make the world a better place to live by preserving our environment and safe guarding our fellow beings.

I wish everyone the very best in life.

President

Lectures organized by SOMB during the year 2012-13

1. Components of data quality in research with special reference to liquid and gas chromatography by Dr. George Joseph, Senior Scientist (Chemistry), Assure Quality New Zealand, on 6th January 2012.

2. Youths role in conservation of marine ecosystem by Dr. K. K. Joshy, Senior Scientist, Marine Biodiversity Division, CMFRI, Kochi, on 8th June 2012.

3. Marine Birds by Mr. Praveen J, Software Engineer, NDS Bangalore on 20th July 2012.

4. Fish Behaviour and Cognition: A new horizon by Dr. V.V. Binoy, PDF, IISc, Bangalore, on 27th September 2012.

5. Chip system and mobile networks: Implications for field deployable genetic analysis devices by Dr. Syed A. Hashsham, Professor, Department of Civil and Environmental Engineering and Center for Microbial Ecology, Michigan State University, USA on 4th January 2013.

6. Genetically modified crops and food security: Issues and prospects by Dr. Valsamma Joseph, Asst. Professor, National Centre for Aquatic Animal Health (NCAAH), CUSAT, Kochi, on 8th March 2013.

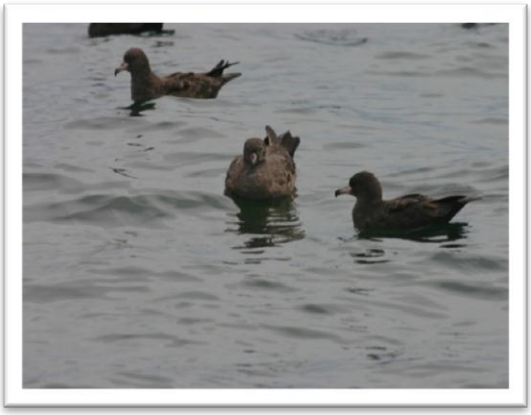
Highlights

Clockwise from Top left: Prof. Babu Philip presenting memento to Mr. Praveen, Kerala Birder; Dr. Binoy interacting with SOMB members; SOMB members listening keenly to Dr. K.K. Joshi; Dr. Rosamma Philip presenting memento to Dr. Binoy.

A member from audience interacting with Dr. K.K. Joshi, Retired Principal Scientist, CMFRI

Marine Birds

Abstract of the talk by Mr. Praveen



Studies on marine birds of India are scarce and available information is based mainly on wind-blown bird data and a few isolated off-shore trips. An attempt was made in recent years to address this lacuna by conducting off-shore trips from the coasts of Karnataka and Kerala to monitor marine birds. The study indicates the presence of a good number of pelagic birds off the south-west coast of India belonging to ten species, including a few significant records for the two states. This presentation introduces the common marine birds found in our

coasts that were recorded during the study, their field identification, migratory patterns and potential confusion species. Significant results of the study are discussed and a simple and sustainable methodology for similar future surveys is demonstrated. Comparison with prior wind-blown records suggests a negative correlation for a large number of species indicating that such off-shore surveys are the only way to document the status of pelagic birds in our waters. This study indicates the presence of both boreal and austral breeders wintering and summering in our region respectively. Potential threats to marine birds in the Arabian Sea are highlighted and an emphasis is laid on the need for such future studies. Requirements, hurdles, improvements, actions and research priorities in executing such surveys, potentially involving collaboration of larger region agencies involved in marine research, is also discussed.

World Oceans Day celebrations organised by SOMB and SMRC. Mr. Naveen Sathyan Addressing the gathering

International Women's Day Celebrations at SOMB

As part of the **International Women's Day** (8th March) celebrations, Society of Marine Biologists (SOMB), Dept. of Marine Biology, Microbiology and Biochemistry, has decided to felicitate **Dr. Swapna P. Antony**, who has received the prestigious **INSPIRE (Innovation in Science Pursuit for Inspired Research) Faculty Award** instituted by Department of Science and Technology, Govt. of India. This award is intended at augmenting high quality scientific manpower in scientific/educational institutions and providing attractive opportunities to young achievers for developing independent scientific profiles to emerge as

S&T leaders.

