

Environmental Management

0301-001. Abbasi AS, Khan FI, Sentilvelan K, Shabudeen A (Cent Polln Contl Energy Techno, Pondicherry Univ, Pondicherry 605014). **Modelling of Buckingham Canal water quality**. Indian J Environ Hlth, 44(4)(2002), 290-297 [6 Ref].

The Buckingham Canal which passes through Chennai has been modelled using the software QUAL2E-UNCAS. After testing and validation of the model, simulations have been carried out. The exercise enables forecasting the impacts of different seasons, base flows, and waste water inputs on the water quality of the Buckingham Canal. It also enables development of water management strategies.

0301-002. Ajmal Mohammad, Khan Rao Rifaqat Ali, Anwar Shahana, Ahmad Jameel, Ahmad Rais (Dept Appl Chem, Envirion Res Lab, Fac Engng Techno, Aligarh Muslim Univ, Aligarh 202007). **Adsorption studies on rice husk : removal and recovery of Cd(II) from wastewater**. Bioresource Techno, 86(2)(2003), 147-149 [14 Ref].

Adsorption behaviour of Ni(II), Zn(II), Cd(II) and Cr(VI) on untreated and phosphate-treated rice husk (PRH) showed that adsorption of Ni(II) and Cd(II) was greater when PRH was used as an adsorbent. Sorption of Cd(II) was depended on contact time, concentration, temperature, adsorbent doses and pH of the solution. The Langmuir constants and thermodynamic parameters have been calculated at different temperatures. It was found that recovery of Cd(II) from synthetic wastewater by column operation was better than a batch process.

0301-003. Awasthi Ajay K, Das Ishita, Pandey Rakesh K (Sch Environ Bio, APS Univ, Rewa 486003, MP) **Environmental assessment studies of lime kilns at Maihar (M.P.)**. Env Conserv J, 2(2&3)(2001), 67-75 [7Ref].

Attempt has been made to assess the environmental impacts of lime kilns at Maihar (MP). Battelle Environmental Evaluation System (BEES) has been applied in the present assessment study. The addition of environmental impact unit values of all the four sections provide with a over all negative values as – 476.6 and 36 positive values. This indicates that due to lime kilns and on going mining and expansion work and also

other related activities approximately 56.07% of the over all environmental quality is negatively affected or likely to be affected while only 3.6% of the benefits could be sought in improving living standard.

0301-004. Banger Samir Kumar (DP Engr, Hope Technologies Ltd., 1 Navjeevan Vihar New Delhi – 110 017). **Potential of remote sensing and Geographical Information System in water resource management.** Env Conserv J, 2(2&3)(2001), 59-62 [3 Ref].

Remote sensing technology and Geographical Information System have been extensively used in exploitation of ground and surface water in many areas. These technologies have the potential to help in reaching the ultimate goal of water resource management so that every one can get sufficient amount of water. The article explores the potential of remote sensing and Geographical Information System in water resources management, development and its capability to handle the issues related to water management and development.

0301-005. Bhargava Renu, Gupta Manoj (Dept Civil Engng, Univ Roorkee, Roorkee). **Expert system for solid waste management.** J Indian Assoc Environ Manag, 29(2)(2002), 81-84 [5Ref].

A prototype expert system (SOLDMANG) has been developed for selection of a suitable solid waste management system, using EXSYS shell. Knowledge for the expert system has been elicited from extensive review of manuals, research papers and opinions of experts from various fields. The expert system “SOLDMANG” is also able to design various disposal units of solid waste management system.

0301-006. Bhathena ZP, Vora G, Kadam K (Dept Microbio, Bhavan's Coll, Munshi Nagar, Andheri (West) Mumbai 58). **Rapid bioremediation of phenolic effluent through use of actinomycal consortium.** Polln Res, 21(3) (2002) 265-275 [21 Ref].

The ability of the microbiota of six mangrove ecosystems within Mumbai city to degrade phenolic effluent was investigated. A total of 14 potent isolates able to degrade 500 ppm of phenol in mineral based medium were obtained through three successive enrichments using increasing concentrations of phenol. Selective pressure of pH 5.0 and 9.0 were incorporated in screening media to enable wider usage of the culture for industrial applications.

0301-007. Bhattacharya AK, Banerjee Suchitra (Indian Inst Forest Manag, Bhopal, M.P.) **Relevance of carrying capacity and eco-development linkages for sustainable eco-tourism.** (The) Indian Forester, 129(3)(2003), 332-340 [28 Ref].

The concept and significance of carrying capacity with respect to sustainable eco-tourism has been explained and analysed. The emerging importance of Carrying Capacity and eco-development linkages in eco-tourism and wildlife management has been addressed and critically examined.

0301-008. Bhattacharya Asokkumar, Sarkar Santosh Kumar (Dept Marine Sci, Univ Calcutta, 35, Ballygunge Circular Rd, Kolkata 700019). **Impact of overexploitation of shellfish : northeastern coast of India.** Ambio, 32(1)(2003), 70-75 [40 Ref].

Paper deals with degrading coastal habitats in northeastern India, and projects the intensity of the stress arising from the collection of tiger prawn seeds (*Penaeus monodon*) for aquacultural farms and molluscan shells for poultry feed and edible lime. The magnitude of such destruction has been quantified. The impacts of biodiversity loss and their after-effects on the ecobalance of this coastal system have become a matter of great concern to ecologists to maintain security and sustainability. Paper proposes a public awareness program on themes relating to the importance of bio-diversity for human livelihoods.

0301-009. Chakraborty Aniruddha (Sociological Res Unit, Indian Statl Inst, 203-BT Rd, Kolkata 700035). **Interface between human population in Sundarbans and the mangrove ecology : problems and prospects. Proc Natl Semin Marine Coastal Ecosyst : Coral Mangroves – Prob Manag Strategies**, SDMRI Res Publ, 2(2002), 55-68 [5Ref].

Paper gives a distinct picture about the changes that have taken place on the nature and extent of interaction between the mangrove forests and human population over decades. Seeds of different types of fishes are main food materials of commercially important and endangered species of fishes. Increasing destruction of the said aquatic fauna may affect different stages of the life cycle of the predators and may break the food chain of mangrove eco-system.

0301-010. Chandrasekhar N, Victor ACC, Easterson DCV, Muthiah P (Chem Marine Geochem Res Lab, SPIC Res Cent, VOC Coll, Tuticorin 628008). **Remote sensing and GIS in coral reef environment, Proc Natl Semin Marine Coastal Ecosyst : Corals Mangrove – Prob Manag Strategies**, SDMRI Res Pub, 2, 2002, 132-138 [19 Ref].

Indian coast line particularly Tamilnadu, Andaman and Nicobar Islands, Lakshadweep Islands and Gulf of Kachchh are characterized by mangroves, coral reefs, sea grass and seaweeds. The need for better monitoring and mapping of these resources has increased dramatically in recent years. Paper reviews the potential of high resolution satellites used for coral reef ecosystem.

0301-011. Charatkar Sunit Lawoo, Radhakrishnan KV (Dept Fisheries Resources Manag, Coll Fisheries, Mangalore, Karnataka 575002). **A study on coastal attrition of Dakshina Kannada district using remote sensing and GIS**. Indian J Environ Hlth, 44(4)(2002), 270-281 [17 Ref].

A study has been carried out on the shoreline changes and coastal processes operating in the Dakshina Kannada coast using remote sensing and GIS technique. Erosion is observed at southern spit (Ullal) upto Talapadi and also northern spit (Bengre) upto New Mangalore Port. Accretion is observed at north of New Mangalore Port. Gradual shifting of the estuarine mouth of Nethravathi-Gurpur to the north is also observed. The changes could be attributed to human interference by way of constructing coastal structures.

0301-012. Chauhan Surender Singh (Dept Environ Sci, Indira Gandhi Cent HEEPS, Univ Rajasthan, Jaipur 302004). **Environmental awareness among senior secondary school students of Jaipur area, Rajasthan**. J Ecotoxicol Environ Monit, 12(4)(2002), 263-270 [8 Ref].

Study was to assess as the skills and understanding by a specific group of students for responsible citizenship. The results suggested that the students were familiar with a wide variety of environmental issues; however; their understanding of these issues was shallow. Statistical analyses found no differences or negligible difference in the performances of these various issues related to the gender, age and urban-rural background of the students.

0301-013. Garg Jaya, Garg HK (HIG-50, A-Sector, Sonagiri, Bhopal 462021). **Water quality management : strategies for conservation of Bhopal waters.** *Env Conserv J*, 2(2&3)(2001), 101-104 [20 Ref].

The city of Bhopal is crowned with lakes and reservoirs, which are major sources of potable water, recreational activities and aquaculture. In order to maintain Upper lake as a healthy water-resource for drinking purposes, lower lake as a recreational ground and Shahpura reservoir as a pisciculture station, an attempt has been made to formulate certain measures, that can cure the already spoilt lakes and check the water sheds from getting eutrophicated further.

0301-014. Gautam Ashutosh (India Glycols Ltd, Bazpur Rd, Kashipur 244713). **Some considerations on waste management.** *Env Conserv J*, 3(1)(2002), 15-17.

The extent of natural resources degradation is increasing with the rate of withdrawal and unmanaged utilization of our natural resources. Sustainable development can be achieved either by utilizing our natural resources more effectively and more efficiently and/or by converting the so termed waste into wealth. Paper explains the ways to understand the nature of waste and to approach for the best suited treatment of the waste so as to ascertain the sustainable development.

0301-015. Jayaseeli Antony Amala, Murugan A (Suganthi Devadason Marine Res Inst, 44-Beach Rd, Tuticorin 628001, Tamil Nadu). **Mangrove in Punnakayal, Tuticorin, southeast coast of India: a study on socio economic conditions.** *Proc Natl Semin Marine Coastal Ecosyst: Corals Mangroves – Prob Manag Strategies*, SDMRI Res Publ, 2(2002), 69-72 [2 Ref].

A survey was carried out to assess the socio-economic status of the people depending on mangroves in Punnakayal, south of Tuticorin in Gulf of Mannar region. The mangrove destruction is estimated to be at a higher rate. Awareness creation is considered very much necessary among the villagers in order to conserve the mangroves from destruction and to safeguard its resources for posterity. Replantation of the mangrove is another option, which has to be carried out with the participation of the local people.

0301-016. Jha MN, Gupta MK, Raina AK (Forest Soil Land Reclamation Div, Forest Res Inst, Dehra Dun 248006, Uttaranchal). **Carbon sequestration : Forest soil and land use management.** *Annals Forestry*, 9(2)(2001), 249-256 [11 Ref].

The carbon store in forest land is higher than agricultural lands followed by pastures and barren land. The variety of soils occurring in India offers different potential for carbon sequestration. Paper deals with the global carbon store in soil and vegetation, global carbon exchange between forest and atmosphere, organic carbon store in some Indian soils, soil carbon store under different land uses, soil carbon store in plantation and natural forest in India and carbon sequestration in wastelands etc.

0301-017. Jha Mohan (Indian Coun Forestry Res Edn, Dehra Dun, Uttaranchal). **Community based conservation and management of medicinal plants in India. (The)** *Indian Forester*, 129(2)(2003), 187-197 [18 Ref].

Successful implementation of activities related to medicinal plants conservation and their sustainable utilization needs the involvement of local communities, especially women groups and provides scope for income employment and empowerment of primary users of medicinal plants. Some of the works by Government and non-government organization related to community based conservation is discussed.

0301-018. Koul Monika (Environ Bio Lab, Dept Bot, Univ Delhi, Delhi 110007). **Forests and ecological security. (The)** *Botanica*, 51(2001), 100-109 [21 Ref].

Human actions have caused forest cover to shrink significantly over the last several decades. Continued forest loss and degradation have serious implications at local, regional and global levels. The state of forests should not simply be a matter of their extent. More attention should be focused upon the health, genetic diversity and age profile of forests, collectively known as forest quality. Forests should not only be quantitatively adequate but qualitatively rich.

0301-019. Kshirsagar PS, Pandhya GH (Natl Environ Engng Res Inst, Nehru Marg, Nagpur). **Development of low cost all glass recirculation systems for environmental applications.** *Indian J Environ Hlth*, 44(4)(2002), 266-269 [4 Ref].

Some simple glassware has been developed for recirculation of liquid medium. These glassware have wider applications and have been tested in experiments involving leaching, biodegradation, and desulfurization. The fabrication cost is minimum and can be developed in a small glassware workshop. Paper discusses the developed, design and fabrication of some specialized glass recirculation systems and its environmental applications.

0301-020. Kumar Prem, Meenakumari B (BRC, CIFT, Burla, Sambalpur 768017).

Suggestions for management of beels, the Brahmaputra river system, Assam.

Aquacult, 3(2)(2002), 223-228 [8 Ref].

The state of Assam is endowed with natural flood plain lakes in the form of beels which have very rich fishery resources. A situation exists whereby many individual fish stocks have been or are being fished beyond their sustainable level with the consequences that many stocks have depleted alarmingly. The combined action of the natural changes and anthropogenic interferences will prove disastrous to the biodiversity if measures are not adopted in time. Issues related to the present situation and suggestion to improve the productivity of beels are discussed.

0301-021. Mahanta PC, Tripathi Rashmi (Natl Bureau Fish Genetic Resources, Canal Ring Rd, P.O. Dilkhusa Telibagh, Lucknow 226002). **Commercialisation of aquaculture in India and its impact on environment - A review.** Aqua Cult, 3(2)(2002), 117-124 [9 Ref].

Paper reviews and discusses the development and impact of commercial aquaculture on environment particularly in Indian context. Aquaculture adversely affects the biodiversity and so there needs to be a control, proper management and training for the users as well as general population. Sustainable aquaculture should be promoted and encouraged and Government should keep a vigil and proper acts or laws should be made.

0301-022. Meshram PU, Gourkar MN, Ramteke DS, Patil PV (Dept Environ Sci, Sevadal Mahila Mahavidhyalaya, Sakkardara Square, Nagpur 9). **Evaluation of Artocarpus heterophyllus bark for scavenging lead and chromium metal ions from aqueous phase.** Polln Res, 21(4)(2002), 439-447 [9 Ref].

Removal of toxic heavy metals like lead and chromium from potable water has become essential due to their stringent limit imposed by the Public Health Authorities. Several options are made for their removal using different technologies. Tree bark substrate (*Artocarpus heterophyllus*) has been tried for the removal of lead and chromium ions from aqueous phase. The maximum removal of lead and chromium was observed at pH 7 and 4 respectively. Instant adsorption of both the metals (>90% and >50% respectively) was found to be achieved within 10 minutes by the product and increased with increasing dosages.

0301-023. Mishra TK, Sahoo T, Bhuiyan A, Roy SB (Raja NL Khan Women's Coll, Midnapur 721102, West Bengal). **Assessing impact of extraction on sustainability of forests under joint forest management : a case study.** *Annals Forestry*, 9(2)(2001), 181-187 [7 Ref].

The impact of extraction on sustainability of forests under Joint Forest Management in West Bengal has been assessed by comparing productivity and extraction of NTFPs in terms of biomass. Study conducted on productivity of certain fuelwood producing species show that perfect protection leads to dominance of a particular species on the one hand and decreases level of total production on the other. Earmarking certain species for fuelwood by some Forest Protection Committees has certainly some positive impact on forest ecosystem, but lack of attention towards a valuable species like *Bassia latifolia* leads to total elimination of the species.

0301-024. Murthy MN, Kumar S (Inst Economic Growth, Delhi Univ Enclave, Delhi 110 007). **Win- win opportunities and environmental regulation: testing of porter hypothesis for Indian manufacturing industries.** *J Environ Manag*, 67(2)(2003), 139-144 [33 Ref].

Paper studies the effect of environmental regulation on the productive efficiency of water polluting industries in India. The panel data of 92 firms belonging to sugar industry of India are used to test the Porter hypothesis of having win-win opportunities for the firms subjected to the regulation. The main empirical result is that the technical efficiency of firms increases with the degree of compliance of firms to the environmental regulation and the water conservation efforts there by supporting the Porter hypothesis.

0301-025. Negi Chandra S, Maikhuri RK (Govt PG Coll, Pithoragarh 262502, Uttarakhand). **Nanda Devi Biosphere Reserve – pro-poor tourism – an option.** (The Botanica, 52(2002), 101-111 [23 Ref].

Keen to market Nanda Devi on the lines of Mount Everest, the Uttarakhand government is contemplating opening up the Nanda Devi Biosphere Reserve (NDBR) for limited tourism activities. All these steps have resulted in giving rise to conflicts, both within and outside the reserve, which is most, if not all, have been a result of indifferent attitude of the governing officials towards the wants and aspirations of the local inhabitants. The paper delves into the major areas of conflicts and offers policy options towards sound conservation strategies and amelioration of the conflicts.

0301-026. Pathak JK, Balwaria HS (Dept Zoo, Hindu Coll, Moradabad). **A note on the disaster management training practices in India.** Himalayan J Env Zoo, 16(1)(2002), 67-72 [12 Ref].

Training is obviously a most important component in pre-disaster, during disaster and post disaster activities. A permanent training system and programme is desirable for effective management. This should cover not only the needs of government officials but also those of non-government organizations. Government carries the major responsibility for dealing with disaster and the government resources must be utilized to optimum effect.

0301-027. Patterson Edward JK, Muley EV (Suganthi Devadason Marine Res Inst, 44-Beach Rd, Tuticorin 628001, Tamil Nadu). **Reef restoration - an overview. Proc Natl Semin Marine Coastal Ecosyst : Coral Mangroves – Prob Manag Strategies, SDMRI Res Publ, 2(2002), 120-124 [29 Ref].**

The technology for reef rehabilitation has been developed mainly to repair damaged reef areas by natural and manmade causes. So far several methods were adapted for reef restoration in several countries. In India it is virgin field and small-scale restoration work was started on experimental basis to study the feasibility using low-tech methods. The status of reef restoration in general and its need in India especially in Gulf of Mannar are discussed.

0301-028. Pramanik SK, Nandi NC (Thakurpukur Maheshtala Block Dev Office, 39, Biren Roy Rd (East), Kolkata 700008). **An appraisal of alternate livelihood to capture fishery affecting Sunderban mangrove ecosystem, West Bengal. Proc Natl Semin Marine Coastal Ecosyst : Coral Mangroves – Prob Manag Strategies**, SDMRI Res Publ, 2(2002), 48-54 [9 Ref].

The tremendous pressure on the mangrove ecosystem of Sundarban due to collection of firewood during dry fish trade in winter as well as by the crab catchers round the year has been investigated and analysed. The extent of dry fish trade and crab catching has been discussed while highlighting the mud crab fattening project as an alternative to capture fisheries in the region.

0301-029. Ravichandran M, Balasundaram C, Boopathi S (Dept Eco, Bharathidasan Univ, Tiruchirappalli). **Ecology of drinking water – an overview**. Indian J Environ Sci, 6(1)(2002), 1-11 [15 Ref].

Lack of awareness about water quality parameters, purification methods, health impacts and measures to overcome is a hurdle in achieving safe water practices. Paper reviews the water quality problems and the prospects with the available source of information.

0301-030. Reddy GP, Ramamohan Rao MS, Math NSK, Adhikari RN (WTCER, Chandrasekharapur, Bhubaneswar 751023, Orissa). **Environmental sustainability through watershed programme in semi-arid region of Andhra Pradesh**. *Indian J Soil Consev*, 31(1)(2002), 57-65 [8 Ref].

To increase and sustain the crop production and to ensure food security and environmental quality, watershed covering an area of 1120 ha at Chinnatekur, Kurnool district, Andhra Pradesh representing red soils was developed on watershed basis. The conservation measures reduced runoff and increased the yields of major crops. Conservation of natural resources on watershed basis on semi-arid region with benefit is to cost ratio 2.29 in Chinnatekur proved to be economically viable and environmentally sustainable.

0301-031. Shankar Darshan, Ved DK (Foundation Revitalisation Local Hlth Traditions, Bangalore, Karnataka). **A balanced perspective for management of Indian medicinal plants. (The)** Indian Forester, 129(2)(2003), 275-288.

Threat assessment has indicated that about 200 species out of 1500 species of medicinal plants are rare, endangered or threatened. Conservation and cultivation strategies have been suggested and a holistic approach recommended because cultivation alone cannot prevent extinction. In-situ conservation of wild population, establishment of taluka-level herbal gardens, thousands of home gardens and large scale cultivation of selected cultivators are the four important measures, which are likely to effect conservation and reduce threat at present facing them due to over-exploitation as well as their destructive utilization, as roots barks, whole plants etc. in these systems.

0301-032. Sharma Maneesh, Tobschall Heinz Jurgan, Singh Indra Bir (Dept Geo, Lucknow Univ, Lucknow 226007). **Environmental impact assessment in the Moradabad industrial area (rivers Ramganga-Ganga interfluve)**, Ganga Plain, India. Environ Geo, 43(8)(2003), 957-967 [41 Ref].

Sediment samples collected in Moradabad area, lying in the interfluve of the Ganga and Ramganga River, were analysed for heavy metals, after studying the geomorphology of the area. The sediments are redistributed and redeposited within the basin itself, and thus these basins serve as sinks. The concentrations of heavy metals in such a basin will show exponential increases with time, because there is no activity to funnel out the sediments and dilute the effect of pollution. This increase will pose more threats, as ultimately it will make its way laterally and vertically through the sediments, thereby polluting groundwater.

0301-033. Shi Hua, Singh Ashbindu, (UNEP/GRID, Div Early Warning Assessment, North America USGS/EROS. **Data Cent 47914 252nd St Sioux Falls, SD 57198 USA**). **Status and interconnections of selected environmental issues in the global coastal zones.** Ambio, 32(2)(2003), 145-152 [40 Ref].

Study focuses on assessing the state of population distribution, land cover distribution, biodiversity hotspots, and protected areas in global coastal zones. The application of Geographic Information System (GIS) layering methods and consistent

datasets has made it possible to identify and quantify selected coastal zones environmental issues and their interconnections. It is expected that such information provide a scientific basis for global coastal zones management and assist in policy formulations at the national and international levels.

0301-034. Singh AK, Banerjee SK, Shukla PK (Trop Forest Res Inst, Jabalpur, MP). **Utilization of wastelands for growing medicinal plants. (The)** Indian Forester, 129(1)(2003), 119-129 [25 Ref].

In India nearly 175 million ha of land is degraded, out of which 93 million ha is lying waste. This land is not suitable for growing agricultural crops economically but can be effectively used for growing medicinal plants after proper management. Species suitability for different types of wastelands, proper amendments for boosting the growth of these plants etc. have been discussed.

0301-035. Singh NP, Chowdhery HJ (Botl Surv India, P-8, Brabourne Rd, Kolkata 700001). **Plant diversity and conservation priorities. (The)** Botanica, 51(2001), 83-90 [20 Ref].

It is estimated that out of nearly 2,50,000 species of vascular plants nearly 20-25,000 species are seriously endangered or coming under severe threat. National Biodiversity Strategy and Action Plan has been launched with the sole objective of preparing detailed micro level action plans at state and regional levels. Urgent need to declare Biological Diversity as National Resource and its conservation and sustainable utilization as national goal and national priority have been emphasized.

0301-036. Tripathi BD, Upadhyay Alka R (Dept Bot, Banaras Hindu Univ, Varanasi 221005). **Dairy effluent polishing by aquatic macrophytes.** *Water Air Soil Polln*, 143(1-4)(2003), 377-385 [23 Ref].

