

Environmental Management

9202-001. Agrawal GD, Haq-Saleem-ul, Islam Md Anwar-ul (Envirotech East (Pvt) Ltd, 97-C Harish Mukerjee Rd, Calcutta -700026). **Sharpening the EIA tool to handle socio-economic issues of developing projects.** *Indian J Environ Prot*, **11** (10) (1991), 755-760 [10 Ref].

EIA often creates more controversies and conflicts and does little to help improve environment compatibility of the project and social acceptability of the decisions based on the findings and recommendations of the EIA document. This paper tries to examine some of the reasons of this poor performance of the EIA process and to suggest some modifications in the approach to, and methodology of, carrying out EIAs particularly in respect of major development projects in South Asia.

9202-002. Bhattacharya Ira (Dept Biotechno, Block No-2, CGO Complex, New Delhi-110003). **Role of biotechnology in pollution control.** *Illustrated Biodigest*, **4** (5&6) (1990), 97-100.

Paper presents an overview of the role of biotechnology in pollution control, some safety and legal issues and provide basis for taking up studies in environmental biotechnology. It was suggested that there is a need to understand and explain toxicity by biology and not necessarily by increasing sensitivity in chemical analysis and also for bridging the gaps and reaching across disciplines and scientific public policy aspects of the nationally important area of environmental biotechnology.

9202-003. Deshmukh SN (Div Product Dev, Hindustan Insecticides Ltd, New Delhi.) **Environmental impact of use of pesticides and strategies for their safe use.** *Fusion Asia*, **8** (1) (1992), 25-28 [6 Ref].

Paper discusses about the improper uses of pesticides and the measures for their safe use. It stresses for creating an awareness about the hazards of pesticides in public through training of workers and through field demonstrations, mass Media, Krishi Melas etc. Roles of pesticides organisations in manufacturing, formulating and selling agencies is also discussed. As long term measures it advocates for ecologically safe pesticides, environmental surveillance, medical surveillance etc.

9202-004. Devraj Urs KC (Dept Entomo, Univ Agric Sci, Bangalore 560065). **Pesticides, their residues and environmental hazards.** *Indian J Environ Toxicol*, **1** (1) (1991), 33-38 [29 Ref].

Paper discusses the historical evolution of pesticides in India, amount of residues of pesticides in fruits & vegetables, cereals and pulses, milk and human milk. The environmental hazards due to use of pesticides are also discussed. Paper suggests for the use of minimum quantities of pesticides combined with other suitable and safer control measures.

9202-005. Jha Kulanand (Dept Civil Engng, MME Engng Coll, Gorakhpur 273001). **Effect of pollution on the geotechnical properties of soils with industrial reference of eastern UP.** *J Environ Res*, **1** (2) (1991), 23-27 [6 Ref].

Due to massive increase in population and rapid industrialisation, construction is made on limited available land made of fill materials and being used for sanitary and industrial wastes disposal due to lack of proper environmental planning. It has been observed that due to these pollution environment most important civil engineering material loses its geotechnical properties. Also the downwind direction of the chimnies of cement factories surface soil are stabilized and become non-plastic compared to subsurface soil and ultimately turn alkaline due to particulate and gaseous pollutants coming out of chimnies. Massive plantation of shrubs and trees are in progress to preserve the soils from ultramodern industries.

9202-006. Kumar Vikas, Choudhury KD (Metallurg-Engng Consultants (India) Ltd, Environ Engng Sec, Ranchi 834002). **A survey of stability classifications in the boundary layer.** *Indian J Environ Prot*, **11** (10) (1991), 721-726 [17 Ref].

The methods available for determining stability in the boundary layer are examined and assessed of their suitability based on physical soundness and availability of data under normal Indian conditions.

9202-007. Modak Prasad (Cent Environ Sci Engng, Indian Inst Techno, Powai Bombay 400076). **PC applications for environmental management in industry.** *UNEP Ind Env*, **14** (3) (1991), 2-5 [5 Ref]

Some emerging applications of personal computers for the environmental management of industry are reviewed. These include computationally intensive,

information-oriented and graphics-based applications, as well as applications involving real-time communications and control. Some software products are mentioned.

9202-008. Nyati KP, Chandak SP (Natl Productivity Coun, New Delhi-110003). **Managing pollution from small enterprises.** *Productivity*, **32** (2) (1991), 306-308.

Several steps and approaches have been given for effective implementation of pollution control in industries. The prevalent approach towards industrial pollution control is biased towards curative or end-of-the-pipe measures. Consequently, pollution control is looked upon by the industries as a costly burden which needs to be circumvented. The existing policies are neither conducive to the type of industries we have in our country nor to our resource scarce economy. More so, the small scale industries presently are treated almost at par with the large scale industries in terms of mandatory pollution control requirements. A shift is essential if SSI units have to be made responsive to the compulsions of maintaining clean environment.

9202-009. Saigal RS. **Pollution control Acts and Rules.** *Gas News*, **14** (4) (1991), 19-23.

The paper summarises various Acts and Rules as well as amendments framed by Govt. of India for prevention and control of pollution and preservation of environment. Besides this, standards for ambient air quality, noise, mass emission standards for petrol driven vehicles have been dealt in brief.

