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Seshaiyana



*ENVIS Newsletter on Estuaries,
Mangroves, Coral Reefs and Lagoons*



ENVIS CENTRE
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ENVIS Newsletter on Estuaries, Mangroves, Coral Reefs and Lagoons

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Hello Readers,

Over the years, this newsletter has come in different dimensions covering various facets of the coastal and marine ecosystems, thereby playing an important role in the dissemination of information to the scientific community world over.

*This issue carries variety of articles on marine sciences. The first article explains the effect of temperature on 'N' uptake of macro algae *Chaetomorpha linum* and *Padina tetrastomatica*. The uptake of 'N' from the medium at all temperatures suggests that these two species are highly competitive in harvesting 'N' nutrients from the water column. The second article elaborates the importance of fat and explains well why fat and cholesterol should not be avoided altogether in our diet. Following this is an article which gives an account of biodiversity and its role in the local economy of an unexplored mangrove forest in Ramnad district. The fourth article describes the potential of bioactive compounds in various groups of marine organisms namely microbes, seaweeds, sponges and mollusks. The next article narrates the capture of whale shark *Rhincodon typus* during the shore seine operation at Pallithurai near Vizhinjam, Kerala. The last article details information regarding the various immunosuppressive compounds derived from marine sponges.*

This issue also includes recent news in brief besides a list of monographs published by Centre of Advanced Study in Marine Biology and forth coming research meets. Apart from reading, the users can contribute articles to Seshaiyana.

Prof. T. BALASUBRAMANIAN
Prof. S. AJMAL KHAN

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INSTRUCTIONS TO AUTHORS

Seshaiyana welcomes original articles, snippets and cartoons in the area of coastal wetlands, preferably, estuaries, mangroves, coral reefs and lagoons. The newsletter accepts popular/research articles, reviews, news and notes. Details of forthcoming seminars/symposia/trainings/workshops will also be considered for publication.

The articles should not exceed five typed pages in double space.

Line drawings and cartoons should be clear for good reproduction.

References should be limited and cited in the text by name and year. Council of Biological Editors' style manual may be referred to for listing references at the end.

Articles should be sent to:

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Editor's desk invites reader's views, suggestions and constructive criticism on *Seshaiyana*.

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Please help to keep information abreast.

Front cover photo : Mangrove plant *Sonneratia caseolaris* (L.) Engler

EFFECT OF TEMPERATURE ON 'N' UPTAKE OF *CHAETOMORPHA LINUM* (MULLER) AND *PADINA TETRASTOMATICA* (HAUCK)

One of the most important environmental factors controlling the growth of macroalgae is temperature. Severe effects of temperature may lead to reduction in growth, abundance, number of species and decline in reproductive rate in the intertidal flora of the tropics. The algae growing in the shallow intertidal region and tide pools are affected by temperature variations throughout the day. At higher levels on the shore, the pools remain uncovered by the sea long enough leading to significant changes in temperature during the day. But at successively lower levels on the shore, the temperature effects may be less significant. However, thermal stratification would occur near the surface and it is important to know how the uptake rates of different N species at different temperatures vary in different species of algae. Therefore a study to determine the effect of temperature on the N uptake rates of macroalgae in a coral atoll was undertaken. Even though the present study was carried out on the macroalgae of a coral atoll, the *in situ* measurements conducted at different temperatures could be considered as the representative temperature existing in the tide pools during low tides of the intertidal region in oligotrophic or eutrophic waters.

Macroalgal species (*Chaetomorpha linum* and *Padina tetrastomatica*) collected from the Kavarratti lagoon (lat. 10°33'16" N and long. 72°38'34" E) were brought to the laboratory and cleaned with filtered seawater. 0.5 g of algal thallus was placed in the beakers with 50 ml of seawater to which ammonium, nitrate and urea were added separately at the concentrations of 2, 5 and 10 μM in the form of NH_4Cl , KNO_3 and urea respectively. Measurements of uptake of N as a function of temperature were tested at 4 different temperatures (20, 25, 30 and 35°C). The irradiance measured during the incubation period was 276 $\mu\text{E m}^{-2} \text{s}^{-1}$. The duration of each experiment was 1 h. The experiments were carried out in duplicates. At the end of the experiment the algae were retrieved, oven dried at 70°C and weighed. Technicon II autoanalyser was used for ammonium, nitrate and urea measurement using methods described by Koroleff (1970), Wood *et al.* (1967) and Aminot

and Keroule (1982) respectively. Uptake was calculated based on the depletion of added nutrient from the experimental medium.

Under all the combinations of temperature and N species, the uptake rate of NH_4^+ was greater than that of NO_3^- and urea.

Effect of temperature on ammonium uptake rates

In *C. linum* (Fig. 1a), the ammonium uptake rates at 2 μM NH_4^+ increased from 20 to 25°C by 5.46 $\mu\text{M (g dry wt)}^{-1}\text{h}^{-1}$ and then decreased upto 35 °C by 6.13 $\mu\text{M (g dry wt)}^{-1}\text{h}^{-1}$, whereas at 10 μM NH_4^+ the uptake rates decreased with the increase in temperature from 20 to 35° by 20 $\mu\text{M (g dry wt)}^{-1}\text{h}^{-1}$, thus showing that as the temperature increases the uptake decreases. However, the ammonium uptake rates at 5 μM ammonium was almost constant at all the temperatures suggesting that *C. linum* behaves independently at different concentrations irrespective of temperatures. *P. tetrastomatica* (Fig. 1b) exhibited dissimilar behavior in the ammonium uptake rates at different concentrations. At low concentration (2 μM) of ammonium, the uptake increased from 20 to 35°C. At 5 μM , it was constant at all the concentrations and at 10 μM decrease in the uptake rates was observed from 20 to 35°C.

Effect of temperature on nitrate uptake rates

Almost similar uptake rates at all the 3 concentrations at 20°C were observed for *C. linum* (Fig. 1c). Nitrate uptake rates at 2 and 10 μM increased from 20 to 35°C by 8 and 14 $\mu\text{M (g dry wt)}^{-1} \text{h}^{-1}$ respectively whereas at 5 μM the uptake increased by 8 $\mu\text{M (g dry wt)}^{-1} \text{h}^{-1}$ upto 30°C and thereafter was constant upto 35°C. *P. tetrastomatica* (Fig. 1d) showed decrease in the uptake rates at 2 and 5 μM with the increase in temperature. However at 10 μM the uptake rates decreased upto 30°C and later increased with the increase in temperature.

Effect of temperature on urea uptake rates

Both the species showed increase in the urea uptake at the temperatures and concentrations studied (Fig.1e & f).

Relatively little is known about the temperature sensitivity of N uptake on macroalgae (Hanisak and Harlin, 1978; Asare and Harlin, 1983; Pedersen *et al.*, 2004). The results of this study showed that the ammonium uptake rates are temperature independent and have no response to the increase in temperature. The nitrate uptake rates are temperature dependent with *C. linum* and *P. tetrastomatica* showing positive and negative response respectively whereas both

the species showed increase in the urea uptake rates with the increase in temperature.

No study has been reported so far on the effect of temperature on the urea uptake rates and this study is the first of its kind to be reported. The uptake of N from the medium at all the temperatures suggests that these species are highly competitive in harvesting N nutrients from the water column (especially urea).

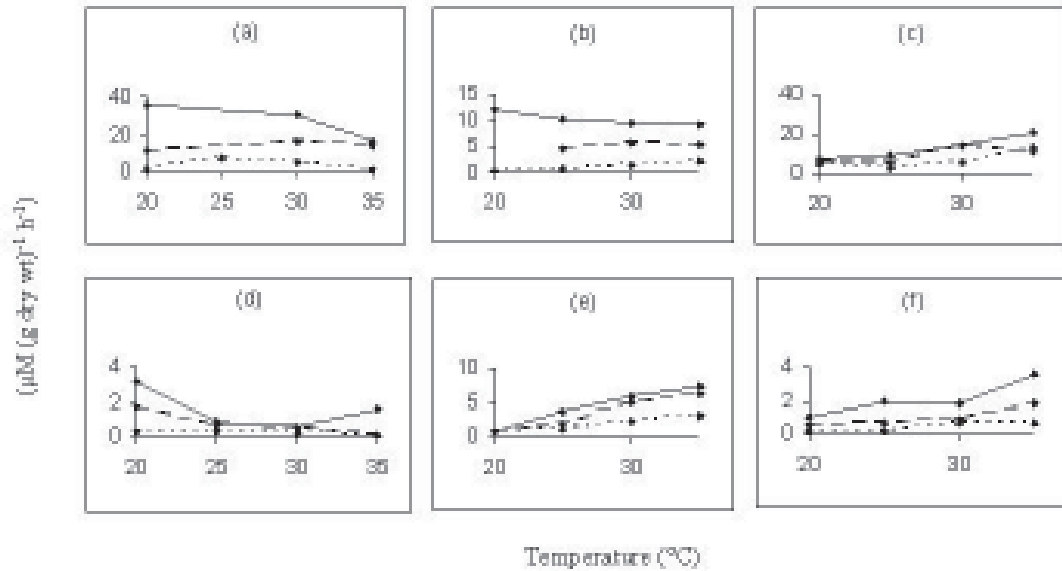


Fig.1. Average uptake rates of ammonium (a, b), nitrate (c, d) and urea (e, f) in *Chaetomorpha linum* and *Padina tetrastomatica* respectively at different concentrations (2 µM , 5 µM - - - - , 10 µM —) and temperatures (20, 25, 30, 35°C).

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CHOLESTEROL AND FAT - INDISPENSABLE FOR HUMAN BODY

Low fat, no fat and now they say eat more fat?