In dairy industry, primary and secondary treatment methods are quite common for effluent treatment. However, this type of treatment is not effective in filtering the nutrients from the dairy waste water. Nutrient removal capacity of some important macrophytes i.e. Eichhornia crassipes, Lemna minor and Azolla pinnata have been tested individually as well as in combinations under microcosm investigations. The results are presented.

Air Pollution

0301-037. Banerjee Anju DK (Sch Environ Sci, Jawaharlal Nehru Univ, New Delhi 110067). **Heavy metal levels and solid phase speciation in street dusts of Delhi, India.** *Environ Polln*, 123(1)(2003), 95-105 [42 Ref].

Street dust samples were collected from three different localities (industries, heavy traffic and rural) situated in greater Delhi area of India. The samples analyzed for Cd, Zn, Pb, Ni, Cu, and Cr indicated remarkably high levels of Cr, Ni and Cu in the industrial area, whilst Pb and Cd did not show any discernible variations between the three localities. A multivariate statistical approach (Principal Component Analysis) was used to define the possible origin of metals in dusts. The apparent mobility and potential metal bioavailability for these highly contaminated street dust samples is: Cd>Zn @Pb>Ni>Cu>Cr.

0301-038. Chaulya SK, Ahmad M, Singh RS, Bandyopadhyay LK, Bandyopadhyay C, Mondal GC (Centl Mining Res Inst, Dhanbad, Jharkhand). **Validation of two air quality models for Indian mining conditions.** *Environ Monit Assess*, 82(1)(2003), 23-24 [37 Ref].

Study was taken up for determination of emission rate for SPM to calculate emission rate of various opencast mining activities and validation of commonly used two air quality models for Indian mining conditions. Statistical analysis was carried out to assess the performance of the models based on a set measured and predicted SPM concentration data. The value of coefficient of correlation for Point, Area and Lines sources model (PAL) and Fugitive Dust Model (FDM) was calculated to be 0.990-0.994 and 0.996-0.997, respectively, which shows a fairly good agreement between measured and predicted values of SPM concentration. These indicate that FDM model is more suited for Indian mining conditions.

0301-039. Gupta HK, Gajghate DG, Gupta VBC, Rao CVC, Hasan MZ (Air Polln Contl Div, Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Air quality indices for air management in regional areas.** *Cheml Environ Res*, 11(1&2) (2002), 91-100 [21 Ref].

Air Quality Indices (AQI) are important to decision makers for implementation of various air pollution control strategies. A case study of regional area is illustrated through computation techniques of an AQI. The annual average of the indices shows a decreasing trend, which reflects improvement of air quality in the study area over the years. The index values obtained for various areas are feed back for effective pollution control measures adopted for reduction of emissions from various sources.

0301-040. Gurumani V, Senthilvelan S, Ramajayam M, Ramanathan AR (Dept Chem, Annamalai Univ, Annamalainagar 608002). **A study on smoke reduction in diesel engines through organic fuel additives.** *Asian J Chem*, 15(1)(2003), 693-699 [9 Ref].

Some earlier studies on diesel engine emission control employing metallic additives are briefly reviewed. Considering the formation of undesirable toxic combustion products by the deposits left by the metallic additives, present study examined, rated and reported the smoke reduction characteristics of eight non-metallic organic compounds (one non-oxygenated and seven oxygenated). The effects of additive concentration and the engine load per cent are outlined.

0301-041. Padma S Rao B, Shrinivas Rao B, Manthapurwar NS, Hasan MZ (Air Polln Contl Div, Natl Environ Engng Res Inst, Nagpur). **Flue gas treatability studies: A tool for techno-economic control of industrial air pollution.** *Environ Monit Assess*, 82(1)(2003), 75-81 [5 Ref].

Article provides information about a novel technique known as flue gas treatability studies and to undertake such studies, a pilot scale system is installed in Air Pollution Control Division of M/s National Environmental Engineering Research Institute, NEERI, Nagpur. This study is a tool for techno-economic selection of air-pollution control systems specially for small/medium scale industrial emissions.

0301-042. Sachdeva Neha Som, Khanna DR (Dept Zoo Environ Sci, Gurukul Kangri Univ, Haridwar 249404). **Analysis of some selected characteristics of air emissions from a fertilizer industry.** *Env Conserv J*, 3(1)(2002), 25-29 [11 Ref].

Air is the most essential component of life and is required for the various activities in the biosphere thus it entails to protect our environment. The different parameters of air quality of stacks and ambient air stations were taken for the analysis

and found within the permissible limits. By these results, it becomes a very important concept for every industry to check the pollution load and should minimize its after effects by installing proper treatment systems.

0301-043. Sharma Mukesh, Kiran YNVM, Shandilya Kaushik K (Environ Engng Manag Prog, Dept Civil Engng, Indian Inst Techno Kanpur, Kanpur 208016). **Investigations into formation of atmospheric sulfate under high PM₁₀ concentration.** *Atmos Env*, 37(14)(2003), 2005-2013 [29 Ref].

The objective was to understand the formation of SO₄ as a function of SO₂, and other constituents of atmosphere such as PM₁₀, water content, Ca (in aerosol) and pH (of aerosol). For this purpose, air quality monitoring was conducted at five locations in the city of Kanpur, India representing various land-use patterns. It was concluded that high levels of PM₁₀, Ca and high pH of aerosols in atmosphere provide a conducive environment for conversion of SO₂ to SO₄. It was also concluded that the important migration pathway in study area for the transformation of SO₂ and SO₄ appears to be oxidation of SO₂ on the surfaces (of particulate) available in the ambient atmosphere.

0301-044. Shrivastava KL, Ojha Shrikant (Dept Geo, JNV Univ, Jodhpur 342005). **How pure is the ambient air in the industrial areas of Jodhpur city?** *Oikoassay*, 15(1&2)(2002), 29-34.

The primary parameters chosen for ascertaining the ambient air quality in the industrial areas of Jodhpur city were the SPM concentration, NO₂ and SO₂ content, which are the direct outcome of industrial activities. These were determined by using Respirable Dust High Volume Air Sampler (APM-451, APM-411) and were found to be well within the permissible limits.

0301-045. Srivastava Anjali, Joseph AE, Sheena, Nair V, Wachasunder Sudheer (Natl Environ Engng Res Inst, Mumbai Zonal Lab, 89-B, Dr AB Rd, Worli, Mumbai). **Qualitative analysis of volatile organic compounds in ambient air in urban slum area.** *Cheml Environ Res*, 11(1&2)(2002), 77-81 [4 Ref].

Volatile Organic Compounds (VOCs) in the slum areas of Mumbai city were detected using GC-MS technique. Ambient air was sampled for 8 hours on specially designed activated carbon cartridge. Thermal desorption at 150°C was done in

laboratory followed by injection into GC-MS. Twenty-eight volatile organic compounds were detected.

0301-046. Tripathy BD, Dwivedi AK (Polln Eco Res Lab, Cent Adv Std Bot, Banaras Hindu Univ, Varanasi 221005, Uttar Pradesh). **Atmospheric pollution and its outcome – an analysis.** (*The Botanica*, 52(2002), 88-92 [34 Ref].

Air is the most precious gift of the nature. Man has continuously used it as a sink in order to dispose unwanted air pollution. Air is continuously being polluted by various sources. The two important sources of air pollution are natural and anthropogenic. The pollutants show deposition to large distances from their source in the influence of meteorological factors. Air pollution has pushed many plants and animals towards extinction. Rapid changes in climate due to atmospheric pollution have also been reported since the last few decades.

0301-047. Verma SS (Dept Phys, Sant Longowal Inst Engng Techno, Longowal 148106, Dist Sangrur, Punjab). **Formation and destruction of sulphur oxides with temperature.** *J Indian Inst Environ Manag*, 29(2)(2002), 96-101 [13 Ref].

Formation and destruction behaviour of sulphur oxides during combustion is studied for a wide (i.e. 300 to 1800°C) temperature range. It is found that gaseous phase conversion of SO₂ into SO₃ is only temperature sensitive and dependent. Significant formation of SO₃ due to the destruction of SO₂ takes place at 500 to 600°C temperatures.

Water Pollution

0301-048. Aher HR, Zinjad DG, Gunjal PS, Kuchekar SR>(*PG Dept Analyt Chem, PVP Coll, Pravaranagar, Tal Rahata, Ahmednagar, MS). **Impact of human activities on the quality of water in Pravara river basin and Pravara left bank canal.** *Cheml Environ Res*, 11(1&2)(2002), 101-104 [8 Ref].

Chemical analysis of water samples from Pravara river basin and Pravara left bank canal shows that the water is characterized by alkaline earth. Water samples from thirteen spots of down stream from Bhandara to Babhaleshwar were collected for

analysis at an interval of ten kilometers. The results show that the physico-chemical characteristic of water changes to downstream from Bhandara to Babhaleshwar due to human activities.

0301-049. Aleem Asma, Isar Jasmine, Malik Abdul* (*Fac Agricl Sci, Dept Agricl Mircobio, Aligarh Muslim Univ, Aligarh 202002). **Impact of long-term application on industrial wastewater on the emergence of resistance traits in Azotobacter chroococcum isolation from rhizospheric soil.** *Bioresource Techno*, 86(1)(2003), 7-13 [39 Ref].

A total of 57 (36 and 21) Azotobacter chroococcum were isolated from wheat (*Triticum aestivum*) rhizospheric soil irrigated with industrial wastewater (about a decade) and ground water (uncontaminated) and characterized on the basis of morphological, cultural and biochemical characteristics. The highest minimum inhibitory concentration of 200 mg/ml for Hg²⁺ and 1600 mg/ml for other metals were observed against these bacteria from soil. The incidences of metal resistance and MICs of metals of *A. chroococcum* from wastewater irrigated soil were significantly different to those of uncontaminated soil.

0301-050. Ansari IA, Jalukar RS, Malik GM (Dept Chem, Navyug Sci Coll, Rander Rd, Surat 395007). **Judicious use of coagulants in primary treatment of combined effluent of starch and liquid glucose industries and a tentative design of an effluent treatment plant.** *Asian J Chem*, 14(3) (2002), 1409-1414 [4 Ref].

A treatability study was carried out on a combined effluent of starch and liquid glucose industries using different chemicals for primary treatment so as to make the effluent more amenable to secondary treatment and subsequently reduce the energy consumption. The doses of laboratory scale investigation were implemented at plant level to assess the accuracy of test. The maximum suspended solids and organic removal efficiencies were found to be 45-60 % and 40-50 % respectively.

0301-051. Baroth Anju, Soni Inderpal, John PJ, Bhatnagar Pradeep, Bakre PP (Environ Toxicol Unit, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Assessment of organochlorine pesticides and its source in Keoladeo National Park, Bharatpur.** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 291-297 [13 Ref].

The Keoladeo National Park receives water from a temporary water reservoir, Ajanbund, a few kilometers away from it. This reservoir receives water contaminated with variety of pesticides from the catchment area of river Gambhiri as it is under extensive agricultural practice. Organochlorine pesticides were extracted from the samples with the help of liquid-liquid chromatography and analyzed by Gas chromatograph. All the samples were found to be contaminated with the above mentioned pesticides and the concentration of total organochlorine pesticides in water ranged between 0.07-0.1 ppm while that of sediment between 0.6-1.3 ppm.

0301-052. Baruah BK, Baruah D (Dept Zoo, Cotton Coll, Guwahati, 781001). **Study on physicochemical characteristics of effluent of oil refineries located in Assam.** J Nature Conservator, 14(2)(2002), 371-375 [16 Ref].

Paper deals with the physicochemical characteristics of effluents from four oil refineries of Assam located at Digboi, Numaligarh, Guwahati and Bongaigaon. Study revealed that the quantum of DO, BOD, COD, oil and grease and suspended solid often do not conform with the permissible limit.

0301-053. Baruah BK, Das M (Dept Zoo, Cotton Coll, Guwahati 781001). **Study on the effect of paper mill effluent on the morphology of fish *Heteropneustes fossilis* (Bloch).** J Nature Conservator, 14(2)(2002), 367-369 [11 Ref].

Paper deals with the effect of paper mill effluent on the morphology of fish *Heteropneustes fossilis*. The fishes showed excessive mucous secretion and epidermal lesions during the period of exposure to effluent.

0301-054. Bhadra Bhaskar, Mukherjee Shriparna, Chakraborty Ranadhir, Nanda Ashis K (Dept Chem, Univ North Bengal, Raja Rammohunpur, Siliguri 734430). **Physico-chemical and bacteriological investigation on the river Torsa of North Bengal.** J Environ Bio, 24(2)(2003), 125-133 [11 Ref].

A few physico-chemical and bacteriological parameters on certain locations of the river Torsa was studied. The major characteristics of Torsa river water were high alkalinity, high concentration of free ammonia with respect to albuminoid ammonia and the presence of bacteria of fecal origin. Marked seasonal variations of the parameters were also observed.

0301-055. Bhosle AB (PG Dept Environ Sci, Yeshwant Maha Vidyalaya, Nanded 431602, Maharashtra). **The iron content in the river Godavari at Nanded and its impact on river ecology.** J Ecotoxic Environ Monit, 12(3)(2003), 193-199 [18 Ref].

Natural waters can be very heterogeneous vertically, horizontally and with time. This is not only to man-made pollution, but also can be caused by natural phenomena such as erosion, currents, thermocline and precipitation washout of dust. The total iron content of river Godavari was investigated and the overall study showed the fluctuations in the iron content more than permissible limit prescribed by Indian Council of Medical Research (ICMR). The iron was maximum during November and minimum during June.

0301-056. Chauhan Nidhi, Thakur Indu Sekhar (Environ Biotechno Lab, Dept Environ Sci, Coll Basic Sci Humanities, GB Pant Univ Agricul Techno, Pantnagar 263145, Uttaranchal). **Treatment of pulp and paper mill effluent by Pseudomonas fluorescens in fixed film bioreactor.** Polln Res, 21(4) (2002), 429-434 [19 Ref].

Pseudomonas fluorescens obtained from a bacterial consortium was enriched in minimal salt medium containing 4-chlorophenol. Bacterium utilized 4-chlorophenol was determined by growth of bacteria and removal of chloride in culture medium. The bacterial strain was applied for the treatment of pulp and paper mills effluent in continuous inlet-outlet flow of effluent, 25 ml/h, in sequential bioreactor. The strain produced significant reduction in colour (75%), phenol (66%), chemical oxygen demand (79%) and lignin (45%) and increase in chloride content (92%) on day 15 in bioreactor.

0301-057. Choudhary Anil, Gujar Dhanpat (Dept Zoo, Jai Narain Vyas Univ, Jodhpur 342001). **Fluoride concentration in ground water of few a villages of district Pali, Rajasthan.** Oikoassay, 15(1&2)(2002), 13-14 [7 Ref].

High fluoride concentrations were found in ground water samples of different villages of district Pali (Rajasthan). The maximum fluoride concentration was found as 4.64 mg/l in January 2001 in ground water of Narsingpura. The pH ranged from 7.5 to 8.2. High fluoride concentration in ground water samples may be due to high rate of evaporation, low rainfall and drought. Mean value of alkalinity, hardness and nitrate were 378.1 mg/l, 1061.3 mg/l, 33.44 mg/l respectively.

0301-058. Das R, Das SN (Regl Res Lab, Coun Scient Indl Res, Bhubaneswar 751013). **Impact of wastewater discharge on soil and ground water — a case study.** *J Scient Indl Res*, 62(3)(2003), 207-211 [10 Ref].

Paper reports the analysis of effluents released from different sources and characteristics of soil/ground water nearer to the source of contamination. In a case study the areas selected for investigation comprises of food processing industry and a septic tank in Mysore, Karnataka. Results show that discharge of wastewater into the land, effectively reduces the contaminants due to adsorption/chemical reaction in the soil media. Thus, to prevent pollution of ground water, septic effluents should be disposed off through properly managed underground drainage system and the efficiency of the treatment plant should be good enough to take care of the pollutants.

0301-059. Dhillon MS, Mahajan RK* (*Dept Chem, Guru Nanak Dev Univ, Amritsar 143005). **Studies on the effect of sewage water on soil properties.** *Cheml Environ Res*, 10(3&4)(2001), 255-262 [15 Ref].

The soil samples drawn from sewage water (Tung Dhab Drain. Amritsar) irrigated fields have been analysed for their physico-chemical properties, availability of major plant nutrients and total and plant available contents of heavy metals. The results showed the decrease in pH, increase in electrical conductivity, CaCO₃, organic carbon contents and the availability of nitrogen, phosphorous and potassium.

0301-060. Farooqui Mazahar, Kotharar Sandeep, Zaheer Ahmed, Ubale Sanjay (Dept Chem, Aurangabad Coll Women, Aurangabad 431001). **Use of leaves of cauliflower for the removal of iron from wastewater.** *Asian J Chem*, 14(1)(2002), 95-98 [17 Ref].

Paper describes the use of modified powder of leaves of cauliflower for the removal of iron from industrial wastewater. The presence of heavy metals is toxic even in trace quantities. Leaves of cauliflower were used for the binding of Fe²⁺ ions. The removal of Fe²⁺ is efficient at pH 1 and temperature 25°C.

0301-061. Ghosh TK (Dept Aquacult, Fac Fishery Sci, West Bengal Univ Anim Fishery Sci, Mohanpur Campus, Mohanpur, Nadia 741252). **Effects of chromic nitrate on fish and fish food organisms with special reference to river Churni.** *J Nature Conservator*, 14(2)(2002), 171-176 [16 Ref].

River Churni drains a heavy load of dye factory effluent rich in chromium which is hazardous and carcinogenic heavy metal. Ninety six hours acute toxicity tests conducted under field conditions on crustacean planktons, worms, mollusk and fish at pH 6.0, pH 7.0 and pH 8.0 showed that toxicity of chromic nitrate increased with lowering of pH. The crustaceans were most sensitive to chromic nitrate followed by worms, fish and the gastropods.

0301-062. Ghosh UC, Das Gupta M, Bhat SC, Manna B (Dept Chem, Presidency Coll, 86/1, Coll St. Kolkata 700073). **Studies on removal and recovery of chromium (VI) and chromium (III) from water by hydrated zirconium oxide.** *Cheml Environ Res*, 10(3&4), 321-331 [15 Ref].

Selective adsorption in the pH range 1-7 of microgram quantity of Cr (VI) and Cr(III) has been studied by exploiting the ion-exchange behaviour of hydrated zirconium oxide (HZO). Uptake of Cr (VI) by the HZO (100-200 mesh) was found to decrease with increase of pH while the opposite trend was observed for Cr(III). Cr(III) was found to precipitate from 5 mgL⁻¹ solution at pH>6. The study was also effectively applied for removal and recovery of Cr(VI) from the industrial waste effluent. ~ 99% Cr(VI) was recovered from HZO surface and ultimately isolated as lead chromate from the recovered solution.

0301-063. Ghosh Uday Chand, Dasgupta Manotosh, Debnath Sushanta, Bhat Subash Chander (Dept Chem, Presidency Coll, Kolkata - 700073). **Studies on management of chromium (VI) - contaminated industrial waste effluent using hydrous titanium oxide (HTO).** *Water Air Soil Polln*, 143(1-4) (2003), 245-256 [9 Ref].

The anion exchange behaviour of hydrous titanium oxide (HTO) has been exploited for the management of industrial waste effluents contaminated with chromium (VI). The adsorption of chromium (VI) by HTO (74.0-140.0 micron) in the pH range 0.5-8.0 has been studied. It is found that the adsorption of chromium (VI) by HTO is at a maximum in the pH range 1.5-2.0. Break-through capacity, adsorption and elution of chromium (VI) using HTO have been studied. It is found the HTO could be reused as an adsorbent for chromium (VI).

0301-064. Gopaldasamy V, Damodharan V, Kanakasabai V (Dept Civil Engng, Annamalai Univ, Annamalai Nagar, Tamil Nadu). **Influence of municipal garbage disposal on shallow ground water – a case study.** *Polln Res*, 21(3)(2002), 285-291 [13 Ref].

Solid waste generated from Chidambaram town, Tamil Nadu was taken for leachate study in the laboratory and was found that the groundwater is polluted by present land fill method even though the land fill site which is more than 50 years old, located in clay soil.

0301-065. Gopalswami PM, Kumar PE, Kulandaivelu AR (Dept Chem, Erode Arts Coll, Erode 638009). **Study on the quality of water in the Bhavani river.** *Asian J Chem*, 15(1)(2003), 306-310 [9 Ref].

The Bhavani river water is being highly polluted by letting out industrial effluents, industrial wastewater, agricultural run off and sewage into the stream. The presence of inorganic ions such as hexavalent chromium, sulphate ions, etc., and biological waste has contributed to the pollution of the river water. As a result water borne diseases have become common in this area and the raw water cannot be used as such for industrial purposes. The Bhavani River water should be treated properly and disinfected before being supplied for industrial purposes and human consumption.

0301-066. Gupta AK, Raghubanshi AK (Dept Bot, SB, PG Coll, Baragaon, Varanasi 221204, UP). **Comparative study of enrichment of nutrients and heavy metals in river waters Ghaghra and Ganga due to anthropogenic pressures.** *Polln Res*, 21(3)(2002), 261-263 [11 Ref].

For a comparative study of enrichment of nutrients in river waters of Ghaghra and Ganga due to anthropogenic activities, two sites were selected at both the river corridors and one at the confluence point of both the rivers. The findings show that, due to different anthropogenic activities, the level of nutrient enrichment varies at different sites. Similarly the heavy metal contents also varies with the biotic activities. Due to nutrient and heavy metal's enrichment the water quality is adversely affected.

0301-067. Hasan Samina, Pande SP (Natl Environ Engng Res Inst, Nagpur 400020). **Removal of nitrate from drinking water – a review,** *Env Conserv J*, 2(2&3)(2001), 77-94 [101 Ref].

Several treatment processes for the removal of nitrates from drinking water have been studied. Every method have merits and demerits, however, the methods based on ion exchange for the removal of nitrates from drinking water and regeneration of resin by biological denitrification appear to have edge over other methods. This communication presents a review on existing denitrification processes and spells out needs for future research.

0301-068. Hussain MF, Ahmad I (Dept Chem, NE Regl Inst Sci Techno, Nirjuli (Itanagar) 791109, AP). **Variability in physico-chemical parameters of Pachin river (Itanagar).** *Indian J Environ Hlth*, 44(4)(2002), 329-336 [14 Ref].

The concentration of water quality parameters in river and heavy metals in the bed sediment were measured for Pachin river for the three major flow periods. The variability in the physico-chemical parameters for different flow periods may be assigned to dilution of river water by direct runoff, human activities and organic load. The correlation study of physico-chemical parameters shows that their source of entering the river system is the same whether it may be a natural or anthropogenic or both.

0301-069. Indirabai WPS, George Seenamma (Dept Zoo, Holy Cross Coll (Antononomous), Tiruchirapalli 620002, T.N.). **Assessment of drinking water quality in selected areas of Tiruchirappalli town after floods.** *Polln Res*, 21(3)(2002), 243-248 [21 Ref].

Assessment of drinking water quality involving physical, chemical and biological parameters revealed that the characteristic of the samples varied among themselves considerably. The water quality index (WQI) calculated for nine parameters of these samples ranged between 38.36 and 65.47. Among them, samples S₁ to S₅ were of poor quality, and S₆ to S₈ of good quality for drinking purposes. Therefore, the necessity to purify the available water sources prior to utilization, is suggested.

0301-070. Islam SR, Gyananath G (Sch Cheml Sci, Swami Ramanand Teerth Marathwada Univ, Vishnupuri, Nanded 431606). **Contamination of chemical fertilizers in ground water.** *J Ecotoxicol Environ Monit*, 12(4)(2002), 285-290 [18 Ref].