The felicitation was followed by a talk on '**Genetically modified crops and food security: Issues and prospects'** by **Dr. Valsamma Joseph**, Asst. Professor, NCAAH.

Dr. Valsamma Joseph receiving memento from Dr. Mohamed Hatha

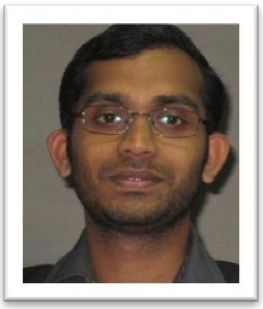
Dr. Swapna P Antony receiving memento from Prof. Babu Philip

SOMB Members who made us proud

Dr. Mohamed Hatha Fulbright Scholarship – 2012

Mr. Shubankar Ghosh- Moved into Civil services

Dr. Prajith K K- ICAR Scientist



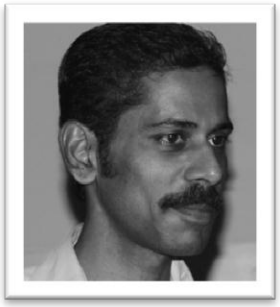
Dr. Sudheer N.S – Young Scientist award, 25th Kerala Science Congress, 2012

Ms. Ramya. K D- Best Poster Award, 2nd Indian Biodiversity Congress, Bangalore

Mr. Sumesh N V- Cochin University *Kalaprathibha*-'12'

IUCN Member-
Mr. Bineesh K K

Dr. Prabhakaran M P- Participated in World Seagrass conference- Thai



Dr. Mujeeb Rahiman, Participated in Arctic Expedition

SOMB Members who got into Govt. Services

Scientist/Teaching

1. Dr. Anil Kumar Vijayan- Scientist C, CMLRE, Kakkanad
2. Dr. Prajith K K – Scientist, CIFT
3. Dr. Sajeevan T. P, Assistant Professor, NCAAH, CUSAT
4. Dr. Annies Joseph- Assistant Professor, Christian College, Chengannur
5. Dr. Selvan S– Assistant Professor, Mar Athanacius College, Kothamangalam
6. Dr. Harikrishnan E- Assistant Professor, Payyanur College, Payyanur
7. Dr. Feeba Rani John- Assistant Professor, Vimala College, Thrissur
8. Dr. Sreedevi N Kutty – Assistant Professor, NSS College, Trivandrum
9. Dr. Gigi Poulose- Assistant Professor, St. Josephs College, Irigalakuda
10. Dr. Sini P J- Govt. H. S. Attapadi
11. Dr. Manjusha K– Assistant Professor, St. Xaviers College, Alwaye
12. Mrs. Revathy, S – Assistant Professor, St. Xaviers College, Alwaye
13. Mr. Shyam Kumar- Assistant Professor, Maharajas College, Cochin
14. Dr. Sanil Kumar M. G –Assistant Professor, SNM College, Maliankara

Fisheries Sub Inspectors

1. Akhilesh K.V
2. Anil Kumar P.R.
3. Bineesh K.K
4. Bisna V
5. Chaithanya E.R
6. Joyni Jacob
7. Renjith Kumar
8. Vinu Jacob

Others achievers

1. Shubankar Ghosh- Indian Civil Service
2. Sheeetal K S- Indian Army Nurse
3. Divya M P- KSFE

Research Article to the student members of SOMB

THE UNSEEN ABUNDANCE

by

Dr. C.K. Radhakrishnan,
Emeritus Professor

Student – Good morning sir, I would like to have a discussion on the fishery scene of India which contributes a key position in our economy.

Teacher – Good morning, you are most welcomed, take your seat

Student - Why the fishery of sardine appears unique among other fisheries?

Teacher- Because they had been in use since ages, Marco Polo (1254-1324) referred to dried sardines used as food for cows to boost milk production in Arabian peninsula. There is French expression “la crise sardiniere” referring the failure of sardine fishery is a signal of disaster. In India even centuries back sardines were in use, mostly they are available in large quantities round the year, and form a highly nutritious food for the common man and also the cheapest fish

Student- Sir, who worked first in India in this group?