With increase in the incidence of heart ailments and death, people have developed the notion that cholesterol and fat are to be avoided in the diet altogether. It is wrong. This article explains why we should not avoid these completely. Normal levels of cholesterol and fat are not harmful to human body. Perhaps they control some of the normal functions of the body. Recent studies reveal that we must have some fat in our diet for good health and reduction of disease.

Much has been said over the last decade or so about the need for reducing the amount of cholesterol in the food we eat. On the other hand, we now know that:

- ❖ Cholesterol plays an important role in the healthy functioning of all the cells in the body.
- ❖ Cholesterol is only one of several different types of fat that have been linked to a higher risk for developing atherosclerosis (e.g. trans fat, saturated fat, hydrogenated fat and oxidized fat).
- ❖ If the level of cholesterol in our blood is high, diet is not responsible for it as 70 - 80% of the cholesterol found in our blood is produced by the liver (this is unrelated to the amount of cholesterol we eat). Only 20 - 30% of the cholesterol found in our blood is absorbed from the foods we eat.
- ❖ There are different types of cholesterol in the blood (some types do not contribute to the development of hardening of the arteries and may help to prevent it, while other types increase the risk).
- ❖ The increase in the amount of cholesterol in the blood of human beings may also be due to smoking, high blood pressure, diabetes, lack of exercise, stoutness etc., which cause the deposition of cholesterol in the arteries (arteriosclerosis). In fact, the average daily cholesterol intake of males should be about 390 mg daily and that of female about 290 mg.

What is cholesterol?

Cholest-5-en-3 β -ol is the principal sterol of vertebrates and the precursor of many steroids, including bile acids and steroid hormones. It is found in all animal tissues, especially brain, spinal cord, bile, and in gallstones, being a component of the plasma membrane lipid bilayer. Excessive levels in the plasma have been implicated in atherogenesis. It is synthesized from acetyl-CoA via hydroxymethylglutaryl-CoA and squalene.

Each day the liver manufactures upto 1 gram of blood cholesterol, the fat like waxy material that is a component of all cells. Blood cholesterol helps to make vitamin D and bile acids which aid in digestion. Fortunately, the body can normally iron out rises in dietary cholesterol. The liver automatically manufactures less cholesterol when levels from food in the diet become too high. Even when there is a substantial intake of fat, the average healthy person is not at risk.

Blood is mainly composed of water- which does not blend with fat- cholesterol is transported around the body attached to specific proteins called lipoproteins. There are four major types of lipoprotein - Chylomicron (CM), Very Low Density Lipoprotein (VLDL), Low Density Lipoproteins (LDL) and High Density Lipoprotein (HDL). HDL is the good cholesterol whereas LDL is the bad cholesterol. The types of cholesterol, their sizes, site of synthesis and nature are given in the following table:

Types of cholesterol, their sizes, site of synthesis and nature

Cholesterol	Size	Synthesis	Nature
HDL	7.5-10 nm	Liver	Good
LDL	19.6-22.7 nm	Plasma	Bad
VLDL	25-70 nm	Liver	Worst

The Chylomicron (CM) is the carrier of triglycerides derived from absorbed fatty acids in the intestinal mucosa. VLDL transports endogenously synthesized triglycerides, (utilized by extra hepatic tissues), phospholipids, cholesterol and cholesteryl ester. VLDL is converted to LDL (via Intermediary Dense Lipoproteins, IDL). LDL is the major vehicle for

the transport of cholesterol to the cells of the body and HDL scavenges excess cholesterol from lipoprotein and extra hepatic cells to liver.

What is fat?

Any triacylglycerol or mixture of triacylglycerols is solid below 20°C. Those that are liquid at such temperatures are usually referred to as oils.

Fat is a natural oily or greasy substance occurring in animal bodies. Chemically, fats are triglycerides, since 3 molecules of fatty acids condense with one molecule of glycerol to yield fat. Most fat is stored just beneath the skin, although various internal organs such as kidneys, heart and liver are also protected by a surrounding layer of fat.

What are omega-3s?

Essential fatty acids (EFA's) are necessary for the proper functioning of the body. Out of a number of essential fatty acids, two are not made in the body and must be supplemented through the diet. These are called omega-3 and omega-6 fatty acids. Omega-3 essential fatty acids can come from either plant or marine sources. They are found in fish and fish oil, unrefined vegetable oils, raw nuts, seeds and beans. Linolenic acid, the marine source, can be found in certain fatty fish such as mackerel, herring, sardines, albacore tuna and salmon. These fish and fish oil supplements contain bioavailable Decosa hexanoic acid (DHA) and Eicosa pentaenoic acid (EPA), the two kinds of omega-3 essential fatty acids crucial to good health. The plant based omega-3 essential fatty acid is alpha linolenic acid (alpha meaning plant) and it can be found in flaxseed, canola, soybean and walnut oils. These plant sourced omega-3 EFAs do not get metabolized in the body like fish oil. They need to be broken down by the body's enzymatic system into DHA and EPA before the body can reap its powerful benefits. Flaxseed oil, the plant source highest in omega-3s, is a great alternative for vegetarians and those who can not tolerate fish or fish oil capsules. In the book entitled "Eat, Drink & Be Healthy," Dr. Walter Willett's has mentioned that "Given the wide ranging importance and benefits of omega-3 fatty acids, everyone should try to eat at least one good source of them a day."

The omega-3 essential fatty acid is a key component of cell membranes throughout the body, especially the eye, brain and central nervous system.

This important fat is the building block of hormones, including those that regulate blood clotting, artery walls and inflammation. A recent study indicated that the omega-3 EFA from fish reduces the risk of cardiovascular disease and can reduce the risk of stroke as well.

Fish oil has been found to increase circulation and reduce insulin sensitivity; but most importantly, diabetics who ate more fish had a significantly lower risk of coronary heart disease and death than those who did not eat fish. Fish oils have been found to be beneficial for people suffering from many disorders including depression, cystic fibrosis, Crohn's disease, irritable bowel syndrome, diabetes and lupus. They also help to keep hair, skin and nails healthy.

On a grand scale, omega-3s play a vital role in health. Doctors and researchers have been studying the benefits for years. Now the government and important organizations are emphasizing the need for good fats in the diet.

Last November, the American Heart Association (AHA) issued a release stating, "omega-3 fatty acids benefit the heart health of healthy people, people at high risk of cardiovascular disease and patients with cardiovascular disease." The organization recommends that Americans eat fatty fish, such as mackerel, lake trout, herring, sardines, albacore tuna and salmon, at least twice a week. Regular consumption of omega-3 fatty acids from plant sources such as flaxseed, canola, soybean and walnut oils is also highly recommended.

Understanding the importance of omega-3 essential fatty acid, the White House Executive Office sent a letter to the Department of Health & Human Services and the United States Drug Administration (USDA) requesting the departments to promote the consumption of omega-3 essential fatty acids. A request was also sent to add omega-3 essential fatty acids to the new dietary guidelines for Americans and to include the same in the updated USDA Food Guide Pyramid.

The American Heart Association which urges Americans to eat fatty fish to get an adequate quantity of omega-3s in their diet, further cautions choosing fatty fish, as sometimes they are laden with contaminants such as mercury, PCBs and lead. It also advises that supplements can be taken if omega-3 rich fish or plants sources are not readily

available. Before purchasing fish oil supplements it is important to look at the label to make sure that it is PCB, mercury and lead free.

Why we need fat?

Fat is as critical a component of the diet as carbohydrate, protein or water. Even though, eating too much fats and oils of any kind may prove harmful, excluding them completely from the diet deprives the body of important nutrients leading to diseases. Dietary fats from oily fish, fish oil and vegetable oils supply the fat-soluble vitamins A, D, E and K. The body needs atleast 25 g of fat a day to absorb these fat-soluble vitamins. Fat also helps to maintain healthy skin and hair; two of the tell tale signs of a lack of fat in the diet are dry, brittle hair and scaly skin.

Fat also provides texture and flavor to food, making mealtime far more enjoyable. When fat is severely limited in the diet, eating loses some of its pleasure. Some clients compensate for this loss of enjoyment by eating greater amounts of fat-free, carbohydrate rich foods. Increasing carbohydrate consumption causes hunger to return more quickly, while higher in overall energy, is much less nutritionally balanced.

Negligence of cholesterol

A diet in which about 25% or less of total calories is derived from fat would be healthier and help to reduce blood cholesterol levels and risk of blood and heart disease. The type of fat in the diet is also important. Increasing the proportion of unsaturated and polyunsaturated in the diet has been shown to produce a significant reduction in blood cholesterol levels.

A matter of surprise comes to those who follow the conventional school of thought in taking negligent amount of cholesterol and fat as this may lead to many heart diseases. As more carbohydrate containing food is taken they will be digested easily thereby releasing more energy. However the excess energy cannot be utilized and will easily be converted to triglyceride (blood fat). The increase in triglyceride and cholesterol is harmful as it leads to illness and finally to heart attack. So uptake of cholesterol and fats at the normal level are vital for the body and can help to prevent heart diseases.

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CORAL REEF FISH MAKE THEIR WAY HOME

Coral reef fish hatchlings dispersed by ocean currents are able to make their way back to their home reefs again to spawn, according to a groundbreaking study published recently in the journal Science. The findings of the study are considered a major advancement in fish conservation biology. The research was conducted by an international team of scientists from Australia, France, and the U.S. using a novel tagging method to track two populations of fish, including the endearing orange, black, and white reef-dwelling clownfish. The study took place on coral reefs in a marine protected area in Papua New Guinea. For more information log on <http://www.sciencedaily.com/releases/2007/05/070503145443.htm>

A WONDERLAND IN DRYLAND OF KARANGAD : AN UNEXPLORED MANGROVE FOREST IN RAMNAD DISTRICT

A notable dry place in Tamil Nadu is the Ramanad district which is interestingly blessed with important marine habitats and rich living resources. One such important habitat is the mangrove rainforest situated over an area of about 400 hectares in the village Karangad, along the banks of estuary in Kottakarai. The mangrove habitat receives seawater up to a distance of 5 km towards the riverside during high tide. From this fishing hamlet more than 600 mechanized and non-mechanized fishing vessels are operated. The mangrove habitat situated in a semi-arid zone with low rainfall and high rate of evapo-transpiration is dominant with a single strand of *Avicennia marina* species, which is known for its extreme environmental tolerance. As this mangrove has not been properly studied so far, a field study was undertaken.