Attempt is made to understand the implications of chemical fertilizers on ground water quality of Nanded. The mean recorded values of sulphate, phosphate and nitrate

levels were found 10.26-34.83 mg/l, 0.052-0.194 mg/l and 3.43-11.37 mg/l, respectively. Sulphate and nitrate levels were within permissible limits but phosphate levels higher than the permissible limits.

0301-071. Islam SR, Gyananath G (Sch Cheml Sci, Swami Ramanand Teerth Marathwada Univ, Nanded 431606). **Seasonal variations in the ground water quality in Nanded district.** *Env Eco*, 20(3)(2002), 524-529 [14 Ref].

Paper presents a case study on the influence of seasonal variations on groundwater quality in Nanded district, Maharashtra. The study shows a marked seasonal trend in various physico-chemical parameters in ground water.

0301-072. Jain CK, Kumar Arvind, Kaythwas DC (Natl Inst Hydro, Roorkee 247667). **Fate of cadmium in bed sediments.** *J Indian Assoc Environ Manag*, 29(2)(2002), 85-89 [8 Ref].

Paper deals with the adsorption characteristics of bed sediments collected from River Solani at Roorkee in the state of Uttaranchal. The uptake of cadmium ions has been studied under laboratory conditions. The study infers that travel of cadmium ions towards ground water is significantly minimized through benthic sediments of river and establishes the significant role in coarser sediments towards cadmium removal.

0301-073. Jonathan MP, Ram Mohan V (Dept Geo, Sch Earth Atmos Sci, Univ Madras, Chennai 600025). **Heavy metals in sediments of the inner shelf off the Gulf of Mannar, south east coast of India.** *Marine Polln Bull*, 46(2)(2003), 258-268 [27 Ref].

The Gulf of Mannar which has been declared a bioserve is a highly productive area endowed with rich marine fauna including corals. During the past three decades, there has been a dramatic surge in industrial development on the coast, with the establishment of a number of large scale industries and nearly 500 small scale industries. The development of Tuticorin main harbour and the river Tambraparani adds additional stress to the coastal ecosystem. Paper provides initial baseline data on metal contamination resulting from the activities of the heavy industries situated along the coast.

0301-074. Joseph KO, Gupta BP, Muralidhar M, Krishnani KK (Cent Inst Brackishwater Aquacult, 75, Santhome High Rd, RA Puram, Chennai 600028). **Studies on soil and water conditions of coastal regions during shrimp farming.** *Aquacult*, 3(2)(2002), 207-213 [19 Ref].

Studies were undertaken to investigate the changes in soil and water quality due to intensification of seawater and creekwater based shrimp farms in Andhra Pradesh and seawater based farms in Tamil Nadu. Soil and drinking water quality were also assessed in coastal areas surrounding shrimp farms. Suggestions have been made for soil and water quality management in shrimp farms.

0301-075. Joseph KO, Muralidhar M, Gupta BP, Krishnani KK, Ravichandran P (Cent Inst Brackishwater Aquacult, 75, Santhome High Rd, RA Puram, Chennai 600028). **Quality of ground water in the vicinity of shrimp farms of Andhra Pradesh and Tamil Nadu.** *Polln Res*, 21(4)(2002), 495-498 [8 Ref].

In order to assess the quality of ground water adjacent to shrimp farms, a survey was conducted in coastal areas of Nellore district of Andhra Pradesh and South Arcot district of Tamil Nadu. Water samples were collected from drinking water wells in villages at various distances from the farms and were analysed for total dissolved solids (TDS) and chloride concentration and the results are presented.

0301-076. Katti RJ, Mohana Kumar B, Gupta TRC, Sharathchandra HC (Dept Fisheries Env Eco, Coll Fisheries, Mangalore 575002, Karnataka). **Tar pollution of beaches along Dakshina Kannada, west coast of India.** *Indian J Environ Sci*, 6(2)(2002), 153-156 [12 Ref].

Communication deals with tar ball deposition on the beaches of Dakshina Kannada. Higher frequency and quality of deposition was found to be restricted to the areas in the proximity of New Mangalore Port Trust and mega industries. The quality of tar balls varied from 180 gm to 950 gm/m². High tide mark had greater deposition than the low tide mark. The chemical characteristics of littoral waters were found to be normal. During the exposure period, partially degraded tar balls smothered intertidal fauna and flora and dislodged sessile and creeping mollusks rendering them homeless.

These tar balls were nuisance for fishing activities and left a thin layer of oily material on fishes, thus rendering reduced market price to the catch.

0301-077. Kaushik A, Kumar K, Kanchan, Taruna, Sharma HR (Dept Environ Sci Engng, Guru Jambheshwar Univ, Hisar 125001). **Water quality index and suitability assessment of urban ground water of Hisar and Panipat in Haryana.** *J Environ Bio*, 23(3)(2002), 325-333 [22 Ref].

Ground water quality in two well developed cities of Haryana, viz. Hisar and Panipat was assessed for drinking purpose based on water quality parameters with respect to different land-use areas. Water quality index based on nine parameters showed that at Panipat, underground water in all the land-use zones was fit for consumption (WQI<50), whereas at Hisar, water in agricultural areas was good in quality, but that in other areas varied in magnitude of pollution (WQI>50 to 100).

0301-078. Khanna DR, Bhutiani Rakesh, Trivedi Manoj (Dept Zoo Environ Sci, Gurukula Kangri Vishwavidhyalaya, Haridwar 249404). **Impact of paper mill effluent on some water parameters of Hindon river, at Saharanpur.** *Himalayan J Env Zoo*, 16(1)(2002), 125-128 [9 Ref].

An investigation was conducted on the water quality of Hindon river, Saharanpur (U.P.) and the impact of nearby paper mill's effluent on it. The important characteristics of combined effluent of integrated pulp and paper mill with chemical recovery system are dark brown colour, characteristic odour, high content of suspended and dissolved solids, high COD, and resistance to biological oxidation.

0301-079. Koshy Mathew, Vasudevan Nayar T (Dept Chem, Bishop Moore Coll, Mavelikara 690110). **Trace metals in the sediments of river Pamba.** *Polln Res*, 21(3)(2002), 235-242 [39 Ref].

The trace metals in the sediments of river Pamba in the state of Kerala from ten stations were analysed for a period of one year by taking monthly samples. Copper, zinc, iron and manganese showed low concentrations as compared to other rivers. The enhanced values of the metals during pre-monsoon and post-monsoon period is attributed to the seasonal accumulation of allochthonous organic residues.

0301-080. Kumar Adarsh, Shukla Meenakshi (Environ Res Cent, Feroze Gandhi Coll, Raebareli 229001, UP). **Physico-chemical characteristics of Sai river at Rae-Bareli in relation to its population.** *J Ecophysio Occupl Hlth*, 2(1&2)(2002), 33-38 [11 Ref].

Paper deals with observations on physico-chemical characteristics of river Sai at six selected sites in Rae-Bareli town and analysed for selected pollution indicating parameters. It was concluded from the results that the quality of water has further deteriorated possibly due to increased human activities as a results of increase in population of the city.

0301-081. Kumar Adarsh, Shukla Meenakshi (Environ Res Cent, Feroz Gandhi Coll, Rae-Bareli 229001). **Water Quality Index (WQI) of river Sai water at Raebareli city, U.P.** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 163-172 [12 Ref].

Water Quality Index (WQI) of River Sai water at six sampling stations at Raebareli city in a stretch of about 20 kms has been calculated to evaluate the water quality. Nine water quality physico-chemical parameters were selected. Values of WQI have been found to be very high as compared to drinking water standard and the river was found to be severely polluted.

0301-082. Kumar Neeraj, Sharma RC (Dept Zoo, Meerut Coll, Meerut 250001). **Water quality of river Krishni [Part-1. Physico-chemical characteristics].** *J Nature Conservator*, 14(2)(2002), 273-297 [15 Ref].

The water quality of river Krishni has been studied at eight sampling points fixed at 70 kilometers stretch. The river received about 50 to 67 cusec. of domestic and industrial waste water via three waste water channels. These waste contents of waste water have changed the characteristics of the river water to great extent.

0301-083. Kumar Neeraj, Sharma RC (Dept Zoo, Merrut Coll, Meerut 250001). **Water quality of river Krishni [Part-2. Biological characteristics and bioindicators].** *J Nature Conservator*, 14(2)(2002), 299-333 [42 Ref].

The biological characteristics of river Krishni have been studied and the results indicate a marked variations in biological characteristics and its diversity at the different sampling points. The floral species are highly sensitive to organic pollution and the

faunal species are highly sensitive to the polluted water. It is evident that both qualitative and quantitative distribution of flora and fauna definitely suggest the level of pollution at different sampling points in river Krishna.

0301-084. Kumar Neeraj, Sharma RC (Dept Zoo, Meerut Coll, Meerut 250001). **Studies on the self-purification and allowable BOD load in river Krishna.** *Aquacult*, 3(2)(2002), 215-218 [8 Ref].

The self-purification capacity of river Krishna has been calculated on the basis of dissolved oxygen and biochemical oxygen demand in the different stretch of the river at different sampling points. Along with this, allowable BOD load to be discharge in different flow of water have also been calculated.

0301-085. Kumara Vijaya, Narayana J, Puttaiah ET (Dept PG Std Res Environ Sci, Kuvempu Univ, Shankaraghatta 577451). **Assessment of ground water quality of Bhadravathi town, Karnataka.** *Geobios*, 29(4)(2002), 217-220 [9 Ref].

Ground water samples in and around Bhadravathi town showed that factors like nitrate, phosphate, total alkalinity and chemical oxygen demand were higher as compared to BIS and WHO standards.

0301-086. Kumari Anupma, Sinha RK*, Gopal Krishna, Lata Swarn (*Environ Bio Lab, Dept Zoo, Patna Univ, Patna 800005). **Concentration of organochlorines in Ganges river dolphins from Patna, Bihar.** *J Environ Bio*, 23(3)(2002), 279-281 [10 Ref].

Concentrations of DDT, HCH, aldrin and endosulfan were determined in river dolphins from the river Ganges, Patna. Among the organochlorines studied in the dolphins, DDT concentration was highest followed by HCH. This shows exposure of dolphins to these organochlorine pesticides. Presence of organochlorines to higher degree in tissues suggest that the river dolphins be at greater risk due to pesticidal contamination of the river system.

0301-087. Madhavi A, Prasad Rao A (Dept Soil Sci Agricl Chem, SV Agricl Coll, Acharya NG Ranga Agricl Univ, Tirupati 517502). **Effect of industrial effluent on properties of groundwater.** *J Environ Bio*, 24(2)(2003), 187-192 [10 Ref].

Field survey was conducted to assess the quality of underground water in four major industrial areas of Hyderabad, Andhra Pradesh. Ground water samples were collected from wells at different lateral distances from the effluent streams. The survey revealed that indiscriminate disposal of the effluent of industrial complexes around Hyderabad has aggravated the acidity, EC, TDS, COD, Cl, SO_2^{4-} , PO_4^{3-} , NO_3^- , F and heavy metals in the ground waters. As the sampling distance from the polluting stream increased a gradual improvement in the quality of ground water was noticed.

0301-088. Manimaran Baskaran, Ramadhas V, Santhanam (Fisheris Coll Res Inst, Tamil Nadu Vet Anim Sci Univ, Tuticorin 628008, Tamil Nadu). **Metal pollution in Tuticorin coastal waters due to fly ash of thermal power plants. Proc Natl Semin Marine Coastal Ecosyst: Coral mangrove – Prob Manag Strategies, SDMRI Res Publ, 2(2002), 190-193 [6 Ref].**

Temporal and spatial variations in the concentration of aluminium, iron, zinc and copper were investigated both in water and sediment of two stations fixed in Tuticorin coastal waters polluted by the disposal of fly ash from the shore-based thermal power station. With regard to the relative concentration of four heavy metals in sediment and water, they could be arranged as $\text{Al} < \text{Fe} < \text{Zn} < \text{Cu}$. It was observed that both copper and zinc do not pose any problems to the biotic components of this coast.

0301-089. Mariappan P, Vasudevan T (Tamil Nadu Water Supply Drainage Bd, Sub Trng Cent, JK Nagar, Kaja Malai, Trichy 620023, Tamil Nadu). **Correlation coefficients of some physico-chemical parameters of drinking water ponds in eastern part of Sivagangai district, Tamil Nadu. Polln Res, 21(4)(2002), 403-407 [11 Ref].**

Drinking water ponds, the traditional rainwater harvesting structures, are common in the rural habitations of Sivagangai district and pond water is highly preferred for drinking due to accustomed taste. A detailed study on water quality was conducted collecting samples from 22 ponds. The correlation co-efficient has been reckoned for the water quality parameters. Significant linear relationships among some water quality parameters have been obtained which can be used for rapid monitoring of water quality parameters.

0301-090. Mariappan V, Rajan MR, Bhuvanewari K (Dept Bio, Gandhigram Rural Instt, Deemed Univ, Gandhigram 624302). **Recycling of treated tannery effluent using aquatic macrophytes.** *Env Eco*, 20(3) (2002), 685-688 [13 Ref].

Study deal with the recycling of treated tannery effluent using aquatic plants such as *Hydrilla verticillata* and *Chara zeylanica*. The experiments were carried out with or without these macrophytes at different concentrations of tannery effluent for different exposures of 7, 14 and 21 days. The physico-chemical parameters such as pH, temperature, EC, calcium, sodium, potassium, and chloride were estimates before and after treatment of tannery effluent.

0301-091. Mohan Devendra, Sharma Yogesh (Dept Zoo, Jai Narayan Vyas Univ, Jodhpur 342001). **Trace metals in a few water bodies of Pali (Rajasthan).** *J Nature Conservators*, 14(2)(2002), 363-366 [15 Ref].

Trace metals were estimated in a few fresh water bodies of Pali and the result were compared with the drinking water standards of WHO. The water of Lakotia lake and Hemawas dam is used for the civil supply in which the mean concentration of Pb was found higher through out the studies while other metals were within the limits. Seasonal river Bandi received the total industrial waste of the city in which Pb, Cd, Ni were found higher through out the study while Zn and Co were within the WHO limits.

0301-092. More Snehal V, John Sheeja, Seetarama Rao B, Nair Balachandran Unni, Laxman Seeta (Div Biocheml Sci, Natl Cheml Lab, Pune 411008). **Chromium removal and reduction in COD of tannery effluents.** *Indian J Environ Hlth*, 44(4)(2002), 320-328 [24 Ref].

Tannery effluents are highly polluting and contain chromium and high COD and BOD. Alkalotolerant/alkalophilic actinomycetes NCIM 5080 and NCIM 5109 have been shown to tolerate and accumulate chromium during growth also produce alkaline protease in presence of chromium ions. Both the actinomycetes are able to grow in undiluted tannery effluents and remove chromium almost completely and reduce the COD by 70-80% during growth as well as by pregrown biomass.

0301-093. Nagarajan K, Shashi Kumar R (Dept Zoo, Srivasavi Coll, Erode 638316).

Effect of sago effluent on selected physiological aspects of the fresh water fish *Labeo rohita*. *J Ecotoxicol Environ Monit*, 12(3)(2002) 233-238 [9 Ref].

The determination of LC₅₀ to *Labeo rohita* for 72 hours in treated and untreated sago effluent confirm that 35% and 3% was LC₅₀ for treated and untreated sago effluent respectively. *Labeo rohita* reared in 15% treated sago effluent recorded maximum conversion rate of 18.80 mg/g/day and conversion efficiency of 37.61%.

0301-094. Nagarajan Prabavathi, Ramachandramoorthy TR (PG Res Dept Chem, Bishop Heber Coll, Trichy 620017, Tamil Nadu). **Oil and grease removal from steel industry wastewater by chemical treatment.** *J Ecotoxicol Environ Monit*, 12(3)(2003), 181-184 [4 Ref].

The steel industry effluent was analysed for pH, EC, oil and grease, alkalinity, total hardness and COD and its effect on the physico-chemical characteristics of soil were determined. Attempt was made to evaluate the effectiveness of chemical treatment consisting of coagulation, flocculation and settling for oil and grease removal. Study showed that lime is the most effective coagulant for oil and grease removal from steel industry wastewater.

0301-095. Narain S, Tewari Anjana (PG Dept Zoo, Janta Coll, Bakewar, Etawah, UP). **Water quality status of river Yamuna near Etawah (U.P.) India with reference to distribution of freshwater turtles.** *Indian J Environ Sci*, 6(2)(2002), 121-124 [14 Ref].

Paper reports co-relation between the water quality status of river Yamuna near Etawah and distribution of fresh water turtles. Hard-shelled turtles were found mainly at station II, which was more polluted and soft-shelled turtles were present at station I which was less polluted. Most abundant species observed was *Kachuga tentoria*, which was found at both the stations. Pollution status affects the distribution of fresh water turtles.

0301-096. Nayak BB, Panda UC, Panigrahy PK, Acharya BC (Regl Res Lab, Bhubaneswar 751013). **Dynamics of heavy metals in Dhamra estuary of Orissa state in India.** *Cheml Environ Res*, 10(3&4)(2001), 203-218[30 Ref].

Water and sediment samples were collected from ten selected stations from Brahmani, Baitarani, Dhamra estuary and coastal sea for analysis of heavy metals along with salinity, pH and suspended solids of water and organic carbon and textural characteristics of sediment. Brahmani water contains high concentrations of dissolved as well as particulate metals due to the effluent load from mining and industrial activities on the upstream. Concentrations of dissolved Cu, Ni, Pb and Cd show an increasing trend towards the sea whereas that of Fe and Mn show a decreasing trend.

0301-097. Pande Rakesh K, Mishra Asha (PG Dept Zoo Environ Bio, DBS (PG) Coll, Dehra Dun 248001). **Impact of paper and pulp industry effluent on the water quality of river Hindon.** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 173-184[49 Ref].

Hindon is a tributary of Yamuna and flows along the western district of U.P. and Uttaranchal and certain physical and chemical parameters have been studied and the effluent stress were observed to understand its possible impact on water quality of river Hindon, where effluent was discharged. It was observed that certain undesired elements had a self reducing tendency alongwith certain physio-chemical parameters but a few remain contaminated for a longer period of time and for longer distance in stream.

0301-098. Pathani SS, Upadhyay KK, Joshi SK (Dept Zoo, Kumaun Univ Campus, Almora, Uttaranchal). **Some physico-chemical parameters and primary productivity of river west Ramganga (Uttaranchal).** *Himalayan J Env Zoo*, 16(2)(2002), 151-158[15 Ref].

Paper describes physico-chemical characteristics and primary productivity of river west Ramganga at two stations Chakuhatiya and Masi Almora, Uttaranchal. DO is higher in the month of October and minimum in the month of May. Free CO₂ has been recorded higher in rainy and summer season due to high percentage of organic compounds and absence of free CO₂ in winter season. The productivity values are recorded maximum in summer and minimum in rainy season (July) due to low transparency and high velocity of the water current.

0301-099. Pathe PP, Nandy T, Kaul SN, Deshpande CV, Szyrkowicz L (Natl Environ Engng Res Inst, Nagpur 440020). **Microbial degradation of urea from urea bearing wastewaters.** *Env Conserv J*, 2(1)(2001), 25-32 [7 Ref].

Based on earlier laboratory investigations, urea bio-hydrolyser was designed, installed and commissioned in fertilizer industry as additional full scale unit to treat urea and ammonia bearing wastewater. Ammonia stripped effluent was mixed with septic tank effluents from industry and township sewage and routed through various lagoons cultured with algae – chlorella to minimize nitrogen. Evaluation of full scale urea bio-hydrolyser and effluent treatment plant before and after modifications at ETP is discussed.

0301-100. Prabhakara Rao A, Prasada Rao PVV (Dept Environ Sci, Andhra Univ, Visakhapatnam 530003). **Pollution potential of sago industry : a case study.** *J Ecotoxicol Environ Monit*, 12(1)(2002), 53-56 [8 Ref].

Cassava, (*Manihot esculenta* Crantz) or tapioca based sago industrial cluster around Samalkot, East Godavari District, Andhra Pradesh has been studied highlighting the process details and wastewater characteristics. Attempt has also been made to assess the pollution potential of this industry as well as the possible effects on the environment. If unattended to, the sago industry wastewater may bring about severe ecological imbalances in the nearby agro ecosystem.

0301-101. Prasad Bijay Bhushan, Singh Krishna Mohan (Aquacult Lab, Dept Zoo, SNS Coll, Motihari 845401, Bihar). **Pesticidal use in swampy and derelict agro system in Champaran district, Bihar, India – a detrimental menace to fish farming.** *Env Conserv J*, 3(1)(2002), 9-14 [17 Ref].

The potential toxic compounds in various chemicals used for agricultural and other domestic purposes get distributed by a variety of means and accumulate concentration in the soil and water. These accumulated organic compounds lower the DO level and does not support fish life. Fish species are far from being biochemical inert and several pesticides are known to induce microsomal enzyme systems in the liver of fish and thereby fish can be used as an indicator of water quality.

0301-102. Rajasegar M (Cent Adv Std Marine Bio, Annamalai Univ, Parangipettai, Tamil Nadu 608502). **Physico-chemical characteristics of the Vellar estuary in relation to shrimp farming.** *J Environ Bio*, 24(1)(2003), 95-101 [17 Ref].

All the physico-chemical parameters and nutrients were studied in relation to shrimp farming. There are as many as 42 shrimp farms situated on the banks of Vellar estuary. The physico-chemical feature in relation to shrimp farming were studied in three stations of estuary. When compared with the previous data from Vellar estuary there was no much difference in physico-chemical characteristics due to shrimp farming.

0301-103. Ramamurthy N, Thillaivelavan K, Karthikeyan S (Dept Physics, Annamalai Univ, Annamalainagar 608002). **Impact of mercury pollutant in Paravanaru river, Neyveli area, Cuddalore district, Tamil Nadu.** *Polln Res*, 21(4)(2002), 503-506 [4 Ref].

Discharge of fly ash from thermal, electric and atomic power plant and coal washeries from Lignite Mining are serious sources of water pollution which severely polluted Paravanaru river. Level of mercury at each locations has been discussed and compared with permissible limit for irrigation and drinking purposes. Effect of mercury pollution and its control measures have also been discussed. The preliminary investigation reveals that there is increase in level of mercury in the Paravanaru river, due to discharge of water from fly ash ponds and coal washeries.

0301-104. Sampoorani V, Dhanapakiam P, Kavitha R, Eswari S, Rajalakshmi R (PG Res Dept Zoo, Alamelu Angappan Coll Women, Komarapalayam 638183). **Assessment of biota in the river Cauvery.** *Polln Res*, 21(3)(2002), 333-340 [29 Ref].

The changes in biological parameters in the Cauvery river due to industrial and domestic pollution were studied. Chlorophyceae reached the peak distribution during January to June. Bacillariophyceae were maximum and was dominated by *Cocconius placentula* and *Nitzschia palea* during summer in both the stations. Cyanophyceae members were in maximum number at station-I, Euglenophyceae were in zero which was in minimum value during the rainy and winter seasons.

0301-105. Sanghi Rashmi, Bhattacharya Bani (302, Southern Lab, Fac Ecol Analyt Testing, Indian Inst Techno, Kanpur 208016). **Alternative low cost adsorbents for colour removal from synthetic dye solution.** *Polln Res*, 21(4)(2002), 479-482 [14 Ref].

The results of laboratory scale investigations for the colour removal of direct orange dye solution by using organoclay bentonite and flyash are reported. The effect of

process variables have been studied to understand the kinetic and thermodynamic parameters of the process. The choice of the variables based on the several factors that may influence the adsorption extension and on information dealing with works performed with similar materials.