Teacher - It was Hornell.J. (1910) gave an account of sardines resources off Malabar and Laccadives published in *Madras. Fish Bull*.4(4) 71-26

Student- Who is the authority in Indian sardines?

Teacher- It can rightly be said as two people, R.Velappan Nair and Antony Raja, B.T. They have Published several papers, reviews and text books on Indian oil sardine

Student- Sir how many sardine species are available in India?

Teacher- Generally sardines are classified as sardines and lesser sardines. Actually it is not a scientific classification but it is mainly viewed from the bulk of production.

sardine, *Sardinella longiceps* (oil sardines), most preferred one. The lesser sardines include *Sardinella fimbriata, S. albella, S. jussiue, S. sirm, S. dayei,* and *Dussumeiria acuta* (Rainbow sardines).They are all available at Indian coast oil sardines contribute nearly 1/3 of the total fish catch in Kerala, and is the main source of fish oil used as a bye-product with high industrial applications.

Student- How could we differentiate a shoal from school?

Teacher- Actually no much marked difference, however school is the habit of certain fishes of particular species to aggregate comprising all size groups chiefly for avoiding predation also seeking better feeding ground. Whereas shoals can be defined as an assemblage of large number of fishes of the same species of similar size and age moving en masse to a particular direction. Fishermen detect 4 types of shoals for sardines. Flipping- characterized by jerking water movements with splashing noise during night. Rippling- fishes make ripples on water surface, this include mostly matured and large individuals. Pattering - sound like large rain drops falling on sea surface in day time during Oct-Dec months. Blue and pink colouration on water due to sunlight reflecting on shoals. Further shoals can be detected by a particular odour emitted by mucous from sardines. Average size of a sardine shoal is about 2 m width and 25 m long.

Student- Sir could you just brief up the fishery biology of oil sardine in a nut shell?

Teacher- Yes, abundant fishery extends up to a strip of 10-25 km in west coast. Usually boat seines, shore seines, gill nets, cast nets etc. are in use. Age and growth studies based on otolith operculae, and length frequencies, revealed that oil sardine grows rapidly during first 12 months. When the fish attains 18.4 cm length it will be of three years old. The growth pattern is shown as 14.3cm in the first year and 16.4 cm in the second year. The average life span is estimated to be of 2-3 years, but there are reports that they enter in the 4^{th} year with a size of 21 cm in total length. They are distributed at 30 to 50 m depth. Spawning occurs during May to November with peak in June to August. Spawning usually occurs at 15kms offshore at 30 metre depth. Fecundity 35,000 to 80,000 eggs.

Regarding food and feeding they prefer to phytoplankton diets, of which *Fragilaria oceanica* is dominant item. Besides diatoms *Trchodesmium, Coesinodiscus* etc are common but they occasionally feeds on zooplankters like *Ceratium*, copepods molluscan and crustaceans larvae. There are reports that oil sardines invade high saline area of estuaries and backwaters. Marked fluctuation in fishery could be observed in different areas and time, mainly due to environmental factors, food availability etc.

Chidambaram observed follicular breakdown resulting Corpora atretia, a follicular breakdown resulting sudden decline in the egg number, and this phenomena often associated with low rainfall during spawning fortnights. But according to Murthy and Elderman the intense rainfall promotes abundance due to the richness of the environment with high dissolved oxygen and support good fishery. Recruitment of 0 -1 year class individuals causes fluctuations in fishery as they contribute much to the fishery.

Student- OK sir, but two terms overfishing and recruitment which off and on come to fishery. What are those?

Teacher- The practice of commercial fishing in a big scale may deplete fishery with the loss of too much adult fishes, that not enough numbers remain to heed and replenish the population and exceeds the carrying capacity of the fishery, and it is a global disaster in fishery- overfishing. Whereas the recruitment is the number of fish surviving to enter the fishery or to some life history stages such as settlement or maturity.

Student- What are the research tools for the appraisal of fishery in a given area?