Vegetation structure

The land use pattern in Karangad village, is shown in Fig. 1 along with the mangroves. The vegetation ranges from shrubby degraded type to dense strands depending upon the tidal influence. Zonation, a salient feature of mangrove forest is absent here due to monospecies dominance. The low tide area which experiences increased submergence is colonized with dense mangrove strands. There is thinning of vegetation towards high water mark due to reduced tidal inundation. *Avicennia marina* with 8 meter height and 40 cm girth is seen along the edges of creek where the water flushing is good.

Faunal diversity

In Karankad mangroves, the most striking feature is the faunal assemblage and zonation pattern. The pattern of distribution of each faunal group is predominantly controlled by tides. Gastropods are the numerically more abundant group in the mangroves. *Assimineia* sp., *Cerithidea* sp. and *Telescopium telescopium* are present on the substratum of low to mid intertidal regions. *Littorina scabra* is arboreal dwelling on tree trunks. Extensive oyster beds are observed in the lower intertidal belts. *Katylisia* sp., *Tellina* sp., and *Donax* sp. are present in the lower part of estuary. The mid

tide level is dominant with brachyuran crabs particularly sesarmids and upper intertidal belt presents a faunal admixture of the two belts with dominance of crab species. The interesting observation in Karangad mangroves is that star fishes occur in some pockets.

Ecosystem services

The people from five villages (Karankad, Mullimunai, Manakudi, Pudukudi and Santhamangalam) utilize the products from Karankad mangroves. However, the extent of use by people from Karankad and Mullimunai villages is more than from other villages. The major income is derived from the mud crab, *Scylla serrata* in the mangrove forest. The crabs are sold at the rate of Rs. 600 to Rs. 800 per kilogram. Shrimps and finfishes also provide good income to fisherfolk. Daily income of the mangrove-dependent fishermen is not less than Rs.100. More than 20 aquaculture ponds have been set up in the Karankad mangroves. The village people collect fire-wood from mangrove forest for the past 20 years. Now, the forest department has been protecting the forests. However, the peripheries of the forest face cutting pressure for firewood. The sandy beaches in the neighborhood of estuaries with mangrove forest mutually enhance the shore based recreational activities such as boating and water games, which give additional income to fishermen.

Management Action Plans

The Forest Department has been taking efforts to conserve Karankad mangroves of late. People in near-by villages now rely on *Prosopis* for use as fire woods. Once it declines they may turn to mangrove forest. They may be dissuaded from doing this. Further the mangrove cover may be increased by growing mangroves in the adjacent wetlands. To provide income and employment to the local people, training on raising mangrove nursery, planting techniques, molluscan culture, as well as cultivation of seaweed *Kappaphycus* species in collaboration with the Pepsi Pvt. India Ltd. was given by our Department. These efforts provide a monthly income of Rs.10,000 for family.

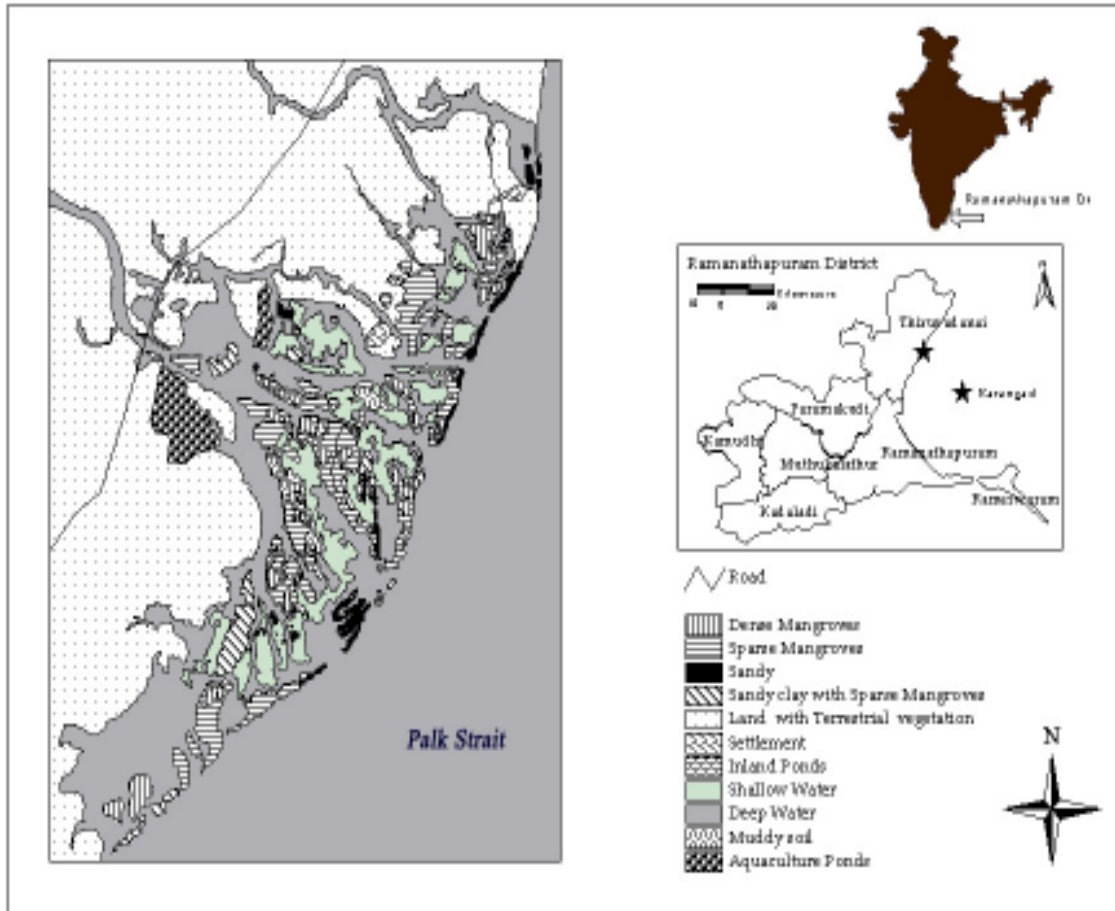


Fig. 1. Land use pattern in Karangad village

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BIOACTIVE SUBSTANCES FROM MARINE RESOURCES

Marine biotechnology is the science in which marine organisms are used in full or partially to make or modify products, to improve plants or animals or to develop microorganisms for specific uses. Many bioactive compounds have been extracted from various marine animals like tunicates, sponges, soft corals, sea horses, sea snakes, marine mollusks, seaweeds, nudibranches, sea slugs and marine microorganisms (Donia and Hamann, 2003). Of late more or less 10,000 metabolites have been isolated from marine organisms. Many of these are endowed with pharmacodynamic properties. Natural products have long been used as food, fragrances, pigments, insecticides, medicines etc.

Bioactive substances from marine bacteria

Nature has been a source of medicinal agents for thousands of years and impressive array of modern drugs have been isolated from microorganisms. In the 20th century however microorganisms played an important role in the production of antibiotics and other drugs. For example penicillin was discovered in 1929. In the aquaculture industry, PCR techniques use to a great extent Taq DNA polymerase. This is obtained from *Thermus aquaticus*. Altogether 50,000 natural products have been discovered from marine microorganisms. Out of these, 100 microbial products are in use today as antibiotics, antitumor agents, and agrochemicals (Carte, 1996). Thermo stable proteases, lipases, esterases and starch and xylan degrading enzymes have been actively sought and in many cases are found in bacterial and archaeal hyperthermophilic marine microorganisms. Microbial metabolite isolated from the tissue of Bermudian marine sponge has been developed with anti-HIV potential as reverse transcriptase inhibitor (Rajeev Kumar Jha and Xu Zi-rong, 2004). Some other marine bacterium produces, collagenase, an enzyme with a variety of industrial and commercial applications, including the dispersion of cells in tissue culture studies (Fenical and Jensen, 1993).

Bioactive substances from marine cyanobacteria

Cyanobacteria in general and marine cyanobacteria in particular are one of the richest sources of known and novel bioactive compounds including toxins with wide

pharmaceutical applications. Lyngbyatoxine-A and debromoaplysiatoxin are the two highly inflammatory but structurally different metabolites isolated from toxin strains of *Lyngbya mausculata* (Cardillina *et al.*, 1979). Some of the marine cyanobacteria appear to be potential sources for large scale production of commercially important vitamin-B complex group and vitamin-E. The carotenoids pigments of cyanobacteria have commercial value as natural food coloring agents, as feed additive to improve the health of cattle, as drugs and in the cosmetic industries.

Bioactive substances from seaweeds

Presently the seaweed industry relies on three important species of *Gelidium* and one species of *Gracilaria* (Anderson *et al.*, 2003). The green alga *Ulva lactuca* was found to possess an anti-inflammatory compound, and an anti-tumour compound was isolated from *Portieria* species. As many as 221 species are utilized commercially. Of these, about 145 species are used for food and 110 species for producing phytochemicals as agar, agarose and carrageenan.