0301-106. Satyanarayana Shanta, Chaudhari PR, Kaul SN (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Environmental significance of helminth parasites and their removal in wastewater treatment processes.** *Env Conserv J*, 2(1)(2001), 1-23 [87 Ref].

Various wastewater treatments process differ in their efficiency in the removal of highly resistant helminth eggs. The information on all these aspects are reviewed including the approaches proposed by different workers to make the treatment more effective to make sewage and sludge suitable for safe reuse and the suitable monitoring methods developed for the enumeration of helminth parasites in wastewater and treated effluents and sludge.

0301-107. Saxena VK, Ahmed Shakeel (Indo-French Cent Groundwater Res, Natl Geophysical Res Inst, Hyderabad 500007). **Inferring the chemical parameters for the dissolution of fluoride in groundwater.** *Environ Geo*, 43(6)(2003), 731-736 [19 Ref].

Geochemical study of groundwater from 58 selected fluoride-rich areas in different parts of India indicated that these groundwaters are alkaline in pH (7.4-8.8) and their electrical conductivity varies from 530-2,680 mS/cm and fluoride concentration from 1.7-6.1 mg/l. Presence of fluoride-bearing minerals in the host rocks and their interaction in water is considered to be the main cause for fluoride in groundwater. The Ca and HCO₃ content of groundwater samples have shown good correlation with fluoride.

0301-108. Sharma Anjana, Khokala Deepali, Budholia Meenal, Sharma Amitabh, Sharma Vinod Kumar, Rajput Sushma (Bacterio Lab, Dept Biosci, Rani Durgavati Univ, Jabalpur 482001, MP). **Prevalence and distribution of aeromonads in different chlorinated water samples.** *Indian J Environ Hlth*, 44(4)(2002), 314-319 [25 Ref].

Four different sites were selected for sampling of water samples - river, pond, hand-pump and municipal water. These were analysed for physico-chemical and bacteriological parameters with special reference to aeromonads following standard

methods. Chlorinated disinfectants in the form of powder and liquid (drops) were used for the treatment. Out of which powdered forms were found to be more effective. Although chlorination reduced the density of aeromonads to some extent but still its presence cannot be behold.

0301-109. Sharma Garima, Mehra NK, Kumar Rita (Limnology Univ, Dept Zoo, Univ Delhi, Delhi 1100067). **Biodegradation of wastewater of Najafgarh drain, Delhi using autochthonous microbial consortia : a laboratory study.** J Environ Bio, 23(4)(2002), 365-371 [23 Ref].

Attempt has been made to reduce the BOD load and COD levels of wastewater of Najafgarh drain using autochthonous microbial consortium. During the study the raw wastewater samples were treated for 6th time interval with different concentration of consortium. It was observed that by increasing the existing microbial population in the wastewater sample by 150-200%, there is a significant decrease in BOD and COD levels. Finally, BOD/COD ratios before and after biotreatment have been analysed to assess the efficacy of the natural consortium.

0301-110. Sharma Shalini, Verma SR, Malik Naresh (Lata Nursing Home, Near Saraswati Cinema, Meerut Rd, Muzaffarnagar 251001). **Combined bacterial and fungal activities for the removal of colour, BOD, COD and lignin from pulp and paper mill effluent.** Aquacult, 3(2)(2002), 155-166 [66 Ref].

The waste waters from pulp and paper mills, which have high BOD, COD, dark brown colour and lignin with high percentage of suspended and dissolved solids have been treated in the laboratory by using the culture of bacteria. It is observed that the bacteria like *Pseudomonas* sp., *Bacillus* sp. bring down the BOD 58%, COD upto 60% and lignin 59% in 30 days and fungal strains like *Phanerochaete chrysosporium*, *Trametes versicolor*, *Schizophyllum commune* and *Daedalea flavida* can degrade and decolorize colour 79%, BOD 76%, COD 75% and lignin content 75% in 30 days.

0301-111. Sharma VP, Dixit BS, Banerji R, Seth PK (Indl Toxic Res Cent, Lucknow 226001). **Organochlorine insecticide residues and fluoride concentration in ground water of Unnao, India.** Polln Res, 21(3)(2002), 349-353 [17 Ref].

The residue levels of organochlorine insecticides found in fifteen samples of water from Unnao district. It was observed that the residues of the total HCH ranged from 0.000118 to 0.010063 ppb. The highest residue was found in Rajepur pond, lowest being in 'Mohalia and Takia' pond and hand pump respectively. The fluoride content ranged from 0.3 to 2.0 ppm. Out of fifteen samples four samples have more fluoride content than permissible limit.

0301-112. Sharma Yashodhara, Verma Ashok (Dept Zoo, KN Govt PG Coll, Gyanpur, Sant Ravidas Nagar, Bhadohi 221304). **Pollutional impact of tannery effluents on the physico-chemical characteristics of the river Yamuna at Agra, India.** *J Expt Zoo India*, 6(1)(2003), 75-88 [55 Ref].

Yamuna is an important river, being the source of irrigation and water supply for human consumption in Agra. The township has got several tanneries including Taj Tannery whose effluents directly mixes with the river water. Pollution monitoring of river Yamuna has been carried out analyzing the physico-chemical parameters. The results indicate higher pollution load and non-pot ability of water at effluent mixing zone-the "Taj Tannery Site". Site-III, indicated gradual dilution of pollution level, being away from the point of effluent mixing zone.

0301-113. Somanath Viswaranjan (PG Dept Environ Manag, Chhatrapathi Shahu Centl Inst Business Edn Res, Shivaji Univ Rd, Kolhapur 416004). **Toxicity of tannery effluent to some aquatic animals.** *J Ecotoxic Environ Monit*, 12(4)(2002), 277-284 [21 Ref].

Toxicity of tannery effluent to aquatic animals was studied by the standard static bioassay procedure. *Cyprinus carpio* (1 g) is the most sensitive and the hindimb stage *Rana tigrina* is the most tolerant of all the tested animals. Among the tested invertebrates, the 24 or 48 hr LC₅₀ for the chironomus *Kiefferulus barbitarsis* eggs was the least. The air breathing fish *Channa striatus* was the least sensitive among the tested fishes. Sensitivity of the fish to effluent decreased with increasing body weight.

0301-114. Srivastava Neera, Agrawal Meena, Tyagi Anupama (Fish Bio Lab, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Study of physico-chemical characteristics of waterbodies around Jaipur.** *J Environ Bio*, 24(2)(2003), 177-180 [25 Ref].

Study was undertaken to evaluate physico-chemical parameters and zinc concentration in water bodies in and around Jaipur. Results revealed that the water of Jalmahal Lake is most polluted due to high pH, hardness, alkalinity, free carbon dioxide, zinc content, and a low level of dissolved oxygen, contrarily to Ramgarh Lake which is least polluted.

0301-115. Sudha Bai R, Abraham T Emilia (Biocheml Processing Wastewater Techno Div, Regl Res Lab, Coun Scient Indl Res, Indl Estate (PO), Trivandrum 695019). **Studies on chromium (VI) adsorption-desorption using immobilized fungal biomass.** *Bioresource Techno*, 87(1)(2003), 17-26 [27 Ref].

Study investigates the Cr(VI) biosorption potential of immobilized *Rhizopus nigricans* and to screen a variety of non-toxic desorbing agents, in order to find out possible application in multiple sorption-desorption cycles. The biomass was immobilized by various mechanisms and evaluated for removal of Cr(VI) from aqueous solution, mechanical stability to desorbents, and reuse in successive cycles. The successive sorption-desorption studies employing polysulfone entrapped biomass indicated that the biomass beads could be regenerated and reused in more than 25 cycles and the regeneration efficiency was 75-78%.

0301-116. Swami A, Ramteke DS, Sarin R, (EIA Div, Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Evaluation of natural polymers for wastewater treatment.** *J Indian Assoc Environ Manag*, 29(2)(2002), 90-95 [13 Ref].

Removal of heavy metals such as cadmium and chromium from synthesized solution with processed and dried tree barks have been investigated with a detention time of 30 minutes. Cadmium and chromium metals were found to be easily adsorbed by the dry bark powder of *Acacia arabica* and *Artocarpus heterophyllus*. From 25 mg/L of heavy metals concentration, more than 95% removal was achieved within 30 minutes at pH 6. The uptake of metal ions was also found to be increased with increasing the bark doses at its optimum pH.

0301-117. Tarafdar B, Bhattacharyya RN* (*PG Dept Bot, Darjeeling Govt Coll, Darjeeling 734101). **Bacteriological analysis of a pond water from Gobardanga, West Bengal.** *J Environ Bio*, 23(3)(2002), 271-274 [4 Ref].

Communication deals with the bacteriological examination of a pond water, which is being used as one of the sources of drinking water, by multiple tube fermentation test to detect the coliform bacteria. The test was performed sequentially in three stages : presumptive, confirmed and completed coliform test. The results show that as the most probable number (MPN) index per 100 ml is 23, that pond water should be treated as nonpotable.

0301-118. Untoo Syeed A, Parveen Saltanat, Khan Asif A (Limnology Res Lab, Dept Zoo, Aligarh Muslim Univ, Aligarh 202002, UP). **Impact of toxic effluents in the river Ganga with particular reference to metal pollution near Rajghat (U.P.).** *Polln Res*, 21(4)(2002), 455-459 [8 Ref].

The results obtained from the field experiments and laboratory bioassay using copper on the fry and fingerlings of *Labeo rohita* are presented. In-situ toxicity evaluation of effluent discharged from a rivulet Mahawa connecting to Ganga river near Rajghat, characterization of the Ganga river water at industrial outfall point and 100 meters above and below of it, and acute toxicity evaluation of the most toxic and maximum available metal in the said effluent are also presented.

0301-119. Walther Dirk, Prebha Samuel, Selvapathy Poovagounder, Beck Dieter (CIM-Expert, Cent Environ Std, Anna Univ, Chennai 600025). **Heavy metals from the river Adayar, India : Infiltration into the adjacent groundwater aquifer.** *Ambio*, 32(2)(2003), 153-157 [23 Ref].

The mobilization of heavy metals into greater depths and their probable effects on the groundwater body are discussed. The high concentration of heavy metals and the influent character of the river Adayar allow the mobilization of metal ions and their transport into the deeper layers of the sediment. A changing environment due to effects such as saltwater intrusion and monsoon floods is the driving force for this phenomenon.

Ecology

0301-120. Ansari Abid Ali, Khan Fareed Ahmad (Environ Polln Res Lab, Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Nutritional status and quality of water of a waste water pond in Aligarh showing blooms of Spirodela polyrrhiza L. (Shleid).** *J Ecophysio Occupl Hlth*, 2(3&4) (2002), 185-189 [14 Ref].

Study compares the nutritional status of simple tap water with the domestic waste water of a waste water pond and evaluates the effects on plants of *Spirodela polyrrhiza* L. There was rapid multiplication of plants which were grown in waste water in comparison to those grown in the simple tap water. There was an excess of nutrients in waste water specially N.P.K. due to the addition of domestic wastes (sewage) resulting in eutrophication of waste water pond.

0301-121. Arif Mohommad, Kumar Narendra (Defence Agricl Res Lab, Pithoragarh 262501). **Medicinal insects and insect - fungus relationship in high altitude areas of Kumaon Hills in Central Himalayas.** *J Expt Zoo India*, 6(1) (2003), 45-55 [36 Ref].

Most of the insects are known to feed on plants but there are certain plants which grow only on insects, complete their life cycle at the cost of insect life and consequently combination of these two become very useful and medicinal for the human health and welfare. *Cordyceps sinensis* Berk, is a fungus occurring at certain alpine meadows situated at 10000-13000 feet altitude in the district Pithoragarh of Kumaon Hills of Central Himalayas. The mummified insect filled with fungal hyphae, locally known as Ghas Keera or Yarsa Gamboo is used to cure a number of human diseases.

0301-122. Bohra NK (Arid Forest Res Inst, Jodhpur). **Plants for reclamation of saline lands.** *Indian J Environ Sci*, 6(1) (2002), 17-21 [15 Ref].

The Indian arid region is the most densely populated arid part of the world. Growing demand of food, fuel, fodder, and timber necessitate the need to utilize the salt affected lands for catering to these demand. The ecology of important plant species growing in saline habitats are described. These species may be grown for reclaiming such habitats.

0301-123. Dube P, Sharma Y, Sharma KK (Dept Zoo, MDS Univ, Ajmer 305009 Rajasthan). **Ecobiology of seasonal waterbodies in southeastern plateau of Rajasthan with special reference to amphibians.** *Indian J Environ Sci*, 6(2) (2002), 135-139 [26 Ref].

Numerous seasonal and perennial ponds, wetlands and swamps are scattered in southeastern Rajasthan. Water in most of the seasonal water bodies is mostly hypoxic in monsoon season until aquatic plants make their appearance. Physical-chemical and biological estimation of three of such seasonal water bodies has been carried out. Air and water breathing (amphibious) anurans is common amphibian fauna, which have been recorded here.

0301-124. Dwivedi BK, Pandey GC (Dept Environ Sci, Dr RML Avadh Univ, Faizabad 224001). **Complex dynamics of toxin producing algal species and primary productivity in two water ponds of Faizabad.** *J Environ Bio*, 24 (1) (2003), 55-61 [23 Ref].

The study was performed to measure water quality variables, primary productivity, chl-a and biomass of toxin producing algal species and fish production. High nutrient influx and toxin producing algal species have been observed in two waterbodies [Girija Kund (A) and Maqubara (B)] of Faizabad. The maximum chl-a concentration, toxins producing algal species biomass were found to be 415.00 and 515.00 in pond. A, while 451.00 µg/l and 541.22 mg/l in pond B, respectively in the case of *Microcystis aeruginosa*.

0301-125. Dwivedi BK, Pandey GC (Dept Environ Sci, Dr RML Avadh Univ, Faizabad 224001). **Physico-chemical factors and algal diversity of two ponds (Girija Kund and Maqubara Pond), Faizabad, India.** *Polln Res*, 21(3) (2002), 361-370 [34 Ref].

The physico-chemical factors and algal diversity studies were carried out at two ponds of Faizabad, India. Seventy species of algae were recorded in both the ponds. During summer season Cyanophyceae was found to be dominant group in both the ponds. Both ponds were found to be moderately polluted and showed a trend of increasing eutrophication. Significant correlations were noted between different parameters.

0301-126. Hameed Sulaiman SM, Prabhakaran J, Purushothaman D (Dept Environ Sci, Tamil Nadu Agricul Univ, Coimbatore 641003). **Population dynamics of microbes in dye factory effluent contaminated soil.** *J Ecotoxicol Environ Monit*, 12(1) (2002), 31-34 [4 Ref].

An investigation was carried out to assess the impact of dye factory effluent on the dynamics of microbial population. At the effluent discharge site, in the 0-15 cm soil layer, there was a suppression of bacterial, fungal and actinomycetous population to the extent of 63, 100 and 59 per cent, respectively. A further progressive reduction in their population was evidenced in deeper soil layers upto 45 cm. At 10 m and 20 m lateral distances, in general, the microbial population progressively decreased as the distance increased. The fungal population was almost nil in the polluted habitat which was moderately sodic.

0301-127. Jhahria Anita (Dept Zoo, Jai Narain Vyas Univ, Jodhpur 342001).

Limnobiological studies of Shekhawat Pond, Jodhpur with special reference to plankton. *J Nature Conservator*, 14(2) (2002), 215-224 [57 Ref].

The limnological studies of the Shekhawat pond was conducted for the physico-chemical characteristics of water. Eleven genera of zooplankton were recognised which belonged to Cladocera, Copepoda and Rotifer. The phytoplankton were represented by nineteen genera belonging to families Cyanophyceae, Euglenophyceae, Chlorophyceae and Bacillariophyceae. The study indicated productive and nutrient rich status of the pond for aquaculture operations.

0301-228. Kailasam N, Subramaniam N, Selvam M (Salem Co-operative Sugar Mills Sch, Mohanur, Namakkal 637015, Tamil Nadu). **Analysis of distillery effluent and its effects on the mortality of earthworm *Megascolex pumilio*.** *J Ecotoxicol Environ Monit*, 12(1) (2002), 21-25 [11 Ref].

The nature of the soil before and after addition of the obnoxious distillery effluent was analysed. The toxicity of the effluent was tested in the soil medium using the earthworm *Megascolex pumilio* as the test organism. Addition of effluent increased the level of pH 8.2, nitrogen to 115 and potassium to 345 kg/c. Since the effluent is widely

used as manure in the nearby fields, the result reveal that the effluent is highly toxic. Need for improving the quality of effluent by effective treatment method is suggested.

0301-129. Kaur H, Jerath N, Sanjeev Kanwal, Bath KS (Dept Zoo Punjabi Univ, Patiala). **Aquatic plant diversity of Ropar wetland.** *Indian J Environ Sci*, 6(1) (2002), 23-26 [6 Ref].

The water of the Ropar reservoir is favourable for the growth of a large number of micro and macrophytes. Paper describes the diversity and seasonal pattern of distribution of aquatic plants of Ropar reservoir. Overall, 21 genera of algae and 23 genera of emergent, floating and submerged plants were identified at Ropar wetland.

0301-130. Khanna DR, Chugh Tarun, Sarkar Praveen (Dept Zoo Environ Sci, GK Univ, Hardwar 249404). **Fluctuation in the population density of macro-invertebrates of river Ganga at Pashulok Barrage, Rishikesh (Uttaranchal, India).** *Env Conserv J*, 2(1) (2001), 37-39 [8 Ref].

Paper describes fluctuation in the population density of macro-invertebrates of river Ganga at Pashulok Barrage, Rishikesh. Total eight groups macro-invertebrates were observed. Out of which, Diptera (33.52%), Ephimeroptera (30.62%), Gastropoda (13.65%) and Trichoptera (10.59%) dominated over the other groups. The population of macro-invertebrates found maximum in the month of February, whereas the minimum values were recorded in September.

0301-131. Kiran BR, Kumara Vijaya, Shanmukha D, Puttaiah ET (PG Dept Environ Sci, Kuvempu Univ, Shankaraghatta 577451). **Phytoplanktonic composition in Jannapura pond, near Bhadravathi town (Karnataka).** *Geobios*, 29(2-3) (2002), 89-92 [12 Ref].

Paper deals with a preliminary survey of phytoplanktonic composition in Jannapura pond near Bhadravathi town. A total of 87 species were identified. Bacillariophyceae and Chlorophyceae members appear to be dominant.

0301-132. Kumar P, Gupta RK (Dept Environ Sci, PG Coll, Ghazipur 233001). **Growth characteristic of Potamogeton crispus and Elodea canadensis in polluted water.** *Polln Res*, 21(3)(2002), 305-307 [14 Ref].

Monthly biomass and seasonal and annual productivity to two macrophytes *Potamogeton crispus* and *Elodea canadensis* growing in river Ganga at Ghazipur (UP) were determined at two sites viz., site I relatively free from major industrial and domestic pollutants and site II was severely affected by different pollutants. *Potamogeton crispus* showed high biomass and productivity at polluted site. The observation suggested that *P. crispus* is more pollution tolerant than *E. canadensis*.

0301-133. Mukhopadhyay SK, Chatterjee A, Banerjee H, Bandyopadhyay KK (Hooghly Mohsin Govt Coll, Chinsurah, 712101, West Bengal). **Zooplankton diversity in lentic/lotic ecosystems in forests, Southern Western Ghats, India.** *Cheml Environ Res*, 11(1&2)(2002) 153-165 [18 Ref].

The lentic water bodies exhibit higher zooplanktonic diversity, richness and evenness but lower dominance while the case for lotic stream pools is just the reverse. The ratio of net to gross production (NPP/GDP) was fairly high. It varied between 57 and 69% in lentic waters and between 36 and 48% in lotic pools. Altogether 28 zooplankton species were observed - 14 rotifers, 8 cladocerans, 4 copepods, and 2 ostracods.

0301-134. Murthy SBK, Umamaheswara Rao M (Dept Bot, Andhra Univ, Visakhapatnam 530003, AP). **Effects of industrial wastes on the growth and reproductive stages of macroalgae of Visakhapatnam coastline, east coast of India.** *Indian J Marine Sci*, 32(1)(2003), 57-66 [25 Ref].

Experiments were conducted to understand the effects of effluents and sediment extracts of Hindustan Zinc Smelter and Alum factory, on the growth and reproductive stages of nine macroalgae of the Visakhapatnam coast. In fully grown algae, growth inhibition was minimum at 0.001 or 0.01 % concentrations of HZE-I and II, HZR-I and II and AFE and AFR and maximum at intermediate concentrations (2.5-25% HZE and R-I and 0.25-8.0% HZE and R - II and AFE and AFR). Among the three classes of algae tested, green algae were more tolerant to the industrial wastes, than the brown and red algae.

0301-135. Nandan SN, Mahajan SR (PG Dept Bot, SSVPS's LK Dr PR Ghogrey Sci Coll, Dhule 424005). **Saprobity system for the assessment of water quality of Hartala lake of Jalgaon (Maharashtra).** *Oikoassay*, 15(1&2)(2002), 35-37 [16 Ref].

Hartala lake is an important lake of Jalgaon district (Maharashtra) where the saprobity indices at three stations were calculated. The system of Kolkwitz & Marsson was followed to find out saprobity index of the lake and it was found to be â-mesosaprobic in nature.

0301-136. Nandoni MB, Murthy PS, Hosetti BB (Dept Zoo, Bangalore Univ, Bangalore 560056). **Impact of organic pollution on the density and composition of macro-zoobenthos in a freshwater tank.** *Env Eco*, 20(3)(2002), 666-674 [12 Ref].

Study reports on macro-zoobenthos at three sampling stations of domestically polluted Amani tank in Tumkur, Karnataka. The increased pollution leads to decline in the number of macro-zoobenthos. Among insect group Tendipes sp., Chaoborus sp., Chironomus plumosa, Cryptochironomus sp. and Tubifex tubifex were dominant organisms.

0301-137. Packiajothi D, Thangamani A (Dept Zoo, Ayya Nadar Janaki Ammal Coll (Autonomous), Sivakasi West, 626124, Tamil Nadu). **Biodiversity of ichthyofauna and insect fauna of Ayyanar hills stream in Western Ghats of Rajapalayam range.** *J Ecotoxicol Environ Monit*, 12(3)(2002), 225-232 [10 Ref].

Fish and insect at three sampling stations in Ayyanar hill stream of Western Ghats, Rajapalayam range were investigated for a period of six months. Ten species of fish and thirteen species of aquatic insects were identified. The density and relative abundance of fishes and insects in the three stations of hill stream are reported. Among the fishes, the maximum relative abundance (26.53%) was seen in the case of sucker fish *Garra mullya* in station III. In the case of insect fauna, mayfly nymph shows the highest value of relative abundance (22.26%) in station III.

0301-138. Pandey N, Malik DS (Dept Zoo Environ Sci, GK Univ, Hardwar 249404, Uttaranchal). **Study on zooplankton production with the application of pig dung biogas slurry.** *J Nature Conserv*, 14(2)(2002), 263-267 [20 Ref].

Study describes the effect of pig effluent biogas slurry on water quality and zooplankton production. No significant effect on physico-chemical properties of water were observed though zooplankton population was significant in all the treated cistern.

0301-139. Pandit BR, Pandya Ushma (Dept Life Sci, Bhavnagar Univ, Bhavnagar, Gujarat). **Characterisation of some coastal wasteland soils of the Bhavnagar district (Gujarat).** *Plant Arch*, 2(2)(2002), 203-206 [10 Ref].

