ONLY NEWS PAPER PUBLISHED IN INDIA FOR SCIENTIFIC COMMUNITIES

NESA

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

Vol. 20 Issue - 10 (MONTHLY) October 2017

ABSTRACTS INVITED

National Conference on

IMPACT OF ENVIRONMENTAL CHANGES ON INDIAN ECOSYSTEMS

and XXIX Annual Conference of National Environmental Science Academy

Joinlty organised by:

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY (NESA)

&

Department of Environmental Sciences & Limnology & University Institute of Technology, Barkatullah University, Bhopal, Madhya Pradesh

on 23-24 December, 2017 at Barkatullah University, Bhopal, Madhya Pradesh

Abstract Submission Deadline 05.12.2017

Last date of Registration 15.12.2017

CONFERENCE THEMES & SUB THEMES

❖ Changing Environment and Indian Biodiversity ❖ Changing Environment and Indian Forestry ❖ Changing Environment and Indian Crops ❖ Changing Environment and Indian Water Bodies ❖ Changing Environment and Indian Climates ❖ Changing Environment and Indian Food Security ❖ Changing Environment and Indian Soil & Microflora ❖ Changing Environment and Human Health ❖ Changing Environment and Seed Production ❖ Changing Environment and Marine Terristrial Flora & Fauna ❖ Changing Environment and Econ omically important plants ❖ Any relevant topic related to main theme

E-mail: ieie2017nesa@gmail.com • Website : www.nesa-india.org

A REPORT ON

A National Conference on 'Ecological Imbalance: A Threat to Flora, Fauna, Economy and Human Survival' was organized on 22nd and 23rd Sep 2017 at Vigyan Parishad Auditorium Allahabad (U.P.).This National Conference was jointly organized by Department of Zoology, Govt. PG College Saidabad Allahabad and National Environmental Science Academy (NESA) New Delhi in association with Society of Life Sciences, Satna (M.P.) and Environment & Social Development Association (ESDA) New Delhi.

Dr. R.P. Singh Director, Higher Education, Uttar Pradesh was its Chief Patron, Prof Ashish Joshi Principal, Govt. PG College Saidabad Allahabad and Prof. UC Srivastava General Secretary, National Academy of Science India (NASI) Patrons, while Dr. Ashok Kumar Verma was Organizing Secretary of this Conference. The organizing secretary was recently awarded with SARASWATI SAMMAN 2017 of U.P. Government by Shri Yogi Adityanath, Hon'ble CM on 5th September 2017 at Lok Bhawan, Lucknow, U.P.

More than 300 participants in the form of academicians, scientists and researchers from 10 states of the country participated in this conference. Guests during inaugural session were: 1). Prof. Rita Bahuguna Joshi Hon'ble Minister for Tourism, Women, Family and Child Welfare, Govt. of U. P. 2). Prof. Rajendra Prasad, Hon'ble Vice Chancellor, Allahabad State University, Allahabad, U. P. 3). Dr. S. P. Khare, Jt. Director, Dept. of Higher Education, Uttar Pradesh. 4). Prof. (Dr.) Javed Ahmad, President, NESA New Delhi 5). Prof. Shivesh Pratap Singh, Secretary, Society of Life Sciences, Satna, M. P. 6). Dr. Jitendra Kumar Nagar, General Secretary, ESDA New Delhi. Key Note Speaker was Prof U.C. Srivastava Emeritus Scientist, General Secretary, National academy of Sciences India (NASI) and former Professor, University of Allahabad, Allahabad, U.P.

During this prestigious national conference, Dr. H.P. Singh (Principal, HNB PG College Naini Allahabad), Dr. Sunanda Chaturvedi (Principal, GDC Dhanupur Allahabad), Dr. Kanchan Gaur (Principal, GDC Kaushambi), Dr Aparna Mishra (Principal, GDC Raniganj Pratapgarh), Dr Shubha Singh Joshi (Principal GDC Unchahar, Raebareli), Dr. Jay Shankar Mishra (Principal, GDC Mangraura Pratapgarh), Dr. Vineeta Yadav (Principal GDC Fatehpur), Dr. Sheelpriya Tripathi (Principal, GDC Bindaki Fatehpur), Dr. MD Ram Gupta (Principal, GDC Salempur Deoria), Dr. JP Singh (Principal, GDC Shrawasti) and Dr. Gyan Prakash Verma RHEO Jhansi graced the occasion.