Teacher- Number of fishing centres, number of fishing crafts (mechanized and non-mechanised), number of fishermen actively engaged, type of gears employed, catch details, species composition, seasonal distribution, marketing and trade practices. At least two years data are essential.

Student- Is there any external method to identify the sex of the *S.longiceps* in the spot itself?

Teacher- Yes -according to George externally visible muscular papillae in the cloaca of male and a corresponding membranous structure in female (membranous tapering) is a distinguishing character.

Student- Since oil sardines are widely distributed all over the world, is there any genetic variation among the population, there can be a possibility isn't?

Teacher- True. Enzyme gene variability in *S. longiceps* population has been studied from three localities of India. Starch gel electrophoresis studies showed 19 loci scored and no locus was polymorphic by 95% criterion. 7 loci were polymorphic P= 0.99 level. If you are interested you can refer to Menezes (1994) *Australian J. Marine Freshwater research* 45(2): 257- 264.

Student- What are the optimal environmental parameters that support good fishery of oil sardines?

Teacher- According to earlier investigations salinity 28.8 to 33.5ppt, temperature 28°C supported good abundance. Rain fall supported good distribution, but there were different views, as shown by several authors as excess rain damages the fishery. However fluctuations in fishery have been reported from various parts of the country.

Student- Has anybody worked on sardine eggs and larvae in a culture viewpoint?

Teacher- Of course there are several investigations in this area, but vividly not on culture stand point. Eggs are collected from plankton samples for identification. Apart from this conventional methodology**, Real time Flow Imaging and classification system (RTFICS)** has been designed to identify and count eggs from the underwater egg sampler. Species specific fixed standard parameters such as egg diameter, yolk, oil globules, embryo pigmentation, number of pre-anal and post anal myomeres etc. are the important tools. If you are interested refer to the following work. Powel, J.R. (2003)

Detection and identification of sardine eggs at sea using machine vision system Oceans 2003 proceedings 10-1109/ Oceans 2003 -178544 (Digital object identifier)

Student- We haven't discussed anything about the nutritive value of oil sardine, Sir - what do you mean by lean fish and fatty fish, a common term used by people?

Teacher- In a scientific standpoint, it mainly depends on how fish store lipids for energy. But common man distinguishes only by size of the fish. Lean fishes use the liver as the energy depot, whereas the fatty fishes store the lipid in the fat cells distributed through the body. The lipid in fishes generally falls into two categories - Phosholipids and Tryglycerides, of which phospholipids constitute 90% (Ackman 1980).

Student- Sir, how do fish lipids differ from mammals?

Teacher- Fish lipids are 40% long chain fatty acids (14-22 carbon atoms) and are highly saturated, whereas Mammalian lipids rarely contain more than two double bonds per fatty acid molecule.

Student- Oil sardines emit unpleasant odour due to high oil content during cooking and may be reason for its backwardness in demand. Will such a high lipid content interfere with the metabolism and normal life of the fishes?

Teacher- The high lipid content is being associated at the onset of breeding and reported to be of 16.6 to 24%. The animal stops to feed and swims constantly. The available fat will in turn be used up in two ways first as energy source for active swimming during starvation and secondly for the development of gonads. But we haven't seen this much of fat retention in the tissues of any other planktivorous fishes, and this an interesting area for further investigation. I would very much appreciate this question.

Student- Thank you sir, but what are the commercial prospects of sardine oil as compared with shark liver oil, you know whether there any sardine oil industry in India?

Teacher- Shark liver oil is a global industry, while sardines not, though there have been lot of investigations in this area, sardine oil is unstable coupled with quality loss on prolonged storage. Cod liver oil mainly consists of diocyl alkyl glycerol esters.

Student – What are the standard protocols for the quality assessment of fish oil?

Teacher- The standard protocols for quality evaluation of fish are mainly the specific gravity, refractive index, acid value, peroxide value, saponification and unsaponified value and iodine value.

Student- Well in spite of all the positive aspects of fishery, sardines are still treated as a low profile resource consumed by poor sections as many go for quality fishes . Most of them think serving sardines in important occasions is disgraceful. What do you think?