Agar-agar, agarose and carrageenan extracted from red seaweeds are widely used in many industries. The maximum use of agar is in the pharmaceutical industry as an outer cover of capsules. Now a day in molecular biology and genetic engineering, agar gums producing an 'agarose' factor are used extensively in electrophoresis. Chemicals from brown seaweeds such as alginic acid, mannitol, laminarin, fucoidin and iodine have been extracted successfully on a commercial basis. Being rich in minerals, vitamins, trace elements and bioactive substances, seaweeds are called medical food of the 21st century. *Digenea* (Rhodophyta) produces an effective vermifuge (kainic acid). There are many seaweeds that can convert simple polyunsaturated fatty acids such as arachidonic acids into complex eicosanoids and related oxylipins. This is an important mechanism which maintains homeostasis in mammalian systems. An aberrant production of metabolites of this class occurs in diseases such as psoriasis, asthma, atherosclerosis, heart disease, ulcers and cancer (Carte, 1996). The green alga *Ulva*

lactuca was shown to possess an anti-inflammatory compound and an anti-tumor compound was isolated from *Portieria hornemannii*. Antioxidative activity of extracts isolated from seaweeds *Sargassum siliquastrum*, *Laminaria* sp., *Undaria* sp. and *Hijikia* sp. (Lim *et al.*, 2002) was evaluated.

Sulphated polysaccharides comprise a complex group of macromolecules with a wide range of important biological properties. These anionic polymers are widespread in nature, occurring in a great variety of organisms. In marine algae, the carrageenans and fucoidans are composed mainly of sulfated galactose and fucose respectively (Pugalendhi, 2001).

Bioactive substances from sponges

High range of bioactive metabolites have been found in about 11 sponge genera. Among these species belonging to three genera namely *Haliclona*, *Petrosia* and *Discodemia* produce powerful anti-tumour and anti-inflammatory agents. The discovery of spongouridine a potent tumour inhibiting arabinosyl nucleoside from *Cryptotethia crypta* focused sponges as a source of biomedically important metabolites. Xestobergsterol compounds isolated from *Xestospongia berguista*, inhibited immunoglobulin E mediated cromoglycate. Leucettamine isolated from *Leucetta* species is a potent and selective antagonist for the receptor of leukotrine (Rajeev Kumar Jha and Xu Zi-rong, 2004).

Bioactive substances from mollusks

Highly active toxins have been extracted from cone and other bivalve mollusks. *Conus* species have evolved deadly nerve toxins and small, conformational constrained peptides of 10-30 amino acids. Some of the conotoxins block channels regulating the flow of potassium or sodium across the membranes of nerve or muscle cells. These conotoxins have been used in various physiological and pharmacological studies (Myers *et al.*, 1993). In the recent years heparin and heparin-like glycosaminoglycans have been isolated from the marine mollusks (Somasundaram *et al.*, 1989; Benny, 1996 and Arumugam, 2004).

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REPORT ON CAPTURE OF WHALE SHARK *RHINCODON TYPUS* (SMITH) IN SHORE SEINE AT PALLITHURAI NEAR VIZHINJAM, KERALA

The whale shark, *Rhincodon typus* (Smith), the gentle giant in the sea and the largest living fish in the ocean, variously known as 'Pulli Udumban', 'Pullian surrow', 'Panai meen', 'Amini Uluvai' and 'Uravi' in Tamil was caught incidentally during the operation of shore seine. In recent years the frequency of such capture on the Indian coast as a whole is more. Silas (1986) reviewed the records of capture and occurrence of whale sharks from Indian waters.

The present report is on the capture of live whale shark *Rhincodon typus* in shore seine on 28.8.2005 at Pallithurai, near Vizhinjam, southwest coast of India. The shark was dragged to the shore and was alive for half an hour. It measured 6.1 m in total length and weighed about 1.7 t. Details regarding morphometry could not be taken as the information about the capture was received late.

When the net was dragged to the shore, the shark struggled to escape and in the process damaged the net badly worth about Rs.75,000. As it is considered not suitable for human consumption, there was no demand for its flesh. Therefore the flesh was cut into pieces and buried near to the sea shore by the corporation people.

An update on information regarding capture of the whale shark *Rhincodon typus* in Vizhinjam and nearby areas is given in Table 1. From the table it is clear that almost all the previous captures of whale sharks (90%) were from Vizhinjam, one of the important fish landing Centres of Kerala state.

Prater (1941) pointed out that the appearance of the whale shark in Indian coastal waters is due to the abundance of zooplankton biomass. The present capture in August coincided with the zooplankton abundance during southwest monsoon period which is the peak season for pelagic fishes. Whale shark is a oceanic form which comes to the shore for feeding. It follows the plankton feeding pelagic fishes which in turn follow the zooplankton. Because of large size somehow or other they could not go back from the shore and accidentally get entangled in trawl nets, gillnets and shoreseine etc. Very few also sustained injuries and got stranded.

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Table 1. Update on capture of whale shark *Rhincodon typus* (Smith) in fishing nets/stranded at Vizhinjam and nearby areas in Trivandrum, Kerala

S. No	Date	Locality	No	Sex	Length in metres	Reported by
1.	1900	Trivandrum, Kerala	1	?	8.83	Pillay (1929)
2.	February, 1909	Trivandrum, Kerala	1	?	4.13	Pillay (1929)
3.	March, 1934	Trivandrum, Kerala	1	?	3.96	Prater (1941)
4.	February, 1960	Vizhinjam	1	?	9.75	Report of FRAD CMFRI.
5.	16.03.1972	Vizhinjam	1	F	5.65	Kuthalingam <i>et al.</i> (1973)
6.	23.12.1972	Vizhinjam	1	F	3.93	Kuthalingam <i>et al.</i> (1973)
7.	20.05.1994	Vizhinjam	1	F	6.30	Personal observation
8.	03.03.1996	Vizhinjam	1 16	F Young ones	5.5 1.0	Krishna Pillai (1998)
9.	26.12.2002	Vizhinjam	1	-	97.5 (cm)	Gopa Kumar <i>et al.</i> (2003)
10.	28.08.2005	Pallithurai Vizhinjam	1	F	6.10	Present observation

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AUSTRALIA'S NEWEST MARINE RESERVE SAFEGUARDS SHARKS

Habitat for a harmless shark that is one of Australia's most threatened marine species was recently protected by a new marine reserve in Commonwealth waters off Australia's east coast. The Australian government announced the creation of a 300 hectare reserve to protect grey nurse sharks at the Cod Grounds, a key aggregation site about four miles off the New South Wales coast, near Port Macquarie. Historically, due to their fierce appearance that cause them to be mistaken for other sharks that pose a danger to humans, large numbers of grey nurse sharks were killed by recreational spear and line fishers and in shark control programs. For more information log on <http://www.ens-newswire.com/ens/may2007/2007-05-11-01.asp>

MARINE SPONGES AS IMMUNOSUPPRESSIVE DRUG CANDIDATES

Marine organisms represent a valuable source of new compounds. The biodiversity of the marine environment and the associated chemical diversity constitute a practically unlimited resource of new active substances in the field of bioactive products. Marine organisms have evolved biochemical and physiological mechanisms that include the production of bioactive compounds for such purposes as reproduction, communication, protection against predation, infection and competition. Because of the physical and chemical conditions in the marine environment, almost every class of marine organism exhibits a variety of molecules with unique structural features.

Many marine natural compounds are isolated from cone snails, corals, sponges, sea squirts, marine worms, bryozoans, sea slug and sharks. These drugs are used for treating fungal infection, tuberculosis, nematode infection, malarial infection, bacterial infection, viral infection, pain management, cancer and inflammation control. The natural compounds currently under clinical trials are very limited and the potential to discover more potent drugs from the seas could be expected. Apart from human medicines, the research on marine natural products in the last three decades has also led to discoveries of many chemically and biologically interesting molecules.

Marine sponges as pharmacy

Marine invertebrates have been recognized as an important source of bioactive compounds having medicinal potential. Among the invertebrates, sponges remain the most prolific phylum, concerning novel pharmacologically active compounds (Faulkner, 2000). Sponges (37%), coelenterates (21%) and microorganisms (18%) are the major sources of biomedical compounds followed by algae (9%), echinoderms (6%), tunicates (6%), mollusks (2%) and bryozoans (1%). Approximately 10,000 sponges have been described in the world and most of them live in the marine environment. Among the various marine organisms sponges are the most prolific producers of secondary metabolites with a wide array of bioactive substances being reported from about 11

genera. Among these, three genera namely *Haliclona*, *Petrosia* and *Discodermia* are known to produce powerful anticancer and anti-inflammatory agents (Blunt *et al.*, 2003).

The foremost compounds isolated from marine organisms and used as tools in drug development were the unusual nucleosides spongouridin and spongothymidin from the sponge *Cryptotethya cryptai* (Bergmann and Feeney, 1951). Currently, sponges have gained renewed interest due to discovery of many secondary metabolites with potential pharmaceutical applications. Some of them as manoalide and halichondrin B were harvested in large quantities for clinical trials (Kernan *et al.*, 1987; Litaudon *et al.*, 1997). Roman historian Plinius recommended the use of sponges against sunstrokes and they were used against all kinds of wounds, bone fractures, dropsy, stomach aches, infectious diseases, and testicle tumours (Hofrichter and Sidri, 2001) or even as implant after breast operations (Arndt, 1938). However, the combination of predominantly low concentrations of these molecules and the low growth rates of sponges in the sea results in a very slow production of the bioactive compounds

Immune system suppression

Immune system suppression is desired in case of hypersensitivity to certain antigens (e.g. allergies) or organ transplantations. Patients who receive a donor organ need life-long medication to prevent rejection by the immune system, and for that reason it is extremely important that these medicines are very specific suppressors. Therefore there is a continuous demand for new immunosuppressives. A number of new molecules with immunosuppressive activity have been discovered in marine sponges, which interfere at different points of the immune response (Table 1).