Important Speakers / Chairpersons were : Prof Bechan Sharma, Prof AK Pandey, Prof Krishna Kumar, Prof SM Prasad, Prof AK Srivastava, Prof Mohd Arif , Prof. BP Sinha, Prof AN Shukla and so on.

Guests during Valedictory function were: 1). Dr. Priti Gautam, Jt Director, Department of Higher Education, Govt of U.P. 2). Dr.

...contd. on page 3

...contd. from page 2

...contd. on page 7

Recreational fishing: A window of opportunity for developing local Indian economy

S. K. Basu
UFL, Lethbridge AB Canada T1K 3M4;
Email: saikat.basu@alumni.uleth.ca

Recreational fishing or sports fishing has great promise in India with huge number of rivers, lakes and local fresh water bodies like different indigenous ponds (bheries, bills, howor, baor), bogs, swamps, canals and related water ways present across the country. Although angling is a popular sports fishing activity in many parts of India; however, it has never really been developed into an organized industry. If promoted, funded, managed and developed properly; sports fishing or recreational fishing can help in building local economy in India and in finding additional local employment during recreational fishing season and at the same time provide recreation for anglers and fishing enthusiasts!

Sports fishing or recreational fishing is a big industry and part of regular tourism programs in many developed western nations along with recreational hunting. The industry includes hunters, anglers, foresters, fish and wildlife departments of the state and provinces as well as federal government; fishing communities along with manufacturers, suppliers, distributor and retailers of various fishing and hunting equipment, tools and gears; books, magazines and newsletters providing guidelines and promoting recreational hunting and fishing; still photos and videos for capturing special nature and wildlife moments through a huge shelf line of advanced cameras and lenses for photography and videography; safety gears used in these activities to mention only a handful of the items, products and services made available to sports fishing enthusiasts.

The big industry caters to all including professional anglers, both professional and amateur recreational fishing enthusiasts and even children and teens who wish to take an adventure trip in sports fishing under supervision of trained guides or experts. But it is also

...contd. on page 5

...contd. from page 4

important to mention that recreational fishing in western nations are heavily monitored and has been developed with a sustainable and environment friendly approach that can serve both the economy as well as the local ecology and ecosystem.

Recreational fishing is based on solid research on the population dynamics of locally available fish species. There are size restrictions in catching fishes and in many countries there is capture and release programs to avoid impacting wild fish populations. There are also strong restrictions on some fish species that are either endangered or critically endangered and are free by law from any/all recreational or sports fishing or commercial fishing activities other than research. Fishing licenses are issued every year against prescribed fees including taxes; and results in generation of revenues worth millions of dollars. This money is again utilized back in the maintenance of nature and wilderness areas, natural water bodies, fish stocking and repopulation as well as in their proper conservation. It is an important source of recreation; but at the same time it is sustainable and environment friendly catering towards building local economy and protecting local ecosystems.

India does not have this kind of regulation and infrastructure to cater to fishing of wild species. Moreover, India with huge fish diversity; but with many indigenous and endemic local fish species belonging to the endangered, critically endangered or vulnerable categories will not be suitable for any further exploitation through recreational fishing. Furthermore, India also does not have enough appropriate infrastructure, regulations and facilities right now in an organized form to cater to all forms of sports fishing like fresh water, brackish water or marine recreational fishing. It will take some time for the local Indian fishing and tourism industry to build up sustainable recreational fishing.