Teacher- Sardines are not inferior but superior in quality "A sardine a day keeps doctor a day away" that is what now scientists quote. You know during 1942-43 when the

second World War was its worst the coastal inhabitants of Kerala subsisted only on sardines and tapioca (protein and starch) as the only alternative for rice and wheat .This diet retained life in the horrible famine-epidemic stricken Malabar from a state of devastation. During post war period this combination served as a palatable dish "Sardine and Tapioca' in restaurants and even star hotels. When CMFRI assumed its shape in 1947 sardines occupied front line in the research programmes.

Student- It is too often heard that oil sardines are rich with omega fatty acids could you please explain a little.

Teacher- Well, not only oil sardine alone other species of sardines also a good source of omega fatty acids. In sardines they occur mainly as two categories, saturated fatty acids (SFA) and unsaturated fatty acids (USFA). The USFA consists of monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA). All these have a key role in the health of man. Department of Marine Biology, Microbiology and Biochemistry has undertaken a detailed study on omega fatty acids in sardines, mainly its antibacterial, antidiabetic and antitumour properties. The results are being published in peer-reviewed journals.

Student- Sir how do you review sardine research hitherto done in India since 1910 to 2010 and do all the attempts resulted in large scale production to meet the requirements, or we are still far away from the goal.

Teacher – Actually it is not so dear. Fish production in the open sea is controlled the productivity of the seas, not land based research inputs alone, Research inputs and managerial interventions would definitely promote aquaculture of given species. But on coming to the ocean scenario, we have a multispecies, multi locational, multigear and multi seasonal fishery. By the induction of multifaceted experimental trawlings at different depths, at different seasons, different localities would give the true information on the characteristics of the resource that we investigate. This means we can't augment sardine production in the open sea by scientific devices, but vividly no dearth for this resource till today.

Student - Oh that is true sir however what can be your message for future sardine work.

Teacher - Well - despite of heavy demand, the fishery is not bad and a promising one. But I think conventional biological researches are being outdated, and have to be replaced with innovative ones, mainly in methodologies and sampling schemes. Time is ripe to redraw a new utility map in tune with the emerging sea food trends in utilization. It leaves all possibilities for developing this simple fishery to a multimillion dollar global industry.

Student- Sir I am interested to investigate on the genetic variability of sardines of both west and east coasts. What is your opinion?

Teacher- It is good because, the reported occurrences of races, varieties, polymorphs etc. in species are important to investigate so particularly in sardine group. You have my wishes. Go ahead

Student- Thank you very much sir.

SOMB members who are awarded with Ph. D since 2008

Dr. Anupama Nair
Dr. Rejish Kumar V J
Dr. Annies Joseph
Dr. Selvan Subramanian
Dr. Lakshmi G Nair
Dr. Priya Lakshmi G
Dr. Sanil Kumar M G
Dr. Bindhya Bhargavan
Dr. Sreedharan K
Dr. Sreedevi N Kutty
Dr. Feeba Rani John
Dr. Aniladevi Kunjamma K P
Dr. Smitha V Bhanu
Dr. Simi Joseph P
Dr. Sudheer N S
Dr. Kesavan K
Dr. Sreejamol K L
Dr. Padmakumar K B
Dr. Smitha C K
Dr. Ramya Varadharajan
Dr. Chithra Som R S
Dr. Manjusha K
Dr. Swapna P Antony
Dr. Gigi Poulose
Dr. Bindhu Baskaran
Dr. Roja Sebastian
Dr. Sini P J
Dr. Prajith K.K
Dr. Priyaja P
Dr. Harikrishnan E
Dr. Abdul Jaleel K U
Dr. Smitha S L
Dr. Jayesh P
Dr. Raghul Subin S
Dr. Jeena Augustine

SOMB members who received CSIR JRF since 2008

Ajith Kumar A
Anne Heloise Theio
Usha V Parameshvaran

SOMB members who received UGC JRF since 2008

Elaine A Sabu

SOMB members who received CSIR NET in Life Science since '08

Ancy Thomas
Aneesha K A
Anil Kumar P R
Bisna V
Dhanya S Warrier
Elaine A Sabu
Revathy S
Revathy V
Satheesh T B
Soumya Krishnankutty
Swapna P Antony