The simplexides from the Caribbean sponge *Plakortis simplex* are a group of immunosuppressive glycolipids that inhibit proliferation of activated T-cells by a non-cytotoxic mechanism (Costantino *et al.*, 1999).

Three polyoxygenated sterols from *Dysidea* sp. occurring in Northern Australia are selective immunosuppressive compounds that inhibit the binding of interleukin-8 (IL-8), a cytokine that attracts neutrophils into an area of tissue injury, to the IL-8 receptor (Leone *et al.*, 2000). Pateamine A, from *Mycale* sp., inhibits the production of interleukin-2 (Romo *et al.*, 1998) and thereby the activation of resting T-cells and B-cells to a lesser extent. Contignasterol from *Petrosia contignata* (Burgoyne and Andersen, 1992) inhibits allergen-induced histamine release from rat mast cells (Takei *et al.*, 1994) and from guinea-pig lung tissue *in vitro* (Bramley *et al.*, 1995) and the activation of eosinophils into airways in guinea-pigs and could be used to treat asthma (Langlands *et al.*, 1995) (Fig. 1).

Immunosuppressive compounds

A wide variety of natural products are alleged to possess immunosuppressant activity. But it is often difficult to differentiate this suppressed activity from the associated cytotoxicity of the compounds. Polyketides and fatty acid derivatives of Discodermolide have been of considerable interest as an experimental immunosuppressant since their isolation from the marine sponge *Discodermia dissoluta*. The Plakosides A and B from the marine sponge *Plakortis simplex* are prenylated glycosphingolipids. These exhibit strong immunosuppressant activity against concavalin A stimulated T. cells. The structurally related simplexides have been isolated from the same sponge, albeit as a crude mixture of compounds. They are claimed to inhibit T. cell proliferation induced by concavalin A and by lipopolysaccharide (Costantino *et al.*, 1999).

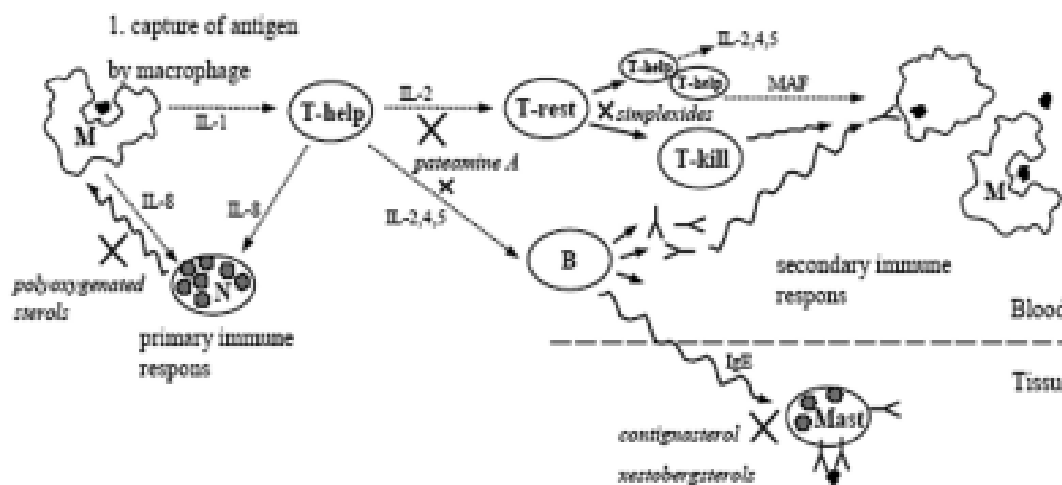


Fig. 1. Schematic representation of sponge-derived immunosuppressive compounds

Explanation to the figure : Immune response after capture of an antigen by the macrophages (M). Both macrophages, especially T-helper cells (T-help) secrete many interleukins (IL-x) or macrophage activation factor (MAF), to trigger the primary immune response via neutrophils (N), or the secondary immune response by activating resting T-cells (T-rest) and B cells (B). Activated B cells secrete antibodies that bind to macrophages which have phagocytised an antigen and they are subsequently destroyed by T-killer cells (T-kill). Mast cells (Mast) release histamine as a response of binding of an antigen to IgE molecules that are present in their cell membranes. The black crosses indicate the position where sponge-derived immunosuppressive compounds interfere with the immune response (Modified from Sipkema, 1999).

Table.1.Immunosuppressive compounds from marine sponges

Name of species	Compound	Compound class	Mode of action	Reference
<i>Xestospongia berquista/ Agealas oroides</i>	Xestobergsterols A & B Taurod ispacamide A	Pentacyclic sterol Pyrrole-imidazole alkaloid	Histamine release inhibitor IL-2 inhibitor	Shoji, <i>et al.</i> , 1992 ; Fattprisso and Taglialatel Scafati, 2000
<i>Mycale</i> sp.	Pateamine A	Thiazole macrolide	IL-2 inhibitor	Northcote <i>et al.</i> , 1991
<i>Plakortis simplex</i>	Simplexides	Glycolipid	Inhibitor of T. cell proliferation	Costantino <i>et al.</i> , 1999
<i>Dyside</i> sp. <i>Petrosia contignata</i>	Polyoxygenated sterols contignasterol	Sterol oxygenated sterol	IL-8 inhibitor histamine release inhibitor	Leone <i>et al.</i> , 2000; Takei <i>et al.</i> , 1994 ; Bramley <i>et al.</i> , 1995

Several acridine alkaloids have been isolated from deep water sponges of the family Pachastrellidae called nordercitin, dercitamine, dercitamide and cyclodercitin. The first three are claimed to exhibit immunosuppressant activity. The beta-carboline alkaloid hyrtiomanzamine has been isolated from the marine sponge *Hyrtios erecta*. It is claimed to exhibit marked immunosuppressant activity in the B lymphocyte reaction assay (John Mann, 2001). The potential for marine natural products is still far from being fully explored. The vast range of organisms and their associated evolutionary quirks may well provide solutions to long standing problems.

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GIANT SQUID CAPTURED, FILMED FOR FIRST TIME

Like pulling a shadow from the darkness, researchers in Japan have captured and filmed a live giant squid—likely for the first time—shedding new light on the famous elusive creatures. Tsunemi Kubodera, a scientist with Japan's National Science Museum, caught the 24-foot (7-meter) animal near the island of Chichijima, some 600 miles (960 kilometers) southeast of Tokyo. Giant squid, the world's largest invertebrates, are thought to reach sizes up to 60 feet (18 meters), but because they live at such great ocean depths they have never been studied in the wild. Kubodera has three years searching for the creatures, and his team scored a coup in 2004 when it used a remote underwater camera to take the first-ever photographs of a live giant squid. For more information log on <http://news.nationalgeographic.com/news/2006/12/061222-giant-squid.html>

RECENT NEWS IN BRIEF

20 new species of sharks, rays discovered in Indonesia

At least 20 new species of sharks and rays have been discovered in the waters off Indonesia, scientists announced. These findings are the result of a five-year survey -mostly done at local fish markets. The spade-shaped Hurtle's whipray collected in the survey is the newest of 17 whipray species known to live in the muddy shallows along Indonesia's shores. "Indonesia has the most diverse shark and ray fauna and the largest shark and ray fishery in the world," said biologist William White from CSIRO, Australia. For more information log on <http://news.nationalgeographic.com/news/2007/03/070301-sharks-stingrays.html>

"Walking" sharks found in Indonesia reefs

Among the new species of sharks discovered off the coast of Indonesia, small, slender-bodied sharks that "walk" with their fins along coral reefs have been found. In addition to the two types of walking epaulette sharks, the researchers discovered 22 species of other fishes, 20 species of hard corals, and 8 kinds of shrimp all believed to be new to science. These new species were found during two recent expeditions to the Bird's Head Seascape, a distinctive peninsula on the northwestern end of Indonesia's Papua province that is already renowned for its marine biodiversity. "It's an incredible place in both the number of species and the abundance of marine wildlife," said Roger McManus, Senior Director for Global Marine Conservation at the Washington, D.C. based nonprofit Conservation International, which led the expeditions. The Missouri-size region is home to more than 1,200 types of reef fishes and nearly 600 species of hard corals. Whales, sea turtles, crocodiles, giant clams, manta rays, and dugongs also occur in the peninsular waters. For more information log on <http://news.nationalgeographic.com>

Coral reef paradise found in remote Indonesian islands

The waters of the Raja Ampat Islands off Indonesia's province of Irian Jaya may replace heralded Palau as the most species-rich sea in the world. An international team of marine biologists led by Gerald Allen from the Western Australia Museum conducted a scientific expedition in the Raja Ampats waters of Indonesian island recently to examine the reefs. They found what may be an unparalleled array of species - corals, fishes, and mollusks -including some species never seen before. During the entire three-week expedition, Allen an expert on coral reef fishes recorded 950 different species of fishes. Also he broke his own world record, twice, for the number of species he saw in a one-hour dive - 281 on one dive and 283 on another. Their results revealed what they said were an extraordinary wealth of marine biodiversity: 450 species of hard coral, more than 600 mollusk species, and possibly as many as 1,100 fish species. For more information log on <http://news.nationalgeographic.com>

Thousands of new species found in Philippines

An international wildlife expedition has unearthed a treasure trove of new species from around the Philippines' Panglao island. 80 scientists and volunteers from 19 countries were involved in the expedition. The new findings include more than 1,200 varieties of decapods - ten-legged creatures such as lobsters and crabs and at least 4,000 types of mollusks, expedition leader Philippe Bouchet announced. For more information log on <http://news.nationalgeographic.com/news/2007/02/070206-new-species.html>