However, the best and most lucrative option for India is to promote fresh water recreational fishing in commercial water bodies based on commercially available, edible fresh water fish species. Many of these species breeding in fresh water are low maintenance and can reach appreciable trophy sizes for recreational fishing (like the different carp species). These species could easily attract both local as well as international recreational or sports fishing enthusiasts. Existing water bodies, lakes and ponds could be properly developed and suitably stocked with commercial edible fish species that can grow fast and breed efficiently in such natural and artificial water bodies. Recreational fishing could be integrated into regular city conducted tours for foreign tourists interested in catching and eating local commercial species; and could be a great bread earner for fishing communities or fishermen's cooperatives owning or maintaining such commercial water bodies.

Soft bank loans, proper training, education and awareness could help in developing such recreational fishing centers both within the urban and rural areas across the nation over time. Beautification of the water bodies will be necessary to attract international tourists with proper resting and recreational facilities provided within the campus for buying food and drinks, for providing toilets, resting and shade stations, to process and prepare captured fishes and a well monitored system to cater to the various needs of the sports fishing enthusiasts. Such water bodies could be developed in the model of fishing cum resort centers and could be important source of both local and international tourists and help in building local economy and providing employment and funding for fishing communities and fishing/fishermen's cooperatives.

Such organizations can therefore enjoy collecting an additional income during the tourist seasons; over and above their annual sell of edible fresh water species after reaching marketable sizes. In addition to fishing, subsidiary tourism business will also flourish as the recreational fishing tourists will need food, boarding, accommodation and transportation like any other regular tourists helping a secondary line of economic development. Attracting overseas recreational fishing enthusiasts will add to the earning of foreign exchange and building a better image for India on the international platform. The model has great promises and need to be explored and exploited sincerely and commercially to make India an important tropical fishing destination; and help in slowly building an environment friendly, sustainable sports or recreational fishing industry.

Photo credit: **S. K. Basu**

Crisp articles are invited for publication in NESA Newsletter, specially on Clean Ganga, Linking of Rivers, Watershed Management and Wasteland Development.

Publication Division, NESA

Ways to Curb Phosphorus Toxicity in the Environment

S. Ponmani and P. Kannan
Dryland Agricultural Research Station,
Tamil Nadu Agricultural University, Chettinad–630 102,
Tamil Nadu, India
Corresponding Author E-mail: ponmaniphd@gmail.com

Introduction

Phosphorus is one of the key elements necessary for growth of plants and animals. Phosphates (PO4-) are formed from this element. It is the eleventh most abundant mineral in the earth's crust and does not exist in a gaseous state. Phosphates can be produced and may occur in water in two forms. Phosphorus in freshwater and marine systems exists in either a particulate phase or in a dissolved phase. Particulate matter includes living and dead plankton, precipitates of phosphorus, phosphorus adsorbed to particulates and amorphous phosphorus. The dissolved phase includes inorganic phosphorus, organic phosphorus excreted by organisms and macromolecular colloidal phosphorus. The first form orthophosphate are produced by natural processes of decay and are found in sewage. This form of phosphorus is commonly used by plants and animals for growth and development. The second form of phosphate is polyphosphate are used for treating boiler water and are found in many household detergents and soaps. Organic phosphates are also equally important in nature. Their occurrence may result from the breakdown of organic pesticides which contain phosphates. They may exist in solution, as particles, loose fragments or in the bodies of aquatic organisms.

Sources of Phosphorus

Nonpoint sources
Phosphate deposits and phosphate-rich rocks release phosphorus during weathering, erosion and leaching. Phosphorus may be released from lake and reservoir bottom sediments during seasonal overturns.

Point sources
Sewage treatment plants provide most of the available phosphorus to surface water bodies. A normal adult excretes 1.3 - 1.5 g of phosphorus per day. Additional phosphorus originates from agricultural runoff and the use of industrial products, such as toothpaste, detergents, pharmaceuticals and food-treating compounds.

Environmental effects of phosphate
Phosphorus in water is not considered directly toxic to humans and animals, and because of this, no drinking water standards have been established for P. Any toxicity caused by P pollution in fresh waters is indirect, through stimulation of toxic algal blooms or resulting oxygen depletion.