SOMB members who received ICAR/ASRB NET since 2008

Akhilesh K V
Anil Kumar P R
Bineesh K K
Chaithanya E R
Divya P S
Jayachandran P R
Jimly C Jacob
Renjith Kumar
Subin C S
Vinu Jacob

SOMB members who received UGC NET in Earth Science	SOMB members who received UGC NET in Environmental Science
Anil Kumar P R	Elaine A Sabu
Elaine A Sabu	Mathew K A
Naseera K	Rani Varghese
	Sreelaksmi S

GATE Holders	KSCSTE Fellowship
Ancy Thomas	Lakshmi Devi P
Bhavya Kachiprath	Sruthi K S
Aishwarya Ajith	
Aswathy Vijayakrishna	

List of M.Sc First Rank Holders	Winners of Quiz competition
Anne Heloise Theio- 2009	First Prize - Nasad M & Sruthi K S
Revathy S- 2010	Second Prize - Anil Kumar & Chaithanya E R
Manomi S- 2011	Third Prize - Lakshmi S & Varsha M S
Nashad M- 2012	

LAB-ON-CHIP SYSTEMS AND MOBILE NETWORKS: IMPLICATIONS FOR FIELD-DEPLOYABLE GENETIC ANALYSIS DEVICES

Abstract of the talk given by Dr. Syed A. Hashsham

Genetic analysis tools based on cell phones and mobile devices have the potential to significantly reduce the economic burden of diseases and pathogens that can be measured using genetic markers. The coming decade is predicted to merge genomics, microfluidics, and miniaturization and multiply its impact many-fold by leveraging the resources and cell phone networks. Impacts of the resulting products and devices are expected on both communicable and non-communicable diseases. The presentation was focused on selected progress made in the area of field-deployable genetic analysis devices

Dr. Hashsham with the staff members

focusing on the work carried out in our lab. A hand-held device named Gene-Z and a microfluidic chip associated with it was demonstrated. The flexible design of Gene-Z makes it useful for a number of applications in the area of health, food and agriculture, fisheries, water safety, and environmental biotechnology. This device is driven by an Android as well as Apple OS based GUI with the following specifications: i) microfluidic DNA biochips containing up to 64 reactions, ii) application specific biochips (clinical, antibiotics, water, food), iii) isothermal or temperature cycling based amplification, iv) quantitative results similar to real time PCR, v) sample volume: less than 40 µl, vi) limit of detection: 10-100 copies per reaction well, vii) Assay time: 5-30 minutes, and viii) low cost. Other devices for applications requiring lower and higher in multiplexing power will be introduced. Developments in the area of cellphone-based analysis devices were summarized.

Prof. Babu Philip presenting memento to Dr. Hashsham

SOMB Member at Biennale

In accordance with the much celebrated *Kochi- Muzris Biennale* 2012, *Global Ocean* a London based, privately financed marine conservation charity had started its activities in India. Our member Solly Solomon was selected as its first 'Education Director India'. The organization under him conducted various plastic pollution awareness programs in the city and its outskirts. With the collaboration of the corporation of cochin they conducted a one day symposium 'plastic politics' in which people from different sectors were brought to one platform to find out a solid solution for the pollution menace in the city. Initial steps for the adoption of two wards from coastal a panchayat to make it plastic free were undertaken.

Mr. Solly (right end) with his team members

Few words of Gratitude…

My sincere gratitude to all who have supported me to make this venture a success. I would like to thank the President Dr. Mohamed Hatha, Vice President Dr. Rosamma Philip and the Editor Dr. Sajeevan T. P for their efforts in publishing the Newsletter. I extend my gratitude to all the team members of SOMB. I greatfully acknowledge Dr. C.K. Radhakrishnan for contributing an excellent article. Special thanks to Ms. Chaithanya E.R for the elegant coverpage. Once again I thank you all for your constant support and encouragement.

Jimly C. Jacob
General Secretary

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