Wasteland soil samples from different depths in different seasons from the Bhavnagar district were analysed for its chemical and physical characteristics. Correlation matrix of nutrients in different localities indicates significant positive correlation between pH, and water holding capacity, clay and organic carbon. Significant negative correlation between organic carbon and water holding capacity and clay were observed.

0301-140. Pandit BR, Pandya Ushma (Dept Life Sci, Bhavnagar Univ, Bhavnagar 364002). **Physicochemical characteristics of wasteland soils of Bhavnagar district (Gujarat).** *Plant Arch*, 2(2)(2002), 219-224 [7 Ref].

Seasonal soil samples from wastelands of twelve talukas of Bhavnagar district (Gujarat) were analysed for their colour, mechanical composition, water holding capacity, pH, and exchangeable cations. The grey to brown coloured soil was alkaline (pH 8) and of sandy loam nature with medium to high water holding capacity which was maximum during monsoon. pH and clay content were highest during winter.

0301-141. Pandit BR, Pandya Ushma, Prajapati Sailesh (Dept Life Sci, Bhavnagar Univ, Bhavnagar 364002). **Microbial biomass in dry deciduous forest ecosystem of Eastern Gir forest of Gujarat.** *Indian J Environ Sci*, 6(2)(2002), 105-108 [8 Ref].

The Eastern Gir forest is a dry deciduous mixed forest. *Annogeisus latifolia*, *Terminalia crenulata*, *Acacia arabica* and *Zizyphus* species are the dominant species. Microbial biomass associated with decomposing litters of the forest was studied. Higher microbial biomass was recorded in monsoon. Among the microbial biomass Actinomycetes population was least compared to bacteria and fungi.

0301-142. Santhana Ramasamy M, Murugan A (Suganthi Devadason Marine Res Inst, 44-Beach Rd, Tuticorin 628001, Tamil Nadu). **Studies on the effect of heavymetals on the enzymatic activity of bacteria isolated from mangrove sediments in Tuticorin coast. Proc Natl Marine Coastal Ecosyst: Corals Mangroves-Prob Manag Strategies, SDMRI Res Publ**, 2(2002), 181-184 [12 Ref].

Bacterial strains were isolated from the mangrove sediments of Tuticorin coast. Majority of the total heterotrophic bacteria appear to be amylolytic. The effect of heavy metals copper, mercury, cadmium and nickel on enzymatic activity of amylolytic strains were studied. In general, the enzymatic activity of the strains was decreasing with increasing concentration of heavy metals. Though some strains showed tolerance to copper, the activity was less when compared to control.

0301-143. Sashikumar KC, Madhyastha MN, Rekha PD (Dept Bio Sci, Mangalore Univ, Mangalore 574199). **Distribution and occurrence of diatom community along three estuaries of Dakshina Kannada, West Coast of India.** *Indian J Environ Hlth*, 44(4)(2002), 258-265 [21 Ref].

Paper deals with the collection and identification of Diatoms (Bacillariophyceae) of three estuaries at Dakshina Kannada district, (Karnataka). A total of 33 taxa belonging to 24 genera were recorded from three different estuaries. The highest number of diatom taxa were recorded from H1 & G1 estuaries and the most common diatom genera observed at all the stations were *Coscinodiscus* sp, and *Cheateoceros* sp., The various ecological parameters analysed are discussed.

0301-144. Sharma Dushyant, Jain Renu (Dept Zoo, Govt PG Coll, Guna, MP). **Diurnal variation in some aspect of limnology of Gopalpura tank of district Guna (Madhya Pradesh, India).** *Env Conserv J*, 2(1)(2001), 41-44 [17 Ref].

Gopalpura tank is one of the artificial water bodies of Guna (MP). Diurnal variations in physico-chemical factors of the tank were studied. Fluctuations were found in water temperature, pH, dissolved oxygen, free CO₂ and alkalinity. Free CO₂ and alkalinity exhibited a negative relationship with the temperature. Abundance of plankton also showed a distinct diurnal variation.

0301-145. Shrivastava Sharad, Shukla Arvind N, Rao KS (Limno Environ Bio Unit, Sch Std Zoo, Vikram Univ, Ujjain 456010). **Biodiversity of Undasa wetland, Ujjain (India) with special reference to its conservation.** *J Expt Zoo India*, 6(1) (2003), 125-135 [24 Ref].

The characteristics of Undasa wetland, Ujjain are reported. The biological spectrum is illustrated and 24 species of macrophytes, 37 species of phytoplankton, 27

species of zooplankton, 39 species of macrozoobenthos, 18 species of fishes, two species of amphibians, three species of reptiles and four species of aves are reported. The least primary productivity, biomass and retarded growth levels of biotic communities are highlighted. It is suggested that the pollution inputs from nearby industries may be responsible in not releasing full biological potential of this wetland.

0301-146. Singh HP, Batish DR*, Pandher JK, Kohli RK (*Dept Bot, Panjab Univ, Chandigarh 160014). **Assessment of allelopathic properties of Parthenium hysterophorus residues.** *Agricl Ecosyst Env*, 95(2-3), 537-541 [17 Ref].

A study was conducted to explore the allelopathic properties of unburnt (UR) and burnt (BR) residues of Parthenium hysterophorus towards the growth of two winter crops - radish and chickpea. The extracts prepared from both UR and BR were toxic to the seedling length and dry weight of the test crops, those from BR in particular. The difference was attributed to the highly alkaline nature of the extracts prepared from BR.

301-147. Tharavathi NC, Hosetti BB (Dept Biosci, Mangalore Univ, Mangalagangothri 574199, Karnataka). **Biodiversity of algae and protozoa in a natural waste stabilisation pond : a field study.** *J Environ Bio*, 24(2)(2003), 193-199 [17 Ref].

A field study was carried out on the biodiversity of protozoa and algae from a natural waste stabilization pond. The raw waste and pond samples were analysed for physico-chemical and biological parameters. High dissolved oxygen (DO) coinciding with phytoplankton peak was recorded. The algae *Ochromonas pyriformis* and *Synura uvella* and protozoa, *Didinium masutum* and *Stentor coeruleus* were noted as rare species.

0301-148. Vasudevan Nayar T, Koshy Mathew, Retnamani KB (Div Marine Chem, Aquatic Bio Fisheries, Univ Kerala, Trivandrum). **Study on the biogeoorganics of Veli-Akkulam lake.** *Polln Res*, 21(3)(2003), 371-376 [24 Ref].

The bio-organics in the sediments of the Veli Akkulam lake in the state of Kerala was analyzed. The bio-organics were found abundant and widely distributed in the sediment and exhibited spatial and temporal variations. Carbohydrates in the sediments were autochthonous in origin. Protein content also resembled to that of carbohydrate. The low lipid concentration in the sediment suggests the preferential utilization of fatty substances by bacteria or other organism, as their energy source.

0301-149. Yadava NK, Kathpal TS, Gupta RK, Anushikha, Chaudhary Arti, Dhanda Sushil (Dept Zoo Aquacult, CCS Haryana Agricul Univ, Hisar 125004). **Use of domestic sewage effluents in aquaculture and their influence on biological productivities.** *Himalayan J Env Zoo*, 16(2)(2002), 177-186 [19 Ref].

Study presents the safe concentration of domestic sewage waste tested under field conditions (in fish ponds), to observe their influence on biological productivities i.e. primary productivity and secondary productivity. The physico-chemical characteristics of the waters were also studied and subsequent statistical analysis for their correlations with biological productivities were also carried out

Nature and Natural Resources Conservation

0301-150. Badola Hemant K, Pal Mohinder (GB Pant Inst Himalayan Env Dev, Himachal Unit, Mohal-Kullu, Himachal Pradesh). **Threatened medicinal plants and their conservation in Himachal Himalaya.** *(The) Indian Forester*, 129(1)(2003), 55-68 [42 Ref].

Paper analyses 133 rare, sensitive and threatened medicinal plant species of Himachal Himalayas for their status with the help of use pattern, nativity and endemism and explores possibilities for their conservation. These species constitute 17% trees, 23% shrubs and 60% herbs distributed over 59 families. Special stress is made on 45 threatened species assessed under IUCN and other experts' criteria for Himalaya. Species prioritization using different exercises is given high value in wide scale conservation strategies, either by means of in-situ or ex-situ methods.

0301-151. Bargali SS, Shrivastava SK (Indira Gandhi Agricul Univ, Krishi Vigyan Kendra, Anjora, PO Box-6, Durg 491001, Chattisgarh). **Exploration of valuable medicinal vegetal wealth from the tribal belt of Bastar district in Chattisgarh.** *(The) Botanica*, 52(2002), 75-82 [19 Ref].

Thirty traditionally used important medicinal plants from Bastar, a tribal belt have been discussed. The plant parts used for medicine and quantity explored per year from the forest is also given. Out of 30 plant species, 15 are herbs, 8 shrubs and 7 trees. In

general all the plant parts have some medicinal use. Some strategies are also given for the conservation of these medicinal plants.

0301-152. Basu Debjaini (Botl Surv India, Centl Botl Lab, Howrah 711103). **An endemic plant for conservation — *Pilea ternifolia* Wedd.** *Env Eco*, 20(2)(2002), 703-704 [8 Ref].

A plant identified as *Pilea ternifolia* Wedd., was collected from the village of Lava in Eastern Darjeeling Kalimpong region. After detailed study from herbarium and literature, the plant was found to be endemic and also threatened, and the plant need immediate protection in its natural habitat.

0301-153. Bhakt RK, Pandit PK (Dept Bot Forestry, Vidyasagar Univ, Midnapore, West Bengal). **Role of sacred grove in conservation of medicinal plants.** (*The Indian Forester*, 129(2)(2003), 224-232 [22 Ref].

Paper deals with an account of the role of Chilkigarh sacred grove in the conservation of regional medicinal plants. It records for the first time 105 species of useful medicinal species of which 12 are threatened elsewhere in Midnapore District. The paper also calls for the continued protection of the grove.

0301-154. Das AC, Baruah BK, Baruah D, Sengupta S(Eco Lab, Dept Zoo, Cotton Coll, Guwahati 781001, Assam). **Study on wetlands of Guwahati city – 1. Water quality of ponds and beels.** *Polln Res*, 21(4)(2002), 511-513 [2 Ref].

The Guwahati city with an estimated population of about twelve lakhs has several lentic waterbodies. These wetlands are presently under intense human activities leading to deterioration of water quality affecting the aquatic life. The study revealed marked fluctuation of values of different parameters in all the wetlands. The water of Sola beel was extremely polluted. Whereas, the water quality of other lentic bodies indicated marginal pollution load.

0301-155. Harit DN (Dept Zoo, Govt Champhai Coll, Champhai 769321, Mizoram). **Report on porcupine and its conservation status in Mizoram, India.** *Himalayan J Env Zoo*, 16(1)(2002), 27-29 [5 Ref].

Mizoram harbours a very rich biological diversity, mainly taken care of by the nature. But this biological diversity is towards fast depletion because of large scale hunting and habitat alteration due to jhuming and seasonal uncontrolled fire in the state. One of the fascinating gift of the nature to this area is porcupine. Paper deals with the porcupines, its use for meat and medicines and its conservation status in the state of Mizoram, India.

0301-156. Kar Devashish, Barbhuiya MH (Dept Life Sci, Assam (Centl) Univ, Silchar 788011). **Waterfowls in Chatla Haor, a seasonal floodplain wetland in Cachar District of Assam with a note on waterfowl and wetland conservation.** *Env Eco*, 20(3)(2002), 689-691 [9 Ref].

A pilot survey conducted on the waterfowls in Chatla Haor, a seasonal floodplain wetland in Cachar district of Assam, revealed large congregation of 20 different species of wading, swimming and diving birds during summer and monsoon seasons. The waterfowls were found to be under stress due to habitat degradation. Conservation strategies for the purpose have been discuss here.

0301-157. Karthikeyani TP (Ethnopharmac Unit, Dept Bot, Bharathiar Univ, Coimbatore 641046). **Ethnobotanical studies among Yanadis of Sathyavedu mandal, Chittoor district, Andhra Pradesh.** *Plant Arch*, 3(1)(2003), 21-27 [10 Ref].

Paper describes the medicinal properties of plants and plant products used among the Yanadis of Sathyavedu mandal, Chittoor district. The local name, parts used for 34 claimed therapeutic uses of 20 plant species belonging to 17 families are recorded. The medicinal applications are discussed in the light of the known bioactive compounds.

0301-158. Mertia RS, Nagarajan M (Centl Arid Zone Res Inst, Regl Res Stn, Jaisalmer, Rajasthan). **Towards conservation of medicinal plant lore of Indian arid zone.** (*The Indian Forester*, 129(2)(2003), 268-274 [11 Ref].

The species *Commiphora wightii* (Gugal) and *Tephrosia falciformis* (Rati Biyani) are now under application in the field of medicine. Besides mitigating the ethno-medicinal needs of the desert peasantry, these species offer potential for conservation

and optimum use in the field of medicines. The results of the study clearly infer the possibilities of conservation of the some of the species investigated.

0301-159. Negi Mahabir Singh (HNB Garhwal Univ, Badshaithaul Campus, New Tehri, Tehri Garhwal, Uttaranchal). **Resource depletion and its environmental management in Kiarda Dun, Himachal, Himalaya, India.** *Env Conserv J*, 2(2&3)(2001), 105-113 [4 Ref].

The resource depletion and environmental management of the Kiarda Dun have been highlighted to work out the resource management in this region which is being degraded by overgrazing, deforestation, over lopping, unscientific blasting, over mining and over ploughing. Such activities have activated the natural geo-catastrophic processes and are responsible for depletion of resources in the Kiarda Dun. Further, unplanned extension and non-coordination of various development agencies, along with a poor ecological perception has caused the evolution of various environmental problems in the Kiarda Dun.

0301-160. Nikhil Kumar (Environ Manag Gr, Centl Mining Res Inst, Barwa Rd, Dhanbad 826001, Jharkhand). **Wasteland rehabilitation around coal washery areas through bio-remedial measures.** *Polln Res*, 21(3)(2002), 249-251 [11 Ref].

All the coal mined is not very much suitable for thermal power plants due to their high ash content and discharges huge amount of coal dust to water cycle in addition to rejection of ash in middling. These are the sources of contamination for soil and water characteristics resulting degradation and vegetation failure in the affected areas. Bio-remedial measures were suggested for the rehabilitation of wasteland created by the coal washeries.

0301-161. Pathak PS, Bhatt RK (Indian Grassland Fodder Res Inst, Jhansi 284003, Uttar Pradesh). **Revegetation of degraded lands through agroforestry : retrospects and prospects.** *(The) Botanica*, 51(2001), 127-142 [32 Ref].

Paper presents an account of revegetation strategy — its past, present and future prospects and role of agroforestry in achieving the goals. Various approaches are suggested with the case studies for understanding the value of the efforts in specific

edapho-climate regions. It also outlines the priority areas for research and emphasizes on the selected species that have the promise on the degraded lands.

0301-162. Prakasam U, Banerjee SK (Trop Forest Res Inst, P.O. RFRC, Mandla Rd, Jabalpur 482021, Madhya Pradesh). **Vegetation and soil development on copper mine spoil of Madhya Pradesh in relation to time.** *Annals Forestry*, 9(2)(2001), 220-234 [28 Ref].

The time dependent changes of species composition, physicochemical, nutritional and biological characteristics of copper mine overburden spoils of Malanjkhanda, Madhya Pradesh were assessed. It was observed that with the increase of the age of overburden spoils from 2-15 years, number of species increased as also the diversity index. It was observed that only four species viz. *Celosia argentea*, *Tridax procumbens*, *Crotalaria prostrata* and *Saccharum spontaneum* participated in community formation as dominants or co-dominants.

0301-163. Pravin P, Remesan MP, Meenakumari B (Centl Inst Fisheries Techno, Cochin 682029). **Conservation of whale sharks (*Rhincodon typus* Smith).** *J Nature Conservators*, 14(2)(2002), 177-182 [20 Ref].

The little known whale shark are hunted off Gujarat coast every year. Due to their harmless and docile nature, slow swimming movements in search for food on the water surface in the coastal areas they are vulnerable and susceptible to easy capture. Fishing for this species intensified with the emergence of a lucrative market for its fins, meat, skin and cartilage. The increasing demand in international trade has put the shark under severe threat. Paper suggests for further research and conservation of this species.

0301-164. Rajasekharan PE (Div Plant Genetic Resources, Indian Inst Hortl Res, Bangalore 560089). **Bioprospecting and biodiversity conservation: opportunities and concerns.** *(The) Botanica*, 52(2002), 1-13 [4 Ref].

A systematic effort is required to prospect species distribution, associated with dynamic changes involved, and predict the future scenario, with regard to the distribution of such species in wild, only then effective conservation strategies can be drawn out, at both in situ and ex situ levels. Ex situ strategies do not provide a complete panacea for conserving naturally occurring plant species and protecting the habitat in the face of

changing environmental conditions. In situ strategy allows evolutionary process which enables release of variability in the form of adaptive gene complexes, new alleles of characters evolved due to genotype environment interaction.

0301-165. Rao Vibha, Rajasekharan PE (Indian Inst Hortl Res, Bangalore 560089). **Threatened medicinal plant resources and conservation needs.** (*The Botanica*, 52(2002), 53-63 [9 Ref].

A combination of factors like over exploitation, habitat destruction and unsustainable harvesting coupled with illegal trade practices have driven many medicinal plant species to brink of extinction. Attempts are being made to conserve these valuable resources. A focused conservation strategy and international regulatory bodies with the co-operation of many countries are aiming at a combined effort.

0301-166. Singh Archana, Singh AK, Rathore RKS, Bhadauria Seema, Singh Vijay Laxmi (Dept Bot, Raja Balwant Singh Coll, Agra). **Demography and ecological dynamic of ethnomedicinal plants of Mainpuri district, India.** *Env Conserv J*, 3(2)(2002), 43-47 [12 Ref].

Paper studies the vegetation of Mainpuri district of Uttar Pradesh. It was found that the medicinal herbs were abundant. Medicinal grasses viz. *Cynodon dactylon*, *Cymbopogon nardus* showed the dynamics regeneration process by suckers and rhizomes and medical trees like *Acacia nilotica*, *Pongamia pinnata*, *Syzygium cuminii*, *Terminalia arjuna*, *Ficus benghalensis*, were most popular. Ex-situ conservation of these plants in such wastelands, with extreme ecological conditions, was found to be with the help of natural germplasm sustaining. Few ecological interactions and niche during all seasons were recorded.

0301-167. Solanki GS (Dept Appl Sci, NE Regl Inst Sci Techno, Nirjuli 791109). **Socio-cultural and faunal diversity of Arunachal Pradesh.** *Himalayan J Env Zoo*, 16(2) (2002), 159-170 [23 Ref].

The knowledge of local tribals about the wild animals and plants of Arunachal and the utility is immense. Domination of technological practices in cultural practice is often perceived as major cause of loss of biodiversity. Attempt is made to understand how the diversity of tribal culture affects the prospects of conservation of faunal diversity.

0301-168. Srinivasamurthy TS, Karnat Mohan, Prabhakaran V, Jadhav SN, Elkunchwar Satish, Ravikumar K, Ghate Utkarsh (Foundation Revitalisation Local Hlth Traditions (FRLHT), Bangalore, Karnataka). **Medicinal plants conservation and sustainable use through forest gene banks.** (*The Indian Forester*, 129(2) (2003), 179-186 [12 Ref].

State Forest Department (SFDs) of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Maharashtra, in consultation with FRLHT and the support of DANIDA and UNDP have established 54 forest gene banks sites termed 'Medicinal Plant Conservation Area (MPCA)'. MPCAs have proved crucial in capacity building of forestry staff, local communities and researchers in the conservation of medicinal plants for sustainable use and equitable benefit sharing. This experience can help in implementing plans and programmes under the Biological Diversity Act 2002, National Biodiversity Strategy and Action Plan (NBSAP) and Medicinal Plants Board.

0301-169. Sunil Kumar R (Ecol Lab, Dept Zoo, Catholicate Coll, Pathanamitta 689645, Kerala). **Status of mangroves in Kerala: The degraded ecosystem urgently needs conservation and management strategies for their development. Proc Natl Semin Marine Coastal Ecosystems: Coral and Mangrove - Prob Manag Strategies.** *SDMRI Res Publ*, 2 (2002), 13-23 [91 Ref].

Species composition and distribution of mangroves and their associates have been listed with special reference to Kerala mangroves, the most degraded ecosystem of the west coast of India. Based on the three authentic surveys on Kerala mangroves, it is revealed that mangrove area is dwindling very fast due to the man made activities. Since the majority of mangrove land belongs to the private ownership, their rehabilitation and development would create various problems as far as the conservation and management strategies are concerned. Possible management strategies needed for the development and conservation of mangrove in Kerala is discussed.

0301-170. Vyas SP (Centl Arid Zone Res Inst, Regl Res Stn, Kukma 370105). **Ethno-medicinal plants of Kachchh.** *Indian J Environ Sci*, 6(1) (2002) 91-94 [8 Ref].

Plants of nearby vicinity are generally used by the local populace to mitigate various kind of diseases and disorders since long. Information collected indicate that various locally available plants form the part of traditional medicine for numerous

diseases. Paper documents the plants of traditional medicine of arid region of Kachchh district of Gujarat state.

0301-171. Yadav JP, Kumar Suresh (Dept Biosci, MD Univ, Rohtak 124001). **Folk medicinal uses of some indigenous plants among the people of Mahendragarh district, Haryana India.** *Plant Archives*, 3(1) (2003), 37-43 [15 Ref].

The rural population of the Mahendragarh district uses medicinal plants found in their surrounding for the treatment of more than twenty-five diseases. A survey was conducted among medicinal plant sellers, healers, hakims and local elderly people. Information of 25 medicinal plants used for therapeutic purposes with their popular names, distribution, empirical properties and manner of using recipes are described.

Health and Toxicology

0301-172. Amudha P, Sangeetha G, Mahalingam S (Dept Zoo, PG Extn Cent, Univ Madras, Vellore 632004). **Dairy effluent induced alterations in the protein, carbohydrate and lipid metabolism of a freshwater teleost fish *Oreochromis mossambicus*.** *Polln Res*, 21(3) (2002), 293-295 [10 Ref].

Static bioassays reveal that the LC₅₀ 96 hour of dairy effluent for a freshwater fish *Oreochromis mossambicus* was 50% of the effluent. The fish were reared in different sublethal concentrations (10 and 15%) of the effluent for 30 days. Various biochemical constituent in three tissues (gill, liver, muscle) of the fish were estimated. These concentrations were found to decrease depending on the dose of the effluent.

0301-173. Anand M, Gupta GSD, Rana MD, Khanna RN (Indl Toxicol Res Cent, PB No. 80, MG Marg, Lucknow 226001). **Peripheral neurotoxicity of cadmium and hexachlorocyclohexane (HCH) in rats.** *J Ecophysiol Occupl Hlth*, 2(3&4) (2002), 281-290 [18 Ref].

Male albino rats were divided into five groups and were orally administered cadmium (0.4 mg/kg) and HCH (10 mg/kg) daily for 90 days. After 45 days one group of Cd and HCH was supplemented vitamin E (50 mg/kg) till the end of experiment. The group dosed with HCH + Cd had a significantly higher concentration of HCH in plasma

and tissues than the group dosed with HCH alone. The brain content of Cd was significantly increased whereas a marked depletion of copper and iron was observed in the group of Cd + HCH. Vitamin E affords protection against the Cd + HCH induced neuronal toxicity.