Antarctic ice breakups reveal new species

A potentially new species of shrimplike crustacean belonging to the genus *Epimeria* was found near Elephant Island in Antarctica, scientists announced. The 1-inch-long (2.5-centimeter-long) creature was among the nearly thousand species collected during the first biological survey of a 3,860-square-mile (10,000-square-kilometer) section of the sea that was once covered by thick polar ice. A 500-billion-ton ice shelf known as Larsen B disintegrated into the Weddell Sea in 2002 - seven years after the nearby Larsen A ice shelf broke apart. Experts believe that global warming triggered both events. For more information log on <http://news.nationalgeographic.com/news/2007/02/070227-antarctica.html>

Chain of cascading lakes discovered under Antarctica

A series of connected lakes has been discovered deep beneath glaciers in Antarctica that is speeding streams of polar ice into the sea, scientists announced. The lakes appear to be filling and emptying rapidly as water cascades from one lake to another before eventually reaching the ocean. This finding is important, as the scientists believe that this water below the surface helps to carry ice into the sea, ultimately contributing to a rise in sea levels. The team's finding may help scientists to understand better how global warming will affect the world's ocean levels. For more information log on <http://news.nationalgeographic.com/news/2007/02/070216-antarctic-lakes.html>

Colossal squid caught off Antarctica

In Antarctica's Ross Sea, a fishing boat has caught what is likely the world's biggest known colossal squid, New Zealand officials announced on February 22, 2007. Heavier than even giant squid, colossal squid (*Mesonychoteuthis hamiltoni*) has eyes as wide as dinner plates and sharp hooks on some of their suckers. The new specimen weighed 990 pounds (450 kilograms). This deep-sea species was first discovered in 1925, though the only evidence available then was two tentacles found in a sperm whale's stomach. Since then there have been only scattered sightings, including a colossal squid caught in 2003 from the same region as the recent one. For more information log on <http://news.nationalgeographic.com/news/2007/02/070222-squid-pictures.html>

Rare "Prehistoric" goblin shark caught in Japan

A rare goblin shark—a "living fossil" that closely resembled ancient shark species—was caught alive recently in Tokyo Bay. Officials from the Tokyo Sea Life Park discovered the 4.3-foot-long (1.3-meter-long) creature during an expedition with local fishermen. The shark had been tangled in fishing nets at the depths of 500 to 650 feet (150 to 200 meters). For more information log on <http://news.nationalgeographic.com/news/2007/02/070209-goblin-shark.html>

Climate change set to damage biodiversity of Sundarbans

Climate change is set to damage biodiversity of the Sundarbans increasing the inundated areas and salinity in water in coastal areas. As a result, crops, fisheries, forests and livestock will be at high risk in the country. This was stated by Prof. Qazi Kholiqzaman Ahmad, lead author of Intergovernmental Panel on Climate Change (IPCC)'s Working Group-2, at a press briefing organised by Bangladesh Economic Association (BEA) and Bangladesh Unnayan Parishad (BUP) at Dhaka Reporters Unity in the city.

"Though Bangladesh is committed to conserve the World Heritage Sites in the Sundarbans, which are at great risk due to climate change," he said two of the total 104 islands of Sundarbans in the Indian side have been lost due to rise in sea level.

Prof. Kholiquzzaman said due to climate change, around two crore people in flooded areas will lose employment and their socio-economic security and millions will be forced to become refugees and face various diseases like malaria, diarrhoea and skin diseases. On the other hand, the climate change caused by global warming, will deepen drought in north-western region leaving agriculture and farmers at great risk, he added. Citing researches, Prof. Kholiquzzaman, said a huge number of hardcore people will become beggars, the poor, into ultra-poor and the lower income groups into poor.

“The consequences of ice-melting in the Himalayas caused by global warming will be devastating for Bangladesh,” he said, with more floods, there will be more people migrating to cities creating immense pressure on urban areas and compelling them to live an inhumane life in the slums. In the wake of such research-based apprehensions, Prof. Kholiquzzaman said Bangladesh as well as other developing countries should be united against the industrialised nations, which are mainly responsible for global warming, but are passing the burden on the developing ones. According to a report of IPCC, on an average global temperature will increase from 1.8°C to 4°C, while sea level will increase by 18 to 59 centimetres by next century. Another IPCC report, published early this year, said 120 crore people of Asia and 25 crore people of Africa will suffer from scarcity of water in the case of increasing temperature by 1°C. “And if the temperature increases by 2° C, productivity of rice in China will come down by 12 percent, 20 lakh people will face coastal flooding in Asia and 160 crore more people in Africa will suffer from scarcity of water,” it added. Increased capacity of adoptability and control of the global warming process are now very urgent, the report suggested. For more information log on <<http://www.thedailystar.net/2007/04/16/d70416060167.html>.

1,000 giant turtles washed ashore in India and Bangladesh

Nearly a thousand dead turtles have been washed ashore along the coasts of both countries in the past few weeks of early 2007. About 200 dead reptiles have appeared in the past week alone along a single stretch of beach, in the Bangladeshi tourist town of Cox’s Bazar. A team of scientists who visited the beach to investigate the mysterious mass deaths concluded that fishing nets were to be blamed. Around 763 dead turtles were washed ashore two months earlier, all dead after getting caught in fishing nets, according to Biswajit Mohanty, Coordinator of the Conservation Group Operation Kachchappa. For more information log on <http://news.nationalgeographic.com/news/2007/02/070207-sea-turtles.html>.

Extreme new species discovered by sea-life survey

A host of weird and wonderful discoveries from across the seven seas has been made this year, according to a global census of ocean life. Heat-resistant volcanic shrimps, bacteria-farming furry crabs, and a giant species of lobster are among the findings made by marine scientists probing some of the world’s deepest and remotest seas. These discoveries added to the Census of Marine Life, a project that seeks to record all known ocean life, living and extinct, by 2010. The census, now in its sixth year, involves a network of more than 1,700 researchers in at least 70 countries. One team involved in the census reported the discovery of marine animals thriving in the hottest ocean waters. Heat-resistant species of mussels and shrimps were found living alongside volcanic fissures where temperatures reached 765°F (407°C). For more information log on <http://news.nationalgeographic.com/news/2006/12/061211-sea-creatures.html>.

Global warming may swamp Hawaiian wildlife, study warns

A chain of tiny, remote Hawaiian islands are becoming the largest marine sanctuary in the U.S. next year. But the rare wildlife living there could disappear beneath the waves by the end of this century because of global warming, a new study warns. A team of Hawaii-based scientists calculated that two-thirds of some islands in the Northwestern Hawaiian Islands (NWHI) could be submerged by 2100. A scattered archipelago stretching some 1,200 miles (1,930 kilometers) across the Pacific Ocean, NWHI is home to colonies of unique animals that may be swamped as their low-lying islands succumb to rising sea levels, researchers say. Animals at risk include rare seals, sea turtles, and bird species found only on NWHI. The NWHI consist of atolls and pristine coral reefs and are slated to form part of the largest national marine sanctuary in the United States. The islands are home to some 7,000 plant and animal species, many of which are found nowhere else in the world. This remote Eden, however, is under threat from fishing, coral harvesting, discarded nets and plastic, and rising seas due to global warming. Threats to the islands from future sea level rise were assessed for the first time by a team led by Jason Baker of the Pacific Islands Fisheries Science Center, part of the U.S. National Oceanic and Atmospheric Administration (NOAA). Studies suggested that sea levels rose almost 6 inches (15 centimeters) during the 20th century. Levels are expected to rise farther and faster this century, as global warming accelerates the melting of glaciers and polar ice caps, and as higher water temperatures expand the volume of the world's oceans.

The team created 3-D computer models of NWHI to gauge the possible impact of future sea level rises using scenarios forecast by the Intergovernmental Panel on Climate Change (IPCC) based in Gland, Switzerland. Their findings suggested that by 2100 up to 65 percent of some islands would be lost if the sea level rose 18.9 inches (48 centimeters), which is the average IPCC projection. The team also found that a 34.6-inch (88-centimeter) rise-the maximum sea level rise forecast by 2100 - could result in up to 75 percent of NWHI wildlife habitat disappearing. The islands are also a breeding site for millions of seabirds and endangered animals, including the Hawaiian monk seal-one of the world's rarest marine mammals and the Hawaiian green sea turtle. For more information log on http://news.nationalgeographic.com/news/2006/06/060615-bush-hawaiian_2.html

Blue jellyfish invade Australia beaches

Huge armadas of toxic bluebottle jellyfish swamped Australia's east coast in record numbers, putting the sting on peak beach season. More than 30,000 people were stung by the translucent blue jellies on this coast during 2006 more than twice the number of incidents in 2005-according to Australia's lifeguard group, Surf Life Saving (SLS). And in a single weekend earlier this month, beachgoers reported more than 1,200 stings, several requiring hospitalization. The recent influx is the result of a wind shift that has pushed flotillas of the invertebrates ashore, scientists say. But the overall trend suggested that the 6-inch-long (15-centimeter-long) jellyfishes are growing in number due to warming ocean waters. For more information log on <http://news.nationalgeographic.com/news/2007/01/070123-blue-jellyfish.html>

Giant jellyfish invade Japan

Japanese waters have been inundated with the giant Nomura's jelly fish, which can grow up to 6.5 feet (2 meters) wide and weigh up to 450 pounds (220 kilograms). Though the jellyfishes are more common in Chinese and Korean waters, their numbers have grown a hundredfold in some areas off Japan, causing a crisis in the local fishing industry. The invertebrates are choking fishing nets and poisoning the catch with their toxic stingers, fishers said. And although reports of serious human injury are rare, there are records of people dying from the creature's noxious sting. For more information log on http://news.nationalgeographic.com/news/2006/01/0119_060119_jellyfish.html