The growth of larger aquatic plants and phytoplankton is stimulated principally by nutrients such as phosphorus and nitrogen. Recently many of our fresh water bodies are experiencing increases of phosphorus and nitrogen from outside sources. The increasing concentration of available phosphorus allows plants to assimilate more nitrogen before the phosphorus is depleted. Thus, if sufficient phosphorus is available, elevated concentrations of nitrates will lead to algal blooms. Although levels of 0.08 to 0.10 ppm phosphate may trigger periodic blooms, long-term eutrophication will usually be prevented if total phosphorus levels are below 0.5 ppm and 0.05 ppm, respectively.
Nutrient-induced production of aquatic plants in freshwater has several detrimental consequences:

1. Algal mats, decaying algal clumps, odors and discoloration of the water will interfere with recreational and aesthetic water uses.
2. Extensive growth of rooted aquatic macrophytes will interfere with navigation, aeration, and channel capacity.
3. Dead macrophytes and phytoplankton settle to the bottom of a water body, stimulating microbial breakdown processes that require oxygen. Eventually, oxygen will be depleted.
4. Aquatic life uses may be hampered when the entire water body experiences daily fluctuations in dissolved oxygen levels as a result of plant respiration at night. Extreme oxygen depletion can lead to death of desirable fish species.
5. Algal blooms shade submersed aquatic vegetation, reducing or eliminating photosynthesis and productivity.

Methods of phosphate removal

Chemical treatment process
Chemical precipitation is used to remove the inorganic forms of phosphate by the addition of a coagulant and a mixing of wastewater and coagulant. The multivalent metal ions most commonly used are calcium, aluminium and iron.

1. Calcium

It is usually added in the form of lime [Ca (OH) 2]. It reacts with the natural alkalinity in the polluted water to produce calcium carbonate, which is primarily responsible for enhancing suspended solids removal.

$$Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow 2CaCO_3 \downarrow + {}_2H_2O$$

As the pH value of the polluted water increases beyond about 10, excess calcium ions will then react with the phosphate, to precipitate in hydroxylapatite:

$$10\,Ca^{2+} + 6\,PO4^{3-} + 2\,OH^- \leftrightarrow Ca10\,(PO_4)*6(OH)_2 \downarrow$$

Because the reaction is between the lime and the alkalinity of the polluted water, the quantity required will be, in general, independent of the amount of phosphate present. It will depend primarily on the alkalinity of the wastewater. The lime dose required can be approximated at 1.5 times the alkalinity as $CaCO_3$. Neutralization may be required to reduce pH before subsequent treatment or disposal. Recarbonation with carbon dioxide (CO_2) is used to lower the pH value.

2. Aluminium

Alum or hydrated aluminium sulphate is widely used precipitating phosphates and aluminium phosphates (AlPO4). The basic reaction is:

$$Al^{3+} + H_nPO4^{3-n} \leftrightarrow AlPO_4 + nH+$$

This reaction is deceptively simple and must be considered in

...contd. on page 7

...contd. from page 6

light of the many competing reactions and their associated equilibrium constants and the effects of alkalinity, pH and trace elements found in polluted water. The dosage rate required is a function of the phosphorous removal required. The efficiency of coagulation falls as the concentration of phosphorous decreases. In practice, an 80-90% removal rate is achieved at coagulant dosage rates between 50 and 200 mg/L.

3. **Ferric chloride or ferrous sulphate**

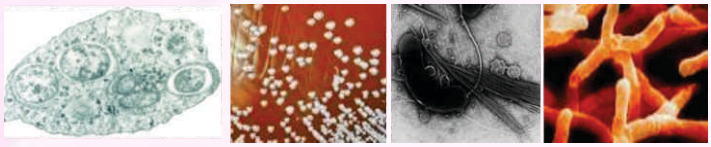
It is also known as copperas, are all widely used for phosphorous removal, although the actual reactions are not fully understood. The basic reaction is:

$$Fe^{3}+ + H_nPO_4^{3-n} \leftrightarrow FePO_4 + nH+$$

Ferric ions combine to form ferric phosphate. They react slowly with the natural alkalinity and so a coagulant aid, such as lime, is normally add to raise the pH in order to enhance the coagulation.