0301-174. Asthana A, Pillai A, Gupta VK* (*Sch Std Chem, Pt Ravishankar Shukla Univ, Raipur, Chattisgarh). **Spectrophotometric determination of endosulfan.** *Cheml Environ Res*, 11(1&2)(2002), 39-45 [24 Ref].

A sensitive spectrophotometric method is proposed for the determination of widely used pesticide endosulfan. The method is based on the liberation of sulphur dioxide from endosulfan by adding acid reagent and alcoholic potassium hydroxide. The liberated sulphur dioxide is then passed through potassium iodate solution and the iodine liberated is then reacted with N-chlorosuccinimide and leuco crystal violet. The method has been applied for the determination of endosulfan in water, soil and vegetables.

0301-175. Bakora Neela, John PJ, Bhatnagar Pradeep (Environ Toxicol Unit, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Evaluation of organochlorine insecticide residue levels in locally marketed vegetables of Jaipur city, Rajasthan, India.** *J Environ Bio*, 23(3) (2002), 247-252 [11 Ref].

Study investigates the magnitude of contamination of organochlorine insecticides in vegetables which were brought for sale to the consumers in the local markets of Jaipur city, Rajasthan. Most of the collected samples were found to be contaminated with residues of DDT and its metabolites isomers of HCH heptachlor, heptachlor epoxide and aldrin. Some of the detected insecticides exceeded the limit of tolerance prescribed by WHO/FAO. Seasonal variations of residue levels were also studied.

0301-176. Baskar Sushmita, Usha Rani MV (Dept Environ Sci, Bharathiar Univ, Coimbatore). **Genotoxic effects of untreated and treated paper mill effluents on the somatic cells of *Allium cepa* L.** *Polln Res*, 21(4) (2002) 469-471 [10 Ref].

Among the test systems, *Allium cepa* has been listed as an example of the plants used in screening mutagens. A study was carried out to study the genotoxic effect of

untreated and treated paper mill effluents on the somatic cells of *Allium cepa* L. The effluents lowered the mitotic index values.

0301-177. Baskar Sushmitha, Usha Rani MV (Dept Environ Sci Engng, Guru Jambheshwar Univ, Hisar, Haryana). **Cytogenetic and biochemical effects of untreated and treated paper mill effluents on the somatic cells of *Allium Cepa* L.** *Polln Res*, 21(4) (2002), 473-477 [17 Ref].

Paper reports cytogenetic and biochemical effects of untreated and treated paper mill effluents on the somatic cells of *Allium cepa*. The effluents lowered the mitotic index. The effluent significantly lowered the protein, DNA and RNA content.

0301-178. Bharathi Ch, Sandeep BV, Subbarao BVSSR (Dept Zoo, Andhra Univ, Visakhapatnam 530003). **Effect of monocrotophos on the oxygen consumption of a freshwater edible crab *Paratelphusa hydrodromus*.** *J Ecophysio Occupl Hlth*, 2(1&2)(2002), 85-88 [19 Ref].

Freshwater crab *Paratelphusa hydrodromus* were exposed to 0.6 ppm to 5 ppm concentration of the pesticide contamination of the medium by monocrotophos. The results showed gradual increase in oxygen consumption of *P. hydrodromus* in concentration ranging from 0.5 to 0.1 ppm and gradual decrease at higher concentration ranging from 1.0 to 5.0 ppm. The change in oxygen consumption of the crabs could be related to the interference respiratory enzymes.

0301-179. Bhatia NP, Sandhu GS, Johal MS (Dept Zoo, SGN Khalsa Coll, Sri Ganganagar, Rajasthan 335001). **Endosulfan induced changes in blood chemistry of *Heteropneustes fossilis*.** *Polln Res*, 21(3)(2002), 323-327 [17 Ref].

The effect of five sublethal concentrations of endosulfan were evaluated on serum glucose, serum cholesterol and serum protein of *Heteropneustes fossilis* after 5d, 15d and 30d exposure. Noticeable differences were observed in the blood chemistry of treated fish. Intoxicated fish after 5d exposure showed hyperglycemia and hypercholesterolemia, but insignificant increase was observed in protein content. Prolonged exposure for 15d and 30 d resulted in decrease in all the three parameters.

0301-180. Bhaumik Utpal, Mitra A, Saha SK, Paria T (Centl Inland Capture Fisheries Res Inst, Barrackpore 743101, W. Bengal). **Professional health hazards among the fin and shell fish collectors of Sundarbans.** *Env Eco*, 20(3)(2002), 514-519 [4 Ref].

The development of prawn and fish industry largely depends on steady and adequate supply of seed of desired species. During collection of seed, the collectors have been observed to fall victim to some diseases. To assess the frequency of these diseases, an investigation was carried out in some villages of Sundarbans. The results shows that the poor people of Sundarbans who chose this profession for their livelihood, do not afford to bear the cost of treatment. Therefore, it is high time that welfare programs be launched for the benefit of those down trodden rural populace.

0301-181. Chaudhari Rajendra T, Sultana Masarrat (Dept Environ Sci, Dr Babasaheb Ambedkar Marathwada Univ, Aurangabad 431004, MS). **Effect of nickel chloride and lead chloride on amylase activity of freshwater bivalve, *Parreysia cylindrica*.** *Polln Res*, 21(3) (2002), 341-342 [6 Ref].

The impact of nickel chloride and lead chloride on amylase activity of freshwater bivalve, *Parreysia cylindrica* was studied. The activity of amylase after acute treatment showed a decrease in both the tested heavy metals. NiCl_2 was more toxic as compared to CdCl_2 affecting amylase activity.

0301-182. David M, Mushigeri SB, Prashanth MS (Dept Zoo, Toxicology Div, Karnataka Sci Coll, Dharwad 580001). **Nickel induced changes on some aspects of protein metabolism in the tissues of *Pila globosa*.** *J Environ Bio*, 24(1) (2003), 69-75 [37 Ref].

Some aspects of protein metabolism were studied in foot, hepatopancreas and mantle tissues of snail, *Pila globosa* on exposure to lethal concentration for 2 days (336.7 mg/L) and sublethal concentration (67.34 mg/L) of nickel for 1, 5 and 10 days. Total, structural and soluble proteins decreased significantly and to continue, this the levels of amino acids and protease activity increased in all the tissues of snail at all time points examined. Under lethal and sublethal exposures, the changes in all the parameters were pronounced in hepatopancreas followed by foot and mantle.

0301-183. Desai Himadri Sekhar, Nanda Balaram, Panigrahi Jayananda (Dept Zoo, TF Coll, Bamra 768221). **Toxicological effects on some biochemical parameters of fresh water fish *Channa punctatus* (Bloch.) under the stress of nickel.** *J Environ Bio*, 23(3)(2002), 275-277 [20 Ref].

Toxicological effects of some biochemical parameters of freshwater fish *Channa punctatus* (Bloch), under the stress of nickel ($\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$), at various concentrations of 10, 20, 30 and 40 ppm for 30 days were observed. Gradual decrease in the levels of liver protein and liver ascorbic acid due to proteolysis and liver glucose breakdown respectively was observed. There was also gradual decrease in the brain protein level showing significant alterations but the brain ascorbic acid level showed no significant alterations.

0301-184. Dey Mithra, Gupta Abhik (Dept Eco, Assam Univ, Silchar 788011, Assam). **Acute toxicity of endosulfan on three anuran tadpoles.** *J Ecotoxicol Environ Monit*, 12(1)(2002), 61-65 [29 Ref].

Acute toxicity tests of pesticide endosulfan were performed on early stage tadpoles of three anuran species - *Bufo melanostictus*, *Limnonectes limnocharis* and *Microhyla ornata*. Mean LC_{50} values at 24, 48, 72 and 96 h were 0.057, 0.029, 0.022 and 0.020 ppm for *B. melanostictus*; 0.0066, 0.004, 0.0014 and 0.0013 ppm for *L. limnocharis*; and 0.0025, 0.0006, 0.00025 and 0.00016 ppm for *M. ornata* respectively. Several behavioural as well as morphological changes were also observed in all the three species.

0301-185. Dharmilata, Joshi Namita (Dept Environ Sci, Kanya Gurukul Mahavidyalaya, Gurukula Kangri Univ, Haridwar 249404). **Toxicity and respiratory responses of *Heteropneustes fossilis* exposed to zinc chloride and fly ash leachate.** *Himalayan J Env Zoo*, 16(1)(2002), 87-90 [16 Ref].

Study evaluates the toxicological impact of flyash leachate and zinc chloride on fresh water catfish *Heteropneustes fossilis* and the effect of leachates and zinc chloride concentration on oxygen uptake of fish. The 96 hours LC_{50} values for zinc chloride and flyash leachate were found to be 15.75mg/l and 550g/l, respectively. The oxygen

consumption was significantly reduced as compared to control, leading to respiratory stress.

0301-186. Dhembare AJ, Sonawane Nalini V, Gacche RN (Dept Zoo, PVP Coll, Pravaranagar 413713, Ahmednagar). **Haematological responses in *Rattus norvegicus* Linn. exposed to malathion.** *J Expt Zoo India*, 6(1) (2003), 117-119 [13 Ref].

Some haematological tests were carried out on albino rat, *Rattus norvegicus*. The rats (8.05 g) were exposed to LD₅₀ (24 hr) malathion. Haematological tests like WBC, RBC, Hb%, PCV, MCV, MCH and MCHC were recorded on 24, 48, 72 and 96 hrs post dose. A decrease in RBC, WBC and Hb% observed in 24 hrs exposure and increase in 48 hrs and onward shows gradual decrease.

0301-187. Dinodia GS, Jain KL, Gupta RK (Dept Zoo Aquacult, CCS Haryana Agric Univ, Hisar 125004). **Effect of cadmium toxicity on total body carbohydrates and residual protein contents in some fresh water fishes.** *Himalayan J Env Zoo*, 16(2)(2002), 171-176 [18 Ref].

The effect of cadmium toxicity on some biochemical components in commonly available fresh water species *Labeo rohita*, *Cirrhinus mrigala* and *Cyprinus carpio* were studied. Marked reduction was recorded in the body tissue carbohydrates and residual protein in all the three fish species after 45 days of exposure to cadmium as compared to control which may be due to dysfunction of several physiological and biochemical processes in the body, and it renders the fish incapable of normal growth.

0301-188. Gupta DK, Mehrotra Neeta, Gupta Neelima (Dept Zoo, Bareilly Coll, Bareilly, UP). **Haemoglobin changes in *Rattus norvegicus* due to heavy metal intoxication.** *Himalayan J Env Zoo*, 16(1)(2002), 91-94 [17 Ref].

Exposure of albino rats (*Rattus norvegicus*) to different combinations of lead acetate and zinc acetate indicated differential changes in haemoglobin concentration due to heavy metal intoxication. A maximum fall in haemoglobin content was observed in rats exposed to a combination of zinc acetate and lead acetate. It was observed that zinc acetate was more toxic and interfered with heme synthesis to a greater extent as compared to lead acetate.

0301-189. Gupta Neelima, Gupta DK, Verma VK (Dept Anim Sci, MJP Rohilkhand Univ, Bareilly). **Assessment of some haematological parameters in Heteropneustes fossilis exposed to lead nitrate.** *Himalayan J Env Zoo*, 16(1)(2002), 63-66 [16 Ref].

Experiments were conducted to observe the toxicity of lead nitrate in the fresh water cat fish, *Heteropneustes fossilis* at varying concentration of 2.25 mg/l and 2.85 mg/l. Observation on Total Erythrocyte Concentration (TEC) and Hb% indicate as fall in both parameters reaching upto a maximum 32% in TEC and 34% at the higher concentration of 2.85 mg/l of $PbNO_3$ at day 21 post treatment.

Wastes

0301-226. Adhikari S, Gupta SK (Centl Inst Freshwater Aquacult, PO Kausalyaganga, Bhubaneswar 700019). **Assessment of the quality of sewage effluents from dry weather flow channel, Calcutta.** *Indian J Environ Hlth*, 44(4) (2002), 308-313 [13 Ref].

The quality of sewage effluent of dry weather flow channel, Calcutta was assessed in order to utilize it for irrigation. Although raw sewage in the winter season was toxic in respect of chlorides, sulphates, bicarbonate, BOD, COD; its dilution in the monsoon decreased the toxicity hazards considerably, making it worth using for irrigation. The sewage effluents were rich in N and K, but poor in P status with marginal concentrations of micronutrients.

0301-227. Agrawal SB, Singh Anoop, Dwivedi Gourav (Dept Bot, Allahabad Agricl Inst, Deemed Univ, Allahabad 211007). **Effect of vermicompost, farm yard manure and chemical fertilizers on growth and yield of wheat (*Triticum aestivum* L. var HD 2643).** *Plant Arch*, 3(1) (2003), 9-14 [17 Ref].

The effect of vermicompost (VC), farm yard manure (FYM) and chemical fertilizers (CF) was studied singly and in combinations on the growth and yield of wheat (*Triticum aestivum* L. var. HD 2643) the most important food crop of North India. Application of VC in all treatments increased the total biomass production and yield of wheat plants over its control. Use of VC in combination with FYM is recommended for

higher wheat production. Application of VC in crop production resulted double benefits by enhancing crop yield vis a vis reduced disposal problem of organic waste.

0301-228. Ashok BT, Musarrat J (Dept Biochem, JN Medl Coll, Aligarh Muslim Univ, Aligarh). **Mechanical, physico-chemical and microbial analysis of oil refinery waste receiving agricultural soil.** *Indian J Environ Hlth*, 44(4) (2002), 282-289 [24 Ref].

The mechanical, physico-chemical characteristics of soil and the activity of indigenous microflora were studied in the agricultural soil steadily receiving petroleum refinery effluent at Mathura, U.P., India. Physico-chemical analysis showed considerable variability in the soil pH, temperature, moisture content and water holding capacity. Higher microbial biomass ranging from 366 to 1604 mg CO₂ 100g⁻¹ soil, clearly implied that the soil in the test region was very well nourished and the refinery waste was providing enough nitrites to support the growth of soil microflora.

0301-229. Bhutiani Rakesh, Khanna DR (Dept Zoo, Environ Sci, GK Univ, Hardwar 249404). **Physico-chemical analysis of fertilizer industrial effluent.** *J Nature Conservtor*, 14(2) (2002), 347-349 [11 Ref].

The fertilizer industry today has attained the status of a major industry in the country and is attracting considerable public attention and interest. Effluent sample have been collected from outside the factory boundary of a fertilizer plant and various physico-chemical parameters are analysed to assess the pollution load of the effluents.

0301-230. Chandra Ram, Rathore Brijesh (Environ Microbio Sec, Indl Toxic Res Cent, Lucknow 226001). **Phenol degradation by bacterial isolates and consortium isolated from anaerobically treated distillery effluent sludge.** *J Ecophysio Occupl Hlth*, 2(1&2) (2002), 143-151 [14 Ref].

Phenol degradation was studied by axenic and mixed aerobic bacterial strains isolated from the naturally degrading sludge of anaerobically treated distillery effluent sample. Four dominantly growing bacterial strains were identified as *Pseudomonas stutzeri*, *P. acidovorans*, *Enterobacter* sp. and *Alcaligenes eutrophus*. It was noted that *Alcaligenes eutrophus* has highest 74% and 100% phenol degrading efficiency in both pure and mixed culture conditions, respectively after 72 hrs time intervals.

0301-231. Chaudhari Archana R, Nagpurkar Laxman P, Ekhe Jayant D (Dept Appl Chem, Visvesvaraya Regl Coll Engng, Nagpur 440011). **Uptake of heavy metal ions by carbonaceous materials obtained from industrial waste lignin using microwave irradiation.** *Asian J Chem*, 15(1) (2003), 917-924 [14 Ref].

Lignin is a major waste material from the pulp and paper industries. Its lesser utilization and disposal problems make it a matter of environmental concern. In the study, the microwave irradiation, zinc chloride and subsequent treatment have been utilized. It produced a good yield of carbonaceous solid material having good capacity to uptake the toxic metal ions from aqueous solutions. The exhausted material may also be used as a solid fuel supplement due to its high calorific value, 5400 kcl/kg.

0301-232. Chauhan Maya Singh, Malviya Kishore (Dept Phys, Govt Malav Kanya Higher Secondary Sch, Moti Tabela, Indore). **Existing solid waste management in hospitals of Indore city.** *Indian J Environ Sci*, 6(1) (2002), 43-49 [3 Ref].

Studies have been carried out on the solid waste management in the hospitals of Indore city. Total sixteen hospitals were surveyed having ten or more number of beds. Two procedures were adopted for collecting the data - (i) personal observation and (ii) interview of the working persons. The collected data have been compiled along with some of the conclusions drawn.

0301-233. Chitdeshwari T, Savithri P, Mahimairaja S (Dept Soil Sci Agricul Chem, Tamil Nadu Agricul Univ, Coimbatore 641003). **Trace element extractability in sewage bio solid composts.** *J Ecotoxicol Environ Monit*, 12(1) (2002), 69-71 [4 Ref].

The extractability of all the trace metals in sewage bio-solid composts showed an inconsistent trend with composting periods excluding Zn, which showed an upheaval trend. The highest concentration of Zn (46.9), Fe (406) and Mn (48.7 mg/kg) was found to be associated with raw sewage bio solid + green leaf manure compost, while the higher values of Cu (183 mg/kg) was associated with raw sewage bio-solid + composted coir pith composts.

0301-234. Chitdeshwari T, Savithri P, Mahimairaja S (Dept Soil Sci Agricul Chem, Tamil Nadu Agricul Univ, Coimbatore 641041). **Fractionation and characterization of sewage sludge.** *J Ecotoxicol Environ Monit*, 12(3) (2002), 161-165 [6 Ref].

Chemical fractionation of heavy metals in the sewage sludge indicated that, nitric acid extracted a great percentage of the total irrespective of heavy metals. A comparative percentage of all the heavy metals viz, Zn, Fe, Mn, Cu, Cd, Cr and Ni were extracted by EDTA and NaOH. About 60-70% of the metals was extracted in residual fraction, which is not available to crop and leached by water. The minimum concentration of water soluble fraction was observed with all the heavy metals.

0301-235. Dhagat N, Nene L, Kapley A, Purohit HJ, Bal AS (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Role of nitrogen level on phenol degrading microorganisms in fixed film bioreactor.** *Polln Res*, 21(4) (2002), 447-450 [8 Ref].

The experiments were designed to study the relationship and influence of the levels of phenol and nitrogen in a biological treatment system. Studies carried out using a fixed film bioreactor system in the treatment of phenol containing medium is reported. The specific role of nitrogen levels has been evaluated for the required degradative capacity of the fixed film reactor.

0301-236. Dhaked Ram Kumar, Waghmare Chandra Kant, Alam Syed Imteyaz, Kamboj Dev Vrat, Singh Lokendra (Def Res Dev Estb, Jhansi Rd, Gwalior). **Effect of propionate toxicity on methanogenesis of night soil at psychrophilic temperature.** *Bioresource Techno*, 87(3) (2003), 299-303 [17 Ref].

The effect of propionate concentrations on biodegradation of human waste (night soil) was studied at 10°C. Propionate was toxic for the biomethanation at all the pH tested (6.0, 7.0 and 8.0). The maximum reduction in biogas production in present of 200 mM propionate was observed at pH 7.0 followed by 8.0. The methane content in biogas also followed a similar trend and at pH 7.0 an 11.5% decrease was observed. Propionate caused the reduction of methanogenic count by an approximately 2 log value.

0301-237. Dhankar R, Dahiya Joginder (Dept Biosci, MD Univ, Rohtak 124001). **Impact of sugar mill effluent on soil and some native forage plant species.** *Plant Arch*, 2(2) (2002), 235-240 [18 Ref].

Investigation was undertaken to analyze the impact of sugar mill effluent on soil properties and certain physiological responses of some native forage plant spp. namely

Chenopodium album, Datura metal, Brachiaria mutica and Launaea procumbens growing in the neighbouring area of sugar mill. The effluent receiving plants showed retarded photosynthetic pigment activity. Nutrient uptake was found to increase many times in the effluent receiving plants with nutrient uptake of sodium, calcium and magnesium due to which the effluent can be utilized in saline soils for improving their fertility.

0301-238. Gaiind Sunita, Gaur AC (Div Microbio, Indian Agricl Res Inst, New Delhi 110012). **Quality assessment of compost prepared from fly ash and crop residue.** *Bioresource Techno*, 87(1) (2003), 125-127 [6 Ref].

Fly ash was co-composted with wheat straw and 2% rock phosphate (w/w) for 90 days and different chemical and microbiological parameters monitored to evaluate its effect on the composting process. Fly ash addition at 20% level resulted in the lowest C/N of 16.4:1 and highest available and total phosphorus. Increasing the addition of fly ash from 40 to 60% (w/w) did not exert any detrimental effect on either C:N or the microbial population.

0301-239. Goyal Vibha, Angar MR, Shrivastava DK (Dept Chem, CM Dubey PG Coll, Bilaspur 495001, Chhattisgarh). **Studies on the effects of flyash treated soil on the increased protein contents in the seeds of Glycine max (soyabean).** *Asian J Chem*, 14(1) (2002), 328-332 [10 Ref].

The soil of Chhattisgarh state has been found to be of acidic nature, which is not conducive to plant growth and better crop yield. In the pot experiments, various proportions of fly ash and soil were used for soya bean plant growth observations. Soil and the fly ash were from Hasdeo-Bango Command Area and NTPC Korba, respectively. Various plant parameters, especially amino acid contents, showed improvement in the modified soil samples.

0301-240. Gupta RK, Gahlawat SK, Yadava NK, Jain KL, Chaudhary Aarti (Dept Zoo Aquacult, CCS Haryana Agricl Univ, Hisar 125004). **Efficient conversion and utilization of agricultural carbonic waste by vermitechnology.** *Himalayan J Env Zoo*, 16(2) (2002), 187-190 [10 Ref].

Study was carried out with seven treatments each having hundred adult earthworms in one unit, and it was found that C:N ratio increases with time of treatment and was found maximum in case of cowdung, because this treatment contain least amount of nitrogen during composting process. The results show that yield of okra and brinjal is increased with vermicompost as compared to other treatments.

0301-241. Jothimani P, Bhaskaran A (Dept Environ Sci, Tamil Nadu Agricul Univ, Coimbatore 641003). **Dye factory effluent decolourisation by fungal cultures under shaking condition.** *Indian J Environ Sci*, 6(1) (2002), 53-56 [14 Ref].

Laboratory incubation experiments were conducted to evaluate the efficiency of different fungal cultures on dye factory effluent decolourisation. The fungal cultures used in the study were *Trametes* sp. (C₁), *Phanerochaete chrysosporium* (C₂), and *Aspergillus* sp. (C₃). Among the cultures, C₁ removed 70 per cent of colour at 10 per cent inoculum level. There was no significant difference between the cultures. All the three fungal strains tested for colour removal performed uniformly.

0301-242. Kadirvelu K, Kavipriya M, Karthika C, Radhika M, Vennilamani N, Pattabhi S (Dept Environ Sci, PSG Coll Arts Sci, Coimbatore 641014). **Utilization of various agricultural wastes for activated carbon preparation and application for the removal of dyes and metal ions from aqueous solutions.** *Bioresource Techno*, 87(1) (2003), 129-132 [15 Ref].

Activated carbons were prepared from the agricultural solid wastes, silk cotton hull, coconut tree sawdust, sago waste, maize cob and banana pith and used to eliminate heavy metals and dyes from aqueous solution. Experimental results show all carbons were effective for the removal of pollutions from water. Since all agricultural solid wastes used in this investigation are freely, abundantly and locally available, the resulting carbons are expected to economically viable for wastewater treatment.