PUBLICATIONS OF CENTRE OF ADVANCED STUDY IN MARINE BIOLOGY

SL. NO.	TITLE	AUTHOR'S	AMOUNT
1	A Field Guide to the Common Invertebrates of the East Coast of India	S. Antony Fernando & Olivia J. Fernando	300.00
2	Aquaculture Equipments	M. Srinivasan, S. Rajagopal & M. Natarajan	100.00
3	Brachyuran Crabs of Parangipettai Coast	S. Sethuramalingam & S. Ajmalkhan	200.00
4	Brackishwater Amphipods of Parangipettai	P. S. Lyla, S. Velvizhi & S. Ajmal Khan	175.00
5	Cephalopods of Parangipettai East Coast of India	A. Shanmugam, A. Purushothaman, S. Sambasivam, S. Vijayalakshmi & T. Balasubramanian	150.00
6	Finfish Resources of Pichavaram Mangrove Ecosystem	V. Ramaiyan, R. Senthil Kumar & M. Rajasegar	200.00
7	Hatchery Operation Manual for <i>Macrobrachium Rosenbergii</i> De Man	P. Soundarapandian, P. Anantharaman & T. Kannupandi	150.00
8	Hatchery Operation Manual for <i>Penaeus Monodon</i> Fabricius	T. Kannupandi, P. Soundarapandian & P. Anantharaman	150.00
9	Hermit Crabs of Parangipettai Coast	S. Ajmal Khan	120.00
10	Interesting Exhibits in the Marine Museum	S. Ajmal Khan, S. Murugan, K.P. Manikandan & T. Balasubramanian	50.00
11	Larvae of Decapod Crustaceans	S. Ajmal Khan, S.M. Raffi & P.S. Lyla	100.00
12	Marine Microbiology Manual	A. Purushothaman, T. Balasubramanian, R. Mohanraju & S. Vijayalakshmi	100.00
13	Medicinal Plants of Parangipettai Coast Vol. II	K. Kathiresan & T. Ramanathan	150.00
14	Oceanographic Equipment	M. Natarajan & S. Balasubramanian	100.00
15	Phytoplankton of the Vellar Estuary Vol.I	P. Anantharaman & L. Kannan	100.00
16	Polychaetes of Parangipettai Coast	B. Srikrishnadhas, P. Murugesan & S. Ajmal Khan	250.00
17	Rotifers of Portonovo	L. Kannan & C.Govindasamy	140.00
18	Sea Snakes of Parangipettai Coast	M. Srinivasan & S. Bragadeeswaran	100.00
19	Seaweeds and Seagrasses of Portonovo	L. Kannan & T. Thangaradjou	300.00
20	Sharks, Skates and Rays	V. Ramaiyan & R. Sivakumar	120.00
21	Spiny Lobsters of the Indian Ocean	P.S. Lyla, P. Murugesan, S. Ajmal Khan & S. Rajagopal	100.00
22	Stomatopods of Parangipettai Coast	P.S. Lyla, V.S. Chandrasekaran & S. Ajmal Khan	300.00

INFORMATION, NEWS AND NOTES



UPCOMING RESEARCH MEETS

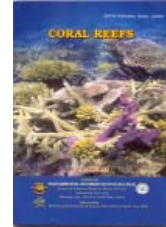
- ✉ 16 – 17th July, 2007. INDO-JAPAN Workshop on Coastal Problems and Mitigation Measures – Including the effects of Tsunami. Contact: Prof. V. Sundar, Department of Ocean Engineering, Indian Institute of Technology, Chennai – 600 036, India. E-mail: vsundar@iitm.ac.in; <http://www.oec.iitm.ac.in/indo-japan>
- ✉ 19 -20th July, 2007. National Seminar on Pollution Hazards and Marine Fishery Resources Management (PHMFRM '07). Contact: Dr. V.K. Venkataramani, Dean and Convener, National Seminar on Pollution Hazards and Marine Fishery Resources Management, Fisheries College and Research Institute, Thoothukudi – 628 008, Tamil Nadu, India. Mobile: 9443555289; E-mail: vk53@rediffmail.com
- ✉ 20-21st July, 2007. Two-Day Conference on Biotechnology for Human Welfare (CIT-Biotech. 2007). Contact: Prof. E. Ramasamy, Organising Secretary, “CIT-BIOTECH 2007”, Department of Chemical Engineering, Coimbatore Institute of Technology, Coimbatore – 641 014, Tamil Nadu, India. Phone: 91-422-2574071, 2574072; Fax: 91-422-2575020; E-mail: profercitbio@gmail.com
- ✉ 27 – 29th August, 2007. National symposium on Marine and Coastal Ecosystems. Contact: Dr. A.K. Kumaraguru, Symposium Organizing Secretary, Professor & Director, Centre for Marine and Coastal Studies, School of Energy, Environment and Natural Resources, Madurai Kamaraj University, Madurai, India. E-mail: sruamku_symposium2007@yahoo.co.in; Website: www.geocities.com/srua_symp/srua_symp.html
- ✉ 5 - 7 September, 2007. Sixth International Conference on Ecosystems and Sustainable Development (ECOSUD 2007). Contact: Rachel Swinburn, Conference Manager, ECOSUD 2007, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA. Phone: 44 (0) 238 029 3223; Fax: 44 (0) 238 029 2853; Email: rswinburn@wessex.ac.uk.
- ✉ 27-31 August 2007. Effects of Climate Change on Marine Ecosystems, Kiel, Germany. Contact: www.irsymposia.com
- ✉ 25 – 28 September, 2007. European Symposium on Marine Protected Areas as a Tool for Fisheries Management and Ecosystem Conservation. Contact: www.mpasymposium2007.eu
- ✉ 3 – 7 January, 2008. 95th Indian Science Congress. Contact: The Executive Secretary, The Indian Science Congress Association, 14, Dr. Biresw Guha Street, Kolkata – 700 017. Phone: 033-2287 4530/2281 5323; Fax: 033-2287-2551; E-mail: iscacal@vsnl.net / iscacal_2004@yahoo.com; Website: <http://sciencecongress.nic.in>
- ✉ 7 – 11 July, 2008. 11th International Coral Reef Symposium on Reefs for the future. Contact: www.nova.edu/ncr/11icrs.
- ✉ 15-19 February 2009. Aquaculture America 2009. Contact: Seattle, Washington, USA. Website: <http://www.was.org/main/Meetings.asp>

ENVIS PUBLICATIONS

Booklet on Coral Reefs

Coral reefs are distinct and unique habitats found mostly in clear shallow waters in the warmest part of the world. The majority of coral reefs are found within tropical and sub-tropical countries. In some developing countries, food from reefs provides about 25 per cent of the total food supply and 60 per cent of the total protein intake. In India, the reefs are distributed along the east and west coasts at restricted places. There are 4 major coral reef areas here namely Andaman and Nicobar Islands, Gulf of Mannar, Lakshadweep Islands and the Gulf of Kachchh. The total area of coral reefs in India is estimated to be 2273.8 sq km. Coral reefs stabilize the shoreline changes, save people living in the coastal areas from natural calamities, and prevent soil erosion. Reef sponges have been used for producing antiviral drugs to treat HIV and herpes. Chemicals from multiple reef species may be able to help fight cancer. This booklet written in a simple manner enables people in common walks of life and students to learn about the importance of coral reef ecosystem and to understand how healthy coral reefs are valuable to the people, plants, and animals that depend on them.

Pages: 54, Rs.25/-



Wave in Bay (Impact of Tsunami on Coastal Resources)

Coral reefs are distinct and unique habitats found mostly in clear shallow waters in the warmest part of the world. The majority of coral reefs are found within tropical and sub-tropical countries. In some developing countries, food from reefs provides about 25 per cent of the total food supply and 60 per cent of the total protein intake. In India, the reefs are distributed along the east and west coasts at restricted places. There are 4 major coral reef areas here namely Andaman and Nicobar Islands, Gulf of Mannar, Lakshadweep Islands and the Gulf of Kachchh. The total area of coral reefs in India is estimated to be 2273.8 sq km. Coral reefs stabilize the shoreline changes, save people living in the coastal areas from natural calamities, and prevent soil erosion. Reef sponges have been used for producing antiviral drugs to treat HIV and herpes. Chemicals from multiple reef species may be able to help fight cancer. This booklet written in a simple manner enables people in common walks of life and students to learn about the importance of coral reef ecosystem and to understand how healthy coral reefs are valuable to the people, plants, and animals that depend on them.

Pages: 129, Rs.150/-



Over the years, the ENVIS Centre has brought out several publications on coastal environment. These publications are highly commended by the scientists, policy makers and planners of various prestigious institutions and agencies. These are found to be highly useful to the researchers in the field of Marine Science, helping them to get an update of the research findings from the Indian coasts.

Considering the overwhelming demand from the researchers and students for these publications and our inability to send them free of charges, the Centre has fixed a nominal price for ENVIS publications. Users interested can write to the following address to receive the publications.

The In-charge, ENVIS Centre
Centre of Advanced Study in Marine Biology
Parangipettai - 608 502
Tamil Nadu, India
E-mail: cdl_aucasmb@sancharnet.in; casmb@envis.nic.in

ENVIS PUBLICATIONS

Flowering Plants and Fern in Mangrove Ecosystems of India

The ENVIS Centre at Centre of Advanced Study in Marine Biology has published many books and reports over the period of time for the benefit of researchers, field planners, policymakers, students and academics. All the publications have been received well and appreciated by the scientists at the National and International levels.

In order to fulfill the requirement of researchers, the Centre has brought out a new publication entitled "Flowering plants and fern in mangrove ecosystems of India". This user friendly manual provides colour plates of plants that are reported in the Indian mangrove ecosystems alongwith their diagnostic characters, distribution, status, uses and their local names.