Biological treatment process

The groups of microorganisms viz., *Alphaproteobacteria* (*Amaricoccus* spp., and *Defluviicoccus vanus*), Betaproteobacteria (*Quadracoccus* sp.), Gammaproteobacteria, and Actinobacteria (*Tetrasphaera* spp., *Micropruina glycogenica* and *Kineosphaera limosa*) that are largely responsible for P removal are known as the polyphosphate accumulating organisms (PAOs). These organisms are able to store phosphate as intracellular polyphosphate, leading to P removal from the bulk liquid phase via PAO cell removal in the waste activated sludge. Unlike most other microorganisms, PAOs can take up carbon sources such as volatile fatty acids (VFAs) under anaerobic conditions, and store them intracellularly as carbon polymers, namely poly-b-hydroxyalkanoates (PHAs). The energy for these bio-transformations is mainly generated by the cleavage of polyphosphate and release of phosphate from the cell. Reducing power is also required for PHA formation, which is produced largely through the glycolysis of internally stored glycogen.



CONCLUSION

The science alone cannot solve the problem, the people, believes the necessary science is available and could be readily mobilized in the search for solutions. The need of society is development of creative policy and regulatory mechanisms that mesh the science with social realities and a course for reducing nonpoint pollution and mitigate phosphate pollution of our waterways and pave way for availability of good quality water for future generation.

...contd. from page 2

Mahendra Ram Ex. Department of Higher Education, Govt of U.P. 3). Dr. VC Srivastava Ex Head, Zoology, CMP PG College Allahabad. Dr. VC Srivastava was honoured with Life Time Achievement Award while Dr. Ashok Kumar Verma with Prof. Baba Jadhav Senior Scientist Medal, bestowed by society of Life Sciences Satna.

Jai Hind

Dr. AK Verma

Flight: An Evolutionary Miracle for Avian Members

S. K. Basu
UFL, Lethbridge, AB Canada • email: saikat.basu@alumni.uleth.ca

Flight is an unique adaptation in birds that has provided them with significant advantage over other species; and have helped them to thrive across the planet in various ecological habitats. Whether smaller passerine species or larger raptors or whether an aquatic or a terrestrial species; the ability to fly is an important aspect of avian life and ecology. Flight enables and empowers a bird to cover long distances for the purpose of finding or locating new suitable foraging and nesting habitats, help them in the process of their annual migration or even help in locating food, predate or defend against other predators including other predatory bird species. Flight has helped birds to thrive in challenging ecosystems like the high mountains and vast deserts, for surviving in the freshwater and marine aquatic habitats, in distant remote islands or vast tropical and sub-tropical forests successfully.

Strong wings and advanced flight dynamics evolved through long geological periods have helped various avian species to dominate unique global ecosystems located at various corners of our green planet. Flight has not only been a great advantage among avian species; it has inspired countless generations of humans through religion, literature, science, technology and engineering in various dynamics and forms of. Flight has not just been an avian endeavor but also cherished dream to rule the sky by humans for centuries.

The advent of aircrafts, war planes, parachutes, helicopters, space ships and various other flying equipments, devices and flying tools and gears are being inspired by some forms of avian flight designs and mechanisms at some stages of their innovations. Our mythologies, cutting across different culture, languages and ethnicities have always been inspired by the ability of birds to fly and making them a part of the human society through imagination, poems, lyrics, words and music. Indeed the sight of majestic flight of birds across the azure sky has been an inspiration for all of us for both in terms of celebrating nature and environment as well as the dream to rule the sky in some forms of other. This unique adaptation of birds for their ability to maintain their long and sustained flight during their annual migration; and remains yet as a mystery to be revealed by future scientific research.

Photo credits: **S. K. Basu**

To,

Vol. 20 Issue - 10 (Monthly) October 2017

From
NATIONAL ENVIRONMENTAL SCIENCE ACADEMY
206 Raj Tower -1, Alaknanda Community Centre,
New Delhi -110019. **Ph.: 011-2602 3614**
E-mails: nesapublications@gmail.com; nesapub@yahoo.co.in