0301-243. Lokhanda RS, Sathe CN (Dept Chem, Univ Mumbai, Vidyanagari, Santa Cruz (E), Mumbai 400098). **Studies on industrial effluent quality with reference to heavy metals content.** *Asian J Chem*, 15(1) (2003), 335-338 [6 Ref].

Paper reports the heavy metals content in some industrial effluents from Maharashtra Industrial Development Centre (MIDC) area of Ambarnath. The effluent in

the area is discharged into Waldhuni Nallah and finally goes to the creek. The metals monitored are Fe, Cr, Cd, Ni, Zn, Cu and Pb. The findings are compared with WHO and Indian standards.

0301-244. Mishra Sarika, Joshi Namita (Dept Environ Sci, Kanya Gurukul Mahavidyalaya, Hardwar). **Generation of solid waste during festive occasions in Hardwar city.** *Himalayan J Env Zoo*, 16(2) (2002), 263-266 [3 Ref].

A survey was carried out to estimate the nature and production rate of solid wastes in Hardwar during six important festive occasions. It was observed that about 20,435 kg of solid wastes was generated by the activities of pilgrims. The maximum production of solid wastes had been recorded during Deepawali. The study indicated that there is a need of awareness towards this problem not at Hardwar but all over the country.

0301-245. Nikhil Kumar (Environ Manag Gr, Centl Mining Res Inst, Barwa Rd, Dhanbad 826001, Jharkhand). **Growth response in crops raised in flyash amended soil.** *Polln Res*, 21(4) (2002), 409-416 [35 Ref].

Study was undertaken to elucidate the possibility of flyash application to agricultural soils to improve crop yields. Result revealed that flyash application, particularly in higher amount (8% w/w) increased the pH and conductivity of the soils, however, the application of low amount (2% and 4% w/w) favoured plant growth and improved yield. Although the element concentration were found more in flyash amended soils than the control, their levels remained well below the threshold limit and thus helped in the crop plant growth and yields.

0301-246. Pulikeshi MB, Amoji SD*, Shagoti UM, Biradar VA (*Dept PG Std Res Zoo, Gulbarga Univ, Gulbarga 585106). **Seasonal variations in compostability and production of vermiprotein by Eisenia fetida.** *J Environ Bio*, 24(2) (2003), 165-171 [25 Ref].

The potential of *Eisenia fetida* to degrade wastes into vermicompost and to produce vermiprotein in the form of worm-biomass during different seasons was evaluated. Results revealed that the environmental factors prevailing during different seasons did influence directly the life activities of the worm and indirectly the

compostability of the wastes. The amount of vermicompost by the worm activity depended primarily on the environmental factors and secondarily on the nature of organic wastes.

0301-247. Rampal Rajkumar, Sharma Deepshikha (Dept Environ Sci, Univ Jammu, Jammu 180006, J&K). **Utilization of unused biowaste for production of vermicompost. Himalayan J Env Zoo**, 16(1) (2002), 113-117 [11 Ref].

Paper describes how the unused biological waste material can be effectively used in vermicompositing, using earthworms. The compost produced by the vermicomposting of organic wastes, could be added to agricultural land to improve soil structure and fertility, for the growth of plants. Attempt has been made to produce vermicompost from the kitchen waste, Parthenium weed and Eichhornia (water hyacinth).

0301-248. Rangasamy VR, Subramanian V (Civil Engng Div, Dept Space, Bangalore - 94). **Treatment of wastewater from small and medium sized communities using root zone bed - a case study. J Indian Water Works Assoc**, 34(4) (2002), 291-300 [5 Ref].

For the treatment of wastewater produced from small and medium sized communities there is increasing interest in aquatic plant systems, which require very little or no electrical energy for their functioning. In one of the ISRO centres, an aquatic plant system - Root Zone Bed (RZB) has been established successfully for treating wastewater from a residential colony because of its advantages over Extended Aeration Systems (EAS). The paper also describes the performance of the RZB design parameters, and its capitals, operation and main tenance costs along with its merits and demerits over the EAS.

0301-249. Reddy RC (NEERI Zonal Lab, IICT Campus, Hyderabad 500007). **Rheological properties of sludges. J Indian Assoc Environ Manag**, 29(2) (2002), 102-109 [13 Ref].

Rheological properties are useful in accurate determination of friction loss in conduits carrying sludges. Depending on rheological properties, the fluids are classified as ideal fluids and real fluids. Paper presents the significance of rheological properties

with specific reference to transportation of sludges through closed conduits and work related to determination of friction losses.

0301-250. Sur MS, Olamiya MS, Pande SP (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Studies on changes in characterization of municipal solid waste due to composting.** *Env Conserv J*, 3(2) (2002), 37-42 [20 Ref].

Municipal Solid Waste (MSW) was composted aerobically for seven weeks. Physical and chemical parameters and eight heavy metals were analyzed in compost during the process of composting. Water extractable and available forms of metals were also estimated. It was observed that there was significant improvement in some physical and chemical properties during composting. There was reduction in availability and solubility of some potentially toxic metals like Cd, Cr, Pb, Ni and Zn. Composting of MSW can thus provide an environmentally safe product which can be used for soil amendment.

0301-251. Thangavel P, Rajannan G, Ramasamy K (Dept Environ Sci, Tamil Nadu Agricul Univ, Coimbatore 641003). **Evidence of hexavalent chromium in tannery waste contaminated soil.** *J Ecotoxicol Environ Monit*, 12(4) (2002), 291-297 [7 Ref].

In order to assess the transformation process involved in the chemistry of chromium, studies on adsorption kinetics and sequential extraction were conducted on oxisol, andept and alfisol soils using $K_2Cr_2O_7$ as source of hexavalent Cr and indicated more adsorption in oxisol due to its high kaolinite clay content and also due to its acidic nature (pH 4.2). Besides adsorption, the added Cr (VI) was considerably reduced by the presence of organic matter.

0301-252. Uma TS, Sandhya S, Sathyanarayana S, Kaul SN (Natl Environ Engng Res Inst, CSIR Complex, Taramani, Chennai 600113). **Biodegradation of pyridine from pharmaceutical wastewater using Bacillus consortia.** *J Indian Assoc Environ Manag*, 29(2) (2002), 76-82 [8 Ref].

A laboratory study was conducted to determine whether pyridine from pharmaceutical wastewater can be biodegraded by Bacillus consortia in an upflow aerobic fixed film reactor. The pharmaceutical wastewater containing 4200 mg L^{-1} of pyridine was tested and found that 86% of pyridine removal could be achieved at 0.5

kgTOC m⁻³ days⁻¹ loading rate at 16hrs hydraulic retention time. The parameters evaluated for the reactor, related to pyridine removal have been discussed.

0301-253. Veeresh H, Tripathy S, Chaudhuri D, Ghosh BC, Hart BR, Powell MA (Dept Geo Geophys, Indian Inst Techno, Kharagpur 721302). **Changes in physical and chemical properties of three soil types in Indian as a result of amendment with fly ash and sewage sludge.** *Environ Geo*, 43(5) (2003), 513-520 [48 Ref].

Mixtures with soil were prepared at different proportion of fly ash and sludge, either alone or in combination at a maximum application rate of 52 t ha⁻¹. The changes in the selected properties and heavy metal contents of three soil types in India were studied after incubating the respective mixtures for 90 days at near field capacity moisture level. Sewage sludge, due to its acidic and saline nature, high organic matter and heavy metals contents, had more impact on soil properties than the fly ash.

0301-254. Veeresh Mangala, Veeresh AV, Hosethi BB (Dept Zoo, SP Chowgule Coll Arts Sci, Margao 403601). **Combined treatment of chemical, pharmaceutical and cosmetic industrial effluents by waste stabilization ponds.** *J Environ Bio*, 23(4) (2002), 437-442 [24 Ref].

Influent and final effluent was collected from the CMM Ltd. Bethora, Ponda, Goa and were analysed for pH, DO, BOD, enzyme activity and chlorophyll content of the waste stabilization pond for over a period of two years of which the data for one year (pre monsoon, monsoon and post monsoon periods) is given. The study revealed that the DO was maximum during the pre-monsoon periods. Enzymatic activity was at its peak during the monsoons than during the other months.

Forestry and Environment

0301-255. Bhojvaid PP (NWFP Div, Forest Res Inst, Dehra Dun, Uttaranchal).

Medicinal plants based forest management : problems and prospects. (*The Indian Forester*, 129(1)(2003), 25-36 [13 Ref].

Many national and international organizations have opined that the sustainable management of medicinal plants has a potential for income generations and poverty alleviation provided that the resources are extracted sustainably. The characteristics features of medicinal plants are described and it is argued that some modifications are required in traditional forest management to make it suitable for management of medicinal plants in natural forests.

0301-256. Ghoshal Chaudhuri S, Pramanik SC, Dinesh R (Centl Agricl Res Inst, Port Blair 744101, Andaman). **Effects of land uses on tropical moist evergreen forest soils of Little Andaman.** *Indian J Soil Conserv*, 31(1)(2003), 92-94 [9 Ref].

Paper assesses the changes in soil chemical properties that have occurred in forest soils due to their use for arable and plantation crops in Little Andaman. It is concluded that clearing of forests and cultivation of paddy, vegetables and plantation crops could significantly reduce soil nutrient levels compared to soils under dense tropical evergreen rainforest in these islands.

0301-257. Jaiswal V, Bukhari MJ*, Khade SW, Gaonkar UC (*Dept Bot, Govt Coll Arts Sci Comm, Quepem, 403705, Goa). **Preliminary survey of arbuscular mycorrhizal association in mangrove vegetation of Goa.** *Plant Arch*, 3(1)(2003), 73-76 [10 Ref].

Studies were carried out on the arbuscular mycorrhizal status of seven dominating mangrove plant species from Goa. Only two of the seven plant species selected for the study, exhibited the presence of arbuscular mycorrhizal fungal colonization. Ten species of arbuscular mycorrhizal fungi belonging to three genera viz. *Acaulospora*, *Glomus* and *Scutellospora* were recovered during the study. *Glomus macrocarpum* Tulasne and Tulasne was the most frequently occurring species of AM fungi, associated with the rhizosphere soil of the mangrove species.

0301-258. Singh Jasbir, Bora Indrani P, Baruah Arundhati (Shifting Cultivation Div, Rain Forests Res Inst, Deovan, Jorhat, Assam). **Physico-chemical attributes of soil under jhum cultivation in Amphengiri (Burnihat), Meghalaya.** *Annals Forestry*, 9(2)(2001), 257-263 [30 Ref].

Study deals with the changes in soil nutrient status where forest vegetation was removed by slash and burn process. The soil pH significantly increased immediately after burning while it declined during cropping and harvesting cycle. Soil was found to be more acidic in natural forest. Organic carbon and total nitrogen decreased after burning and this depletion continue up to cropping and harvesting period. The recovery of the carbon was noticed in 10 year fallow.

Wildlife

0301-259. Ananda Kumar M, Singh Mewa, Srivastava Sanjay K, Udhayan A, Kumara HN, Sharma AK (Biopsychology Lab, Univ Mysore, Mysore 570006). **Distribution patterns, relative abundance and management of mammals in Indira Gandhi Wildlife Sanctuary, Tamil Nadu, India.** *J Bombay Natl Hist Soc*, 99(2)(2002), 184-210 [23 Ref].

Study reports the results from systematic sampling and six year of incidental encounters with wild mammals in Indira Gandhi Wildlife Sanctuary, Anaimalai hills in Western Ghats, Tamil Nadu, India. Elephants moved in dry season to the wet western ranges and back in the wet season to the dry eastern ranges. Tiger had a higher frequency in the wet forests, while that of leopard was higher in the drier forest types. The dry forests at lower altitudes were occupied by bonnet macaque and Hanuman langur, whereas the wet forests of the higher altitude were occupied by lion-tailed macaque and Nilgiri langur. The implications of the mammalian distribution pattern and other factors for the management of these hills are discussed.

0301-260. Bharatha Lakshmi B, Rao BT (Dept Zoo, Andhra Univ, Visakhapatnam 530003). **Mammalian fauna of Narsipatnam forest near Visakhapatnam, Andhra Pradesh.** *J Nature Conservator*, 14(2)(2002), 191-208 [23 Ref].

Paper deals with the systematic survey of the mammalian fauna of Narsipatnam Forest in the Eastern Ghats of Visakhapatnam. The survey was aimed at finding out the diversity of the mammalian fauna. Altogether 41 species of mammals belonging to 34 genera, 8 subfamilies, 19 families and 8 orders have been recorded. A checklist of the same has been presented along with the status and range of distribution. Some conservation measures have also been suggested.

0301-261. Choudhury Prasanta Kumar, Dewan Rituraj, Sengupta Saibal (Zoo Dept, Don Bosco Junior Coll, Azra, Guwahati 781017). **Study of golden langur (*Trachypithecus geei* Khajuria) in a new habitat, Umananda – a river island of Brahmaputra.** *J Nature Conservator*, 14(2)(2002), 209-213 [10 Ref].

Golden langur, a very rare and elusive species of primates was studied in the river island of Brahmaputra, Umananda. It was observed that a troop of five with one adult dominant male present in the island. The peak of activity was observed in morning and afternoon and the most important activity was observed to be foraging and feeding. The golden langur was found to consume 13 species of plants of the island and tender shoots and leaves of *Michenia* were most preferred food. Translocation of troops from their natural habitat to resist genetic drifting is suggested from the study.

0301-262. Joshi Ritesh, Joshi Himani, Verma JK (Dept Zoo Environ Sci, GK Univ, Hardwar 249404). **Crop depredation around Hardwar range by elephants (*Elephas maximus*) in the Rajaji National Park area, India.** *Nature Biosphere*, 6(1&2)(2001), 45-49 [8 Ref].

Due to rapid development in and around the city Hardwar in recent years, a number of developmental project have come up in the potential elephant habitats which has given rise to serious man-elephant conflict. As a result of which crop damage by elephants have become a serious problem around different parts of the Hardwar range of the Rajaji National Park area. From last two years the stray behaviour of the elephants around the park area is more common in comparison to few previous years. This paper projects the ambient conditions of arrival of elephant outside the park area and some preventive measures.

0301-263. Subba Rao MV (Dept Environ Sci, Andhra Univ, Visakhapatnam 530013). **Ecological studies of water otters, *Lutra perspicillata* at Coringa Wildlife Sanctuary, Andhra Pradesh.** *J Nature Conservtor*, 14(2)(2002), 225-232 [5 Ref].

The Coringa Wildlife Sanctuary is a major wetland ecosystem on the eastcoast of India. The coringa mangrove trees are ecologically significant as they form the habitat of otters, *Lutra perspicillata*. They are endangered and threatened mammals under Schedule-II of Wildlife (Protection) Act, 1972. The otters should be protected by conservation and management plans.

Energy and Environment

0301-264. Kashyap DR, Dadhich KS, Sharma SK* (*Energy Res Cent, Punjab Univ, Chandigarh 160014). **Biomethanation under psychrophilic conditions : a review.** *Bioresource Techno*, 87(2)(2003), 147-153 [43 Ref].

Anaerobic digestion of animal manure, sewage and other agricultural wastes at psychrophilic temperatures has not been explored as extensively as either mesophilic or thermophilic digestion, probably due to little anticipation of the development of economically attractive systems using this technology. This review discusses psychrophilic anaerobic digestion studies reported by various researchers using different substrates.

0301-265. Nair Preeti, Shukla RN (Samrat Ashok Technol Inst, Vidisha 464001). **A case study of energy and environmental performance of pulp and paper industry.** *Ultra Scientists Phyl Sci*, 14(3)(2002), 539-544 [7 Ref].

Paper outlines the major findings on the pulp and paper industry. The strategy put forward shows the energy consumptions and environmental performance. The study identifies and priorities major information gaps and needs about the current trends of CO₂ emissions, so as to access the level of awareness of environmental issues and resources. It also identifies available incentives and capacity for industrial management and potential of cleaner technologies and to examine and quantify the opportunity to promote industrial management and cleaner friendly technologies.

0301-266. Singh Jitendra, Jain Kavindra (Scientific Comm Prot Env, 46-A, Manas Nagar, Lucknow). **Biomethanation of fresh and dry leaves of Ipomea carnea.** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 255-264 [10 Ref].

Study deals with the utilization of Ipomea carnea, a weed having prolific growth potential but less utilized for biogas production by a modified multiphase high solid digester, which provides great compaction in comparison to conventional single phase digester. Fresh form of Ipomea carnea have shown better degree of compaction than with dry form. While biogas yield is more with dry form, biogas yield upto eight weeks is highest and reduced with the increase in time.

0301-267. Singhal V, Rai JPN (Dept Environ Sci, GB Pant Univ Agricl Techno, Pantnagar 263145). **Biogas production from water hyacinth and channel grass used for phytoremediation of industrial effluents.** *Bioresource Techno*, 86(3)(2003), 221-225 [25 Ref].

Paper reports on the biogas production from water hyacinth (*Eichhornia crassipes*) and channel grass (*Vallisneria spiralis*) employed separately for phytoremediation of lignin and metal-rich pulp and paper mill and highly acidic distillery effluents. Slurry of the two plants used for phytoremediation produced significantly more biogas than that produced by the plants grown in deionized water; the effect being more marked with plants used for phytoremediation of 20% pulp and paper mill effluent. Biogas production from channel grass was relatively greater and quicker than that from water hyacinth.

Plant and Pollution

0301-268. Agrawal Madhoolika, Singh Deepak S (Eco Res Lab, Dept Bot, Banaras Hindu Univ, Varanasi 221005). **Physiological and biochemical responses of two cultivars of wheat to elevated levels of CO₂ and SO₂, singly and in combination.** *Environ Polln*, 121(2)(2003), 189-197 [36 Ref].

Study was aimed at investigating the long-term influence of elevated concentrations of CO₂ and SO₂, singly and in combination on the physiological and biochemical characteristics of two cultivars of wheat (*Triticum aestivum* L. cv Malviya 234 and HP 1209). Stimulation of photosynthesis rate and reduction in stomatal conductance and transpiration rate were observed under CO₂ treatment. Concentrations of total soluble sugars, starch and total phenolics increased in response to CO₂ and CO₂+SO₂ treatments.

0301-269. Ahmad A, Inam A, Ahmad Iqbal, Hayat S, Azam ZM, Samiullah (Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Response of sugarcane to treated wastewater of oil refinery.** *J Environ Bio*, 24(2)(2003), 141-146 [14 Ref].

The crop of sugarcane (*Saccharum officinarum*) was grown at the agricultural farm of the Mathura Oil Refinery in a simple randomized block design. The plants gave better response to the treated wastewater (TW) than the groundwater. The soil receiving wastewater did not show any significant change in its physico-chemical characteristics. The soil accumulated all the heavy metals but the plant samples receiving TW only exhibited the present of Ni, Pb and Zn whose values are far below the premissible limits.

0301-270. Ajungla T, Sharma GD, Dkhar MS (Dept Bot, Nagaland Univ, Hqrs. Lumani, PB 12, Mokokchung, Nagaland). **Heavy metals toxicity on phosphatase activity of mycorrhizospheric soil of Pinus kesiya seedlings.** *Polln Res*, 21(4)(2002) 421-424 [11 Ref].

The accumulation of pollutants on the plant surface is a contributing factor to the forest decline. Phosphatase is thought to be directly related to the level of organic phosphorous in the soil. Phosphatases are also produced by ectomycorrhizal fungi. Root surface phosphatase activity has its relationship with mycorrhizal association and p-

uptake. Investigation was carried out to study the toxicity of heavy metals on phosphatase activity of mycorrhizospheric pine seedlings.

0301-271. Azad Shamim A, Siddiqui Bahar A, Khan Samiullah (Bot Dept, Amar Singh Coll, Srinagar, Kashmir). **Genotoxic effect of smoke as a pollutant on *Cestrum diurnum* Linn.** *Adv Plant Sci*, 15(2)(2002), 573-577 [13 Ref].

The abnormal growth of trees and failure of growing crops in the vicinity of thermal power house Kasimpur is indicative of the genotoxic effect of air pollution on plants. Miotic studies were carried out on *Cestrum diurnum* Linn. brought from the Kasimpur power station area. Chromosomal abnormalities like stickiness, bridges, laggards, precocious separation and cytoplasmic bridges were observed in considerable frequency.

0301-272. Barman Roy Samadrita, Bera AK (Dept Plant Physio, Bidhan Chandra Krishi Vishwavidyalaya, Mohanpur 741252). **Individual and combined effect of mercury and manganese on phenol and proline content in leaf and stem of mungbean seedlings.** *J Environ Bio*, 23(4)(2002), 433-435 [13 Ref].

Mungbean (*Vigna radiata* L. Witzcek) cv. Pusa Baisakhi seedlings were raised in individual (0, 1, 10, 100 and 1000 ppm) and combined solutions (1: 1, 10 : 1, 1 : 10 ppm Hg : Mn) of mercury and manganese for 6 days. Phenol and proline were found to accumulate in leaves in response to treatment with heavy metals. The magnitude of accumulation correlated with concentration of metals. However, a reverse trend was noticed in stem for phenol. Accumulation of phenol in response to heavy metal treatment was organ specific and occurred at higher rate in plant part, which faced the stress mostly.

0301-273. Barman Roy Samadrita, Bera AK (Dept Plant Physio, Bidhan Chandra Krishi Vishwavidyalaya, Mohanpur, West Bengal 741252). **Amelioration of mercurial toxicity by manganese I. A case study in mung bean seedling.** *J Environ Bio*, 23(3)(2002), 321-323 [8 Ref].

Mercury, a non essential element renders inhibitory effect on many physiological activities of plants even at a low concentration. Plants absorb Hg from soil through root system. Manganese, an essential element has been found to counter the inhibitory effect

of mercury mostly by preventing its uptake from soil. Mung bean grown in individual solution of Hg and Mn showed varied uptake of these heavy metals. However, in combined solutions mercury uptake was mostly prevented in presence of 10 ppm Mn, indicating its ameliorating effect.

0301-274. Bhati M, Singh G (Div Forest Eco Desert Dev, Arid Forest Res Inst, New Pali Rd, Jodhpur 342005). **Growth and mineral accumulation in Eucalyptus camaldulensis seedlings irrigated with mixed industrial effluents.** *Bioresource Techno*, 88(3)(2003), 221-223 [26 Ref].

Effect of mixed industrial effluents on growth, dry matter accumulation and mineral nutrient in Eucalyptus camaldulensis seedlings were studied. Paper evaluates the adaptability of E. camaldulensis to effluent, tolerance to excess/deficiency of mineral elements and ultimately to determine suitable combinations of industrial/municipal effluent for their use in biomass production in dry areas. Mixing of effluents is useful in tree irrigation to increase biomass productivity and reduction of toxic concentration of metal ions in effluents may be helpful for a long-term field application.

0301-275. Bhatnagar Mridula, Gupta Suruchi (Dept Chem, Govt Dungar Coll, Bikaner 334001). **Impact of dairy effluents on physico-chemical characteristics of soil.** *Asian J Chem*, 14(1)(2002), 300-304 [15 Ref].

The nature and quality of soil impaired by dairy effluents was assessed to ascertain the feasibility of use of the effluents for establishment and growth of trees and forage crops suited to the desert region. The impact of the effluents on soils was studied by examining the physico-chemical characteristics of soil (treated and virgin soil) in comparison to due standards use for irrigation of soils.

0301-276. Chandra Saurabh, Gupta SK (Cell Bio Div, Indl Toxic Res Cent, Lucknow 226001). **Genotoxicity of leachates of tannery solid waste in root meristem cells of Allium cepa.** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 225-234 [24 Ref].