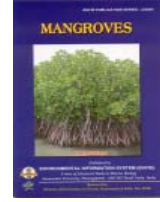
Pages: 110, Rs.300/-



Booklet on Mangroves

Mangroves are salt tolerant plants that are growing in the tropical and subtropical latitudes. They act as a physical barrier in the coast, reduce soil erosion, enhance fishery production and add natural beauty to the sea coast. But, unfortunately the mangrove forests are destroyed by the local community without knowing about their value and importance. This is mainly due to lack of awareness among the local people whose livelihood depends heavily on mangroves. Keeping this in mind, the Centre has published a booklet on mangroves which has been written in a simple and popular style so that it may be used by all. We hope this booklet may create more awareness among people about the importance of mangrove forests in the aftermath of recent tsunami.

Pages: 32, Rs.15/-



சதுப்புநிலக் காடுகள்

சதுப்புநிலக்காடுகள் உவர் நீரில் வளரக்கூடிய சிறப்புத்தன்மை கொண்ட தாவரங்களாகும். இவை பொதுவாக வெப்ப மண்டல மற்றும் மிதவெப்பமண்டல நாடுகளின் கடலோரங்களில் காணப்படும். இக்காடுகள் கடலோரங்களை மண் அரிப்பிலிருந்து பாதுகாக்கின்றன. மீன் உற்பத்தியை பெருக்குகின்றன. இயற்கை அழகை அதிகப்படுத்துகின்றன. ஆனால் இக்காடுகளின் முக்கியத்துவம் மற்றும் பயன்களை அறியாத மக்கள் இக்காடுகளை வெகுவாக அழித்துவருகின்றனர். இதற்கு காரணம் போதுமான விழிப்புணர்வு இல்லாமையே. அதனால் இம்மையம் ஒரு கையேட்டினை வெளியிட்டுள்ளது. இந்த கையேடு சாதாரண மக்களும், மாணவ சமுதாயமும், வனத்துறை ஊழியர்களும் மற்றும் அரசாங்க அலுவலர்களும் புரிந்துகொள்ளும் வகையில் மிக எளிமையாக எழுதப்பட்டுள்ளது. இதன் மூலம் சதுப்புநிலக்காடுகள் பற்றிய விழிப்புணர்வு மக்களிடையே ஏற்படுவது உறுதி.

Pages: 32, Rs.15/-



Booklet on Estuaries

Coastal zone has different biotopes such as estuaries, mangroves, coral reefs and lagoons endowed with splendid beauty and high productivity. Among the above biotopes, estuaries play a vital role and serve as an area of interaction between fresh and salt waters. An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which the sea water is measurably diluted with the freshwater derived from land drainage. They are of consequence to human welfare due to their role in transportation, production of food, waste disposal and various recreational pursuits. Due to lack of understanding about estuaries and their importance, this system is degrading day by day through discharge of pollutants, overfishing and construction of barricades and dams. Keeping in mind the requirement of general readers and laymen, this booklet is prepared in a very simple manner. This booklet which provides information on the importance and the economic uses of estuaries will be useful to the students and people in other walks of life. We fondly hope that this booklet will create more awareness about the importance of estuaries among the common people .

Pages : 64, Rs.25/-



ENVIS PUBLICATIONS

Living on the Edge*

In order to commemorate the International Year of the Ocean 1998, the ENVIS Centre has published a special issue titled "Living on the Edge". This publication provides the experts a chance of saluting our coastal lands during the eve of the Ocean Year 1998. This book gathers lot of information from the experts who are living on the edges of the sea. This rare source of information will be very useful to the people of maritime habitats, researchers, planners and policy makers to arrive at a decision about the status of the coastal lands in our country and to adopt and recommend the strategies to upkeep the health of the ocean edges.

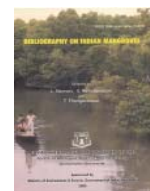
Pages:111, Rs.120/-



Bibliography on Indian Mangroves*

The bibliography deals with various aspects as Geology, Physico-chemistry, Microbiology, Biology, Ecology, Pollution & Toxicology and Conservation and Management of Indian Mangroves. It embraces all available written materials either primarily or peripherally, on mangroves. UNESCO had brought out a comprehensive publication on the bibliography of global mangroves for period 1600 - 1975. As lot of research/ developmental works have been carried out on this fragile environment after this period, the need for such a publication was keenly felt. Hence this publication at the national level. It will help to the present status the lacuna and this enable scientists to strategies to conserve and manage the Indian mangroves.

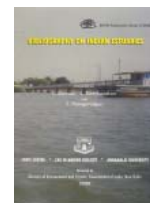
Pages: 65, Rs.70/-



Bibliography on Indian Estuaries*

The bibliography on estuaries of India covers the research works carried out and published between 1981 and 1998. The National Institute of Oceanography brought out a bibliography on "Estuarine Research in India" during 1981. After that, there is no such authentic bibliography on estuaries of India and hence the present one to bridge the gap. This bibliography contains about 1,000 publications which are conveniently classified under various subject headings viz. Geology, Chemistry, Hydrobiology, Microbiology, Phytoplankton, Zooplankton, Flora (Macrophytes), Fauna, Fisheries, Ecology, Pollution and Management. This bibliography will largely help the researchers/entrepreneurs/ policy makes to obtain the reliable information about estuaries of our country and to frame regulation acts.

Pages:119, Rs.120/-



Bibliography on Indian Coral Reefs

The bibliography on Coral reefs covers the diverse field of research works carried out and published in the Indian waters. It includes works on various aspects as Geology, Hydrobiology, Ecology, Taxonomy, Toxicology, Biochemistry, Microbiology, Plankton, Flora, Fauna and Conservation & Management pertaining to Coral reefs published during 1900 - 2000. There are about 206 species of corals recorded in our country. Early works on the taxonomy of Scleractinia from the Indian waters are by Alcock, Gardiner, Brook, Bernard, Matthai and Gravely. An intensive study of Coral reefs in India was started in the early sixties by Dr. C.S. Gopinadha Pillai, who is popularly called as "Coral Pillai". The bibliographic database on various aspects of coral reefs research is the need of the hour. It provides east access to available information and helps to procure them. This will largely help the researchers / developmental workers and fisherfolk to obtain reliable information about coral reefs.

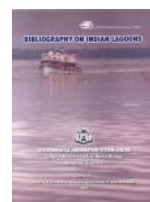
Pages: 74, Rs.80/-



Bibliography on Indian Lagoons

This bibliography enlists the studies made on lagoons in the Indian environment. It includes works on various aspects as Geology, Hydrobiology, Ecology, Microbiology, Plankton, Flora, Other invertebrates and Fisheries. This bibliography includes various research works carried out and published on Indian lagoons from 1900 to 2000. There are 17 noteworthy lagoons along the Indian coasts - 8 on the east and 9 on the west coasts. This bibliography will largely be helpful to the researchers, policy makers and planners who are interested in lagoons and it will enable them to easily locate the information they look for.

Pages: 36, Rs.50/-



**Photocopies only available*

ENVIS PUBLICATIONS

An Anthology of Indian Mangroves

A commemorative volume on the Golden Jubilee of India's Independence. Contains 12 interesting articles contributed by country's mangrove experts. All are informative and will help refresh the bygone days of mangrove research, present status and future strategies to conserve the Indian mangroves. This will certainly usher in the coastal researcher/community to conserve the mangrove forests, country's one of the natural treasures.

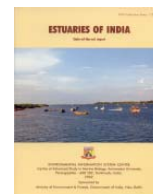
Pages: 66, Rs.75/-



Estuaries of India: State-of-the-art report

This report covers the diverse fields of research in the Indian estuaries between 1985 and 2000. It includes a total of 50 estuaries (23 on the east coast and 27 on the west coast). This will be very useful to the estuarine researchers and administrators and management planners to identify the present bottlenecks in the management of Indian estuaries for their effective conservation.

Pages: 195, Rs.300/-



Mangroves of India: State-of-the-art report

This report has been prepared on considering the research works on Indian mangroves between 1987 and 2000. It includes the environmental, microbiological, biochemical and management aspects of Indian mangroves. This will be very useful for the mangrove researchers to update knowledge in this field.

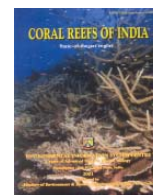
Pages: 140, Rs.250/-



Coral Reefs of India: State-of-the-art report

This report consolidates the research works (upto 2000) on coral reefs carried out from various corners of the country. Coral reef ecosystems viz. Gulf of Kachchh, Lakshadweep Island, Palk Bay, Gulf of Mannar, Andaman & Nicobar Islands, Kerala coast and Goa coast are covered in this report. This will be very useful to the managers, conservators, policy makers and researchers to understand the present scenario of the coral reef ecosystems of the India.

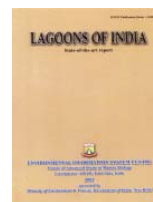
Pages: 104, Rs.250/-



Lagoons of India: State-of-the-art report

This report sketches out the lagoonal systems of the Indian coasts and also various research and developmental activities carried out in these areas. It covers 17 lagoonal systems, 8 on the east coast and 9 on the west coast. An attempt has also been made to assess the status of Indian lagoons. This report, is the updated version (upto 2000) of our previous state-of-the-art report. It will certainly be helpful to the people who consider lagoons as an integral part of their livelihood.

Pages: 100, Rs.250/-



How to Know the Mangroves?

This book, a check list, contains the identification key to genera and species which are based mainly on the morphological characters so that any one can use this as 'Field Guide' to identify the mangroves. The true mangroves are alone considered in this book covering 52 species under 29 genera and 21 families with illustrations. Many taxonomy books are available for identification of plants but this is a specially designed checklist for Indian mangroves alone.

Pages: 29, Rs.75/-