Root meristem cells of Allium cepa have been used as a test model to evaluate the genotoxicity of leachates of tannery solid waste through aqueous and soil medium. Root tips, sampled after 48 h revealed higher frequency of aberrations in aqueous

medium in comparison of leachate-contaminated soil. Both the methods displayed similar type of mitotic and chromosomal aberrations and inhibited MI significantly.

0301-277. Chaurasia Bharti, Mahajan Surabhi, Chauhan SVS (Dept Bot, Sch Life Sci, Khandari Campus, Dr. BR Ambedkar Univ, Agra 282002). **Impact of automobile pollution on phenology and reproductive biology of *Cassia siamea* Lam.** *Indian J Environ Sci*, 6(1) (2002), 85-90 [21 Ref].

Reproductive biology of *Cassia siamea* plants growing at eight different sites on various important roads of Agra city was studied. The plants of this species growing at various sites showed significant variations in their floral morphology and reproductive biology which were found to be closely associated with the extent of air pollution caused by increasing number of automobiles.

0301-278. Dhankhar R, Khatri S, Dahiya JS, Sushma (Dept Biosci, MD Univ, Rohtak 124001). **Inhibition of nitrate reductase activity in some crop plants raised with sewage wastewater.** *J Ecophysiol Occupl Hlth*, 2(3&4) (2002), 235-242 [16 Ref].

Investigation was done on the inhibition of nitrate reductase activity in pot culture experiments of different crop plant species under different concentration of sewage wastewater collected from Rohtak city of Haryana. It has been revealed that all the crop plant species inhibited the nitrate reductase activity at both 50% and 100% sewage concentrations which could be due to high level of nitrogen or high salinity level in sewage wastewater. Nitrate reductase activity has been observed maximum in *Triticum aestivum* at 9% sewage concentration whereas minimum concentration in *Brassica campestris* at 100% sewage concentration.

0301-279. Dhingra HR (Dept Bot Plant Physio, CCS Haryana Agricl Univ, Hisar 125004, Haryana). **Agricultural production in soils polluted with heavy metals.** (*The Botanica*, 52 (2002), 112-125 [112 Ref].

Contamination of seeds with the heavy metals affect welfare of human beings and animals through their entry into the food chain. Recent investigations point to the effect of heavy metals of quantitative and qualitative male and female reproductive structures and sexual units, resulting in diminished crop yield.

0301-280. Ghouse Basha M, Vivekanandan M (Dept Bot Microbio, Jamal Mohammed Coll, Trichi 620020). **Response of Vigna mungo and Vigna unguiculata to inoculation of rhizobial strains from extreme environments on CO₂ fixation and morphometric parameters.** *J Ecophysio Occupl Hlth*, 2(1&2) (2002), 13-19 [13 Ref].

Rhizobial strains isolated and characterized from extreme environments such as virgin soil, polluted soil and saline soil with garden soil as control were employed as bio-inoculants. The rhizobial strains were isolated through root nodule-trap method and applied through seed-pelleting method to Vigna mungo and Vigna unguiculata. After 50 days of growth, the CO₂ fixation and morphometric parameters were analysed. Application of saline soil and virgin soil rhizobia augment the morphometric parameters.

0301-281. Hayat S. Ahmad Iqbal, Azam ZM, Ahmad A, Inam A, Samiullah (Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Longterm effect of oil refinery wastewater on crops yield, heavy metal accumulation in soil and crop produce.** *Polln Res*, 21(3) (2002), 293-303 [18 Ref].

Study was conducted on physico-chemical properties and heavy metal content of wastewater (TW), groundwater (GW) and the field soil that was irrigated with TW or GW. Moreover, the impact of TW on crop productivity, heavy metal status in the seed/grains, at harvest was also studied. Results indicate that the level of nitrate, phosphate, potassium, calcium, magnesium and sulphate in wastewater is comparatively more than of the ground water. The seed yield in mustard and wheat, irrigated with TW, was more than that with GW.

0301-282. Joshi OP, Sikka J (Dept Bot, PMB Gujarati Sci Coll, Indore 452001). **Floral response of some tree species to air pollution.** *Polln Res*, 21(4) (2002), 417-419 [12 Ref].

Flower of Cassia fistula, Delonix regia and Peltophorum inerme collected from polluted areas (textile mills, industrial area and roadsides) and the reference area (Agriculture College Campus) were studied for fresh and dry weights and per cent pollen germination. Maximum reduction in flower weights (fresh and dry) was noted in textile mill area and minimum at roadsides. Flower of P. inerme appeared to be more sensitive

to air pollution than others. Maximum reduction in per cent pollen germination was recorded in the industrial area in *D. regia* being the most sensitive.

0301-283. Jothimani P, Bhaskaran A (Dept Environ Sci, Tamil Nadu Agricul Univ, Coimbatore 641003, Tamil Nadu). **Effects of dilution and dynamics of physical factors during factory effluent irrigation.** *J Ecotoxicol Environ Monit*, 12(4)(2002), 255-261 [8 Ref].

A pot culture experiment was carried out to elucidate an appropriate dilution of dyeing factory effluent for irrigating agricultural crops such as cotton (MCU-5) and sorghum (Co-26) and to assess the changes in soil pH, electrical conductivity and organic carbon during dyeing factory irrigation. Results showed that the effluent could be safely used for irrigation at proper dilutions (25 and 50%) in combination with NPK.

0301-284. Misra Virendra, Pandey Shri Dhar (Ecotoxicol Sec, Indl Toxicol Res Cent, PB No. 80, MG Marg, Lucknow 226001). **Effect of distillery effluent and leachates of industrial sludge on the germination of black gram (*Cicer arietinum*).** *Polln Res*, 21(4)(2002), 461-467 [22 Ref].

Germination studies were conducted in the laboratory to investigate the effect of distillery effluent and leachate on the growth of *Cicer arietinum*. Seeds of *Cicer arietinum* exposed to the concentration of effluent (10 to 50%) and concentration of leachate of flash light factory sludge (5%) of 20% was found to be beneficial for the growth of root and shoot as compared to control. However, the concentration of effluent/leachate 100% was found to be inhibitory.

0301-285. Naidu KC (Dept Water Affairs, P/BAG 002, Maun, Botswana). **Influence of experimental crude oil spills on germination and primary growth features in certain commercial plants.** *J Ecotoxicol Environ Monit*, 12(4)(2002), 241-253 [36 Ref].

The primary objective of this investigation was to determine the lethal dose of experimental crude oil spills on *Oryza sativa* (paddy), *Phaseolus aureus* (greengram) and *Arachis hypogea* (groundnut) and to find out the associated changes in the physical properties of cultivable soil, oil mobility and growth of seedlings during germination period. The LC₅₀ values at the 7th day of germination were determined as 0.039, 1.63 and 2.56 lit. m⁻² for paddy, greengram and groundnut respectively. The oil mobility was

found to be more in well drained soils of greengram and groundnut than in water submerged soil of paddy.

0301-286. Neogy Mala, Datta Jayanta, Roy Amit Kumar, Mukherji Subhendu (Plant Physio Lab, Dept Bot, Univ Calcutta, Kolkata 700019). **Studies on phytotoxic effect of aluminium on growth and some morphological parameters of *Vigna radiata* L. Wilczek.** *J Environ Bio* 23(4)(2002), 411-416 [18 Ref].

Study deals with effect of aluminium toxicity on growth of mungbean (*Vigna radiata* L. Wilczek) seedlings. Seed germination (in %) declined with increased content of $Al_2(SO_4)_3$, while promotive effect was observed at very low dosage. Different concentrations of $Al_2(SO_4)_3$ was observed through scanning electron microscope.

0301-287. Pandey GC, Neraliya S (Dept Environ Sci, Dr. RML Avadh Univ, Faizabad 224001). **Distillery effluent induced alterations on the seed germination, seedling growth, chlorophyll and protein contents of bengal gram, *Cicer arietinum* Linn.** *Himalayan J Env Zoo*, 16(1)(2002), 77-81 [15 Ref].

Studies were made to assess the impact of distillery effluent on seed germination, and seedling growth (root and plumule length), of bengal gram, *Cicer arietinum* Linn. at various concentrations for different days, respectively. There was increment in above parameters at lower concentrations (10%, 20% & 40%) while a decrement was observed at higher concentrations (60%, 80%, and 100%) after exposure. It is concluded that chlorophyll and protein content are very sensitive to pollutants and thus can be used as bio-indicators of water pollution.

0301-288. Pathak Vishal, Singh Ritu, Singh SK, Pathak Prabhat (Dept Chem, Narain (PG) Coll, Shikohabad 205135). **Study of synergistic effects of heavy toxic metals on aquatic plants.** *Asian J Chem*, 14(3)(2002), 1094-1096 [5 Ref].

Effects of heavy metals on biological systems have created interest following the increase in global use of these elements. Synergistic effects of these heavy toxic metals have been studied and concluded that a number of factors like species, strain, concentration and time period of exposure affect the interaction between metals. The possibility of complex formation of any two metals cannot be ignored.

0301-289. Patra HK, Sayed S, Sahoo BN (Environ Physio Lab, Dept Bot, Utkal Univ, Bhubaneswar, Orissa 751004). **Toxicological aspects of chromium (VI) induced catalase, peroxidase and nitrate reductase activities in wheat seedlings under different nitrogen nutritional environment.** *Polln Res*, 21(3)(2002), 277-287 [14 Ref].

Seedling of wheat (*Triticum aestivum* L. cv Sonalika) were treated with different concentrations of hexavalent chromium ($K_2Cr_2O_7$). The plants were subjected to different nitrogen nutritional conditions. Various parameters for chromium toxicity of wheat seedlings were noted. NO_3 and the combination of $NO_3-NH_4^+$ was found to be protective in increasing the activities during early days of treatment. Lower concentration of chromium (0.001mM) increased the peroxidase activity of plants. Plants grown without nitrogen but treated with chromium, showed highest nitrate reductase activity.

0301-290. Prakash Govind, Gupta Vinay, Poonia Shefali, Sangita, Sharma Sujata (Dept Bot, CCS Univ, Meerut 250005). **Effect of sulphur dioxide exposure on the chlorophyll contents in *Raphanus sativus* L and *Brassica rapa* L.** *Plant Arch*, 2(2)(2002), 165-170 [8 Ref].

Three different concentrations of sulphur dioxide (320, 667 & 1334 $\mu g\ m^{-3}$) were used to fumigate the two different varieties, each of *Raphanus sativus* and *Brassica rapa*. Both chlorophyll a and b content decreased with increasing concentration, maximum decrease being at the highest concentration i.e. 1334 $\mu g\ m^{-3}$. Chlorophyll a showed more reduction than chlorophyll b.

0301-291. Radha S, Raju CV, Panigrahi AK (Lab Environ Toxicol, Berhampur Univ, Berhampur 760007, Orissa). **Toxic effect of solid waste from chlor alkali factory on pigments and photosynthetic rate, respiration rate in rice seedlings.** *Polln Res*, 21(3)(2002), 315-318 [10 Ref].

Toxic effect of solid waste from chlor-alkali factory on the pigment and Net Primary Productivity, respiration rate (NPP, R.R) in the rice seedlings were tested. After exposure to the solid waste an initial rise followed by a decline in pigments and NPP, R.R. were observed. The variation of different parameters were attributed to the dichotomous behaviour of the heavy metal mercury which was present in solid waste and the control set remained physiologically healthy through out the experimental period.

0301-292. Rai UN, Gupta DK, Akhtar M, Pal Amit (Ecotoxicology Bioremediation Lab, Natl Bot Res Inst, Lucknow 226001). **Performance of seed germination and growth of *Vicia faba* L. in fly ash amended soil.** *J Environ Bio*, 24(1)(2003), 9-15 [28 Ref].

The performance of *Vicia faba* L. in soil amended by different concentrations of fly ash has been studied. Results revealed that while fly-ash amendment to the soil improved the growth performance at initial stages with application of lower concentrations, it was inhibitory at higher exposure concentrations. Fly ash delayed the nodulation as lesser number of nodules was recorded at higher amendments.

0301-293. Salgare SA, Palathingal Trisa (Dept Bot, Inst Sci, Mumbai 400032). **Effect of industrial pollution at Sewri-Mumbai on the rate of pollen germination of successive flower of *Nerium odorum*-II.** *Plant Arch*, 2(2)(2002), 193-195 [5 Ref].

Potentiality of pollen germinability in *Nerium odorum* was noted in F and F-24 series. Pollen of F series collected from unpolluted area of Colaba and polluted area of Sewri-Mumbai showed their first sign of germination after one hour of sowing. However, the pollen of F-24 series collected from either sites required two hours to germinate. Industrial pollution inhibited the rate of pollen germination of successive flowers of *N. odorum*. It also inhibited the germination of pollen of either series.

0301-294. Salgare SA, Palathingal Trisa (Dept Bot, Inst Sci, Mumbai 400032). **Alteration in resting period of pollen of F-series of *Peltophorum ferrugineum* by industrial pollution at Sewri-Mumbai-II.** *Himalayan J Env Zoo*, 16(1)(2002), 129-132 [20 Ref].

Potentiality of pollen germinability in *Peltophorum ferrugineum* was noted in F series. Pollen of F series collected from unpolluted area of Colaba showed their first signs of germination after one hours of sowing. However, the pollen collected from the polluted side of Sewri-Mumbai required 6 hours to germinate. Industrial pollution inhibited the rate of pollen germination.

0301-295. Shrivastava Neerja, Joshi Sulekha (PG Dept Bot, Govt Coll, Kota 342001). **Effect of automobile air pollution on the growth of some plants at Kota.** *Geobios*, 29(4)(2002), 281-282 [3 Ref].

For healthy environment although more emphasis is now being given to check air pollution, certain plant species resistant to pollutants are being identified, so that such plant can be grown in polluted areas. To find out resistant species some morphological parameters of plants, growing in polluted and non-polluted areas are compared.

0301-296. Singh Anoop, Agrawal SB, Rai JPN, Singh Pratibha (Dept Bot, Allahabad Agricul Inst, Allahabad 211007). **Assessment of the pulp and paper mill effluent on growth, yield and nutrient quality of wheat (*Triticum aestivum* L.)**. *J Environ Bio*, 28(3)(2002), 283-288 [24 Ref].

Assessment of agropotentiality of the effluent coming out from Century pulp and paper mill, Ghanshyamdham, Lalkua (Uttaranchal) has been made on wheat (*Triticum aestivum* var UP-2329) crop grown in two soils differing in texture with different effluent concentrations. Diluted effluent increased the chlorophyll content, plant height, shoot and root biomass, grain yield, protein, carbohydrate and lipid contents in wheat grains, while undiluted effluent caused inhibition in plant growth resulting in a sharp decline of yield.

0301-297. Singh Lamabam P, Siddiqui Zaki A (Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Effects of fly ash and *Helminthosporium oryzae* on growth and yield of three cultivars of rice**. *Bioresource Techno*, 86(1)(2003), 73-78 [11 Ref].

A 120 day greenhouse experiment was conducted to study the effects of various fly ash concentrations (0%, 20%, 40%, 60%, 80% and 100% vol/vol) with normal field soil and *Helminthosporium oryzae* on the growth and yield of three cultivars of rice, *Oryza sativa* L. Application of 20% and 40% fly ash with soil caused a significant increase in plant growth and yield of all the three cultivars. Forty percent fly ash caused a higher increase in growth and yield than did 20%. Sixty percent, 80% and 100% fly ash had an adverse effect on growth and yield of all the three cultivars, the maximum being with 100% fly ash.

0301-298. Singh Lamabam P, Siddiqui Zaki A (Plant Patho Nemato Sec, Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Effect of *Alternaria triticina* and foliar fly ash deposition on growth, yield, photosynthetic pigments, protein and lysine contents of three cultivars of wheat**. *Bioresource Techno*, 86(2) (2003), 189-192 [14 Ref].

A greenhouse experiment was conducted to study the effect of *Alternaria triticina* with and without foliar dusting of fly ash on the growth, yield, photosynthetic pigments, protein and lysine contents of three cultivars of wheat, *Triticum aestivum*. Dusting of 2.5 and 5.0 g fly ash caused a significant increase in growth, yield, photosynthetic pigments, protein and lysine contents of all the three cultivars. Dusting, of 5.0 g fly ash caused a higher increase in the parameters than the 2.5 g dusting. However, dusting of 7.5 g fly ash had an adverse effect on growth, yield, photosynthetic pigments, protein and lysine contents.

0301-299. Singh PK, Tiwari RK (Soil Sci Div, Natl Botl Res Inst, Lucknow 226001).

Cadmium toxicity induced changes in plant water relations and oxidative metabolism of *Brassica juncea* L plants. *J Environ Bio*, 24(1)(2003), 107-112 [30 Ref].

Excess of cadmium (Cd) induced changes in oxidative scenario and water status of plants *Brassica juncea* grown in soil pot culture. Although lower and marginal levels of excess cadmium (100 and 250 ppm) improved growth but higher levels (500 ppm) caused significant suppression. Significant accumulation of proline, an indicator of water stress, occurred at higher level of Cd. The excess levels of Cd also decreased the concentrations of soluble protein and chlorophylls and increased the ratio of chlorophyll a/b.

0301-300. Singh VK, Behal KK (Fac Adv Std Life Sci, Chatrapati Sahu Ji Maharaj Univ, Kanpur 208024). **Effect of fly ash amended soil on growth of mulberry plant (*Morus alba*).** *J Ecophysio Occupl Hlth*, 2(3&4)(2002), 243-254 [34 Ref].

Study deals to assess the suitability of fly ash application with agricultural soil for plant growth and development. Result indicates that best growth performance was obtained at 25% fly ash application. After harvesting of plants, soil analysis results indicate that the soil pH decreased which showed the fly ash pH was slightly acidic in nature. The data indicate that fly ash has a great potential to be utilized as a source of macro and micronutrients for plant growth.

0301-301. Sinha Suchita, Mukherji S, Dutta Jayanta (Crop Physio Lab, Inst Agricl, Visvavarathi, P.O. Santiniketan 731236). **Effect of manganese toxicity on pigment**

content, Hill activity and photosynthetic rate of Vigna radiata L. Wilczek seedlings. *J Environ Bio*, 23(3)(2002), 253-257 [18 Ref].

Effect of different concentrations, of manganese sulphate ($MnSO_4, 7H_2O$) on chlorophyll, carotenoid pigment content and photosynthesis of mungbean seedlings was examined. Progressive increase in manganese sulphate concentration upto 5×10^{-3} M brought about a progressive decrease in total chlorophyll and chl a content. Chl b changed very little by excess manganese treatment. Hill activity of chloroplasts isolated from leaves of mungbean seedling and rate of photosynthesis in terms of CO_2 uptake showed progressive reduction alongwith the increase in concentration of the manganese.

0301-302. Solomon Deepika M, Khan TI (Indira Gandhi Cent HEEPS, Univ Rajasthan, Jaipur 302004). **Effect of simulated acid rain on physiological and bio-chemical parameters of Pisum sativum L. Sens ampl. var. Azad P-1.** *Indian J Environ Sci*, 6(1)(2002), 81-83 [15 Ref].

The seedlings of *Pisum sativum* L. tolerated simulated acid rain exposure down to pH 2.2. Below this the seedling growth was reduced and the seeds succumbed at pH level 1.2 and pH 0.5. A reduction of about 48.7% in root length and 67.3% in shoot length was observed between pH 6.8 (control) and pH 2.2. The shoot dry weight showed a reduction of 48.5% while root dry weight decreased about 56.4%.

0301-303. Thangarasu S, Gopalkrishnan V, Sebastian Rajasekaran C (PG Res Dept Environ Sci, Bishop Heber Coll, Tiruchirapalli 620017). **Evaluation of certain plants for their tolerance to cement kiln-dust emitted from Ariyalur cement factory.** *Geobios*, 29(2&3)(2002), 105-108 [17 Ref].

The high resistant and sensitive plant species were identified in the vicinity of a cement factory in Ariyalur, through the determination of air pollution tolerance index (APTI) using four leaf parameters. The result indicated that out of fifteen woody plant species only eight were found to be resistant to cement kiln dust pollution.

0301-304. Thangavel P, Balagurunathan R (Dept Environ Sci, Tamil Nadu Agricul Univ, Coimbatore 641003). **Effect of tannery effluent on germination and growth of certain crop plants.** *Bull Pure Appl Sci*, 21B(1)(2002), 21-25 [10 Ref].

Dilution of Tan Yard effluent at 75 times showed the highest germination percentage in all the crops tried, but 50 times diluted TYE showed the maximum shoot and root lengths. The inhibition and promotion in both germination and growth is due to high and low salt concentrations at lower and higher dilution respectively and the increased length of root and shoot might be due to the nutrients contained by the effluent. In this study, salinity dominated the toxic constituents like chromium in deciding the crop growth, because of this reason, TYE showed better performance.

0301-305. Tomer BS, Tomer SK, Singh Yogendra (Triveni Engng Ind Ltd, Khatauli 251201). **Studies on the impact of distillery waste on seed germination of sunflower in Western U.P.** *J Nature Conservator*, 14(2)(2002), 233-236 [9 Ref].

Paper discusses the physico-chemical characteristic of distillery effluents and the effect of its various concentrations on the seed germination of *Helianthus annuus* Cv Ec 68413 in Western Uttar Pradesh. High temperature, acidic pH, excessive quantities of inorganic salts, organic matter and total solids in the spent wash caused soil salinity and high osmotic pressure of the soil solution after irrigation and decreased the seed germination drastically.

0301-306. Trivedi GK, Shukla Om Prakash (Birbal Sahni Inst Palaeobotany, 53-Univ Rd, Lucknow 226007). **Role of microflora in environment monitoring and pollution control.** (*The Botanica*, 52(2002), 83-87 [18 Ref].

Microflora usually comprises of unicellular and multicellular microscopic organisms, widely distributed in air, water, soil, dead matter and within the living organisms. Microbes have industrial applications which involve oxidation, reduction, isomerisation, hydrolysis and condensation. They play an important role in human welfare activities and environmental application such as in waste water treatment, sewage treatment, reduction of pollution load in water bodies and environmental biotechnology.

0301-307. Veliappan A, Melchias G, Kasinathan P (Dept Bot, AVVM Sri Pushpam Coll, Poondi, Thanjavur 613503). **Effect of heavy metal toxicity on the nodulation pattern of legume cultivars.** *J Ecotoxicol Environ Monit*, 12(1)(2002), 17-20 [9 Ref].

Tests were performed in pots with five legume cultivars viz. *Vigna unguiculata*, *Vigna mungo*, *Vigna radiata*, *Macrotyloma uniflorum* and *Lablab purpureus* to study the

effects of heavy metal toxicity on nodulation and growth. Heavy metals used were aluminium and mercury. Among these two heavy metals which were tested at the same molar concentration of 100mM, mercury was found to be more toxic than aluminium. Tests were also performed to study the reversal of the inhibitions and disorders caused by heavy metal toxicity. Calcium supplementation proved to show positive results in this process.

0301-308. Wagela DK, Pawar K, Dube B, Joshi OP (MP Polln Contl Bd, Indore 452010). **Lead monitoring in air, soil and foliar deposits at Indore city with special reference to automobile pollution.** *J Environ Bio*, 23(4)(2002), 417-421 [22 Ref].

Ambient lead levels in air, soil and dust deposits on selected plant species at ten distinctly located sampling stations of Indore city are presented. The maximum lead level in air was recorded at Palasia, where the traffic density was found to be the highest. Out of the plant species studied, the maximum lead was recorded on *Dalbergia sissoo* leaves. A possible relationship between leaf morphology and dust accumulation tendency is also discussed.