9202-010. Singh RK, Sethi N, Trivedi SP (Div Toxicol, Centl Drug Res Inst, Lucknow 226001). **Risk assessment and management of pesticides.** *J Environ Res*, **1** (2) (1991), 7-15 [7 Ref].

In modern agricultural practice, more pesticides are used than needed, to replace the nutrients removed by cropping. But the increasing intensive pesticide use has resulted in side effects on the biotic flora and fauna, including man. Paper, have discussed the risk assessment and pesticide management in general.

9202-011. Srivastava Ranjana, Sinha Usha, Srivastava RK (Dept Edn Engng, Allahabad, UP). **An evaluation of environmental education and note of NGOs in Uttar Pradesh Schools.** *Proc Int Conf Rural Water Supply Sanitation Developing Countries*, 4-7 January 1992, Nagpur, 83-85.

This paper discusses the present status of environment education in Uttar Pradesh Schools, with reference to its importance, usefulness and effectiveness in rural water supply and sanitation programmes. Voluntary agencies have a very important role to play, as through these organizations, effective transfer of education specially health, hygiene? sanitation, importance of acquiring and maintaining suitable source of drinking water, etc., is possible in rural areas.

9202-012. Sudhakar P, Ramesh P (Indian Inst Techno, Dept Cheml Engng, Madras 600036). **Environmental population resources nexus-an overview.** *Indian J Environ Rrot.* **11** (10) (1991), 750-759 [9 Ref].

In his quest to create a more comfortable environment for himself, man has done irreparable harm to natural environment of earth and has created undesirable ecological imbalances. This paper is to implore how and what each actions of man have created the present imbroglgio of conditions and its consequences for the human society.

9202-013. Tiwana NS (Centl Polln Contl Bd, East Aqun Nagar, Delhi 110032). **Water resource management-quantity and quality aspects.** *Proc Int Conf Rural Water Supply Sanitation Developing Countries*, 67, January 1992, Nagpur, 6-17.

The Central Pollution Control Board has classified the Indian rivers according to their uses to identify the water quality objectives of different water bodies. Now through an extensive water quality survey and monitoring programme, the Board has identified the stretches of the water bodies which are in need of improvement and the extent of improvement needed with respect to different water quality parameters. These exercises ultimately will lead to formulation of a rational and sound water pollution control programme.

9202-014. Vasantha kaalam Hilda-(Hilton School of Manage, Inst of Soc Sci Res, Greenwoods, Jabberpet, Vellore 632006). **Environmental concern for tourism planning in India.** *Encology*, **6** (1) (1991), 15-18 [16 Ref].

Present paper highlights the concept and inter-relationships of tourism and environment and impact of tourism on environment. Is sues like tourism planning for environmental development and conservation of natural and cultural inheritance have been discussed and a careful, conceived plan integrating tourist infrastructure and super structure facilities in view to homogenise and blend with environment is advocated.

9202-015. Yellappa Reddy AN (Forest Res Utilisation, Karnataka). **Information system and assessment of bioproduction and management in dryland eco-system.** *Myforest.* **27** (4) (1991), 375-384.

An attempt is made to assess the maladies in dry land eco-system and the integrated management systems required to restore the ecosystem while increasing the bio-mass production with low external inputs. Vegetational cover has profound favourable effects on physical properties of soil and also has moderate effect on micro-climate. Good tree cover regulates physical, nutritional and chemical properties of soil while supporting it.

9202-016. Yogamoorthi A (Cent Future Std, Sch Int Std, Pondicherry Univ, Pondicherry 605014). **Present status of environment in Asia and its future trend.** *Encology,* **6** (1) (1991), 19-23 [10 Ref].

The common theme of sustainable development is the need to integrate economic and ecological considerations in. decision making. This article explains some of the critical environmental problems like deforestation, desertification, threatening dam projects, aquatic and atmospheric pollution prevalent in the Asian continent. Each such problem is discussed with illustrations drawn from different Asian countries; A futuristic outlook has also been made on such irreversible environmental drift.

Air Pollution

9202-017. Chakraborty SN (Environ Sec, Civil Engng Dept, Jadavpur Univ, Calcutta 700032). **Development of a kerb side air quality-model for the city of Calcutta.** *J Inst Publis: Hlth Engrs, India,* **1991**(3) (1991), 1-10 [23 Ref].

A kerbside air quality model has various uses. Such a model can be used to assess current concentration pattern of primary vehicular pollutants in cities and to predict the effects of changes in exhaust emission controls; City planners can couple the air pollution model to existing traffic forecasting models and thereby gain insight into the air pollution model. This paper reports on the development of a kerbside air quality model for the city of Calcutta where air pollution problem has assumed an alarming proportion.

9202-018. Datta Ratan R (Dept Sci Techno, New Delhi-110016). **Green -house effect and climate.** *Vayumandal*, **21** (3 & 4) (1991), 83-90.

The green house effect and its impact on climate are discussed. While describing two schools of thought on the impact of green house gases, strategies to strive and to understand how to minimise or eliminate the impact of human society on climate are suggested. An action plan to combat global warming without hampering the development plans adopting a balanced approach is advocated.

9202-019. Datta Tanima R, Jain AK (Jiwaji Univ, Gwalior). **Certain biocomponents in the air of an industrial area at Gwalior.** *Indian J Aerobiology*, **3** (1 & 2) (1990). 45-47 [7 Ref].

Present study deals with the survey of certain biocomponents, other than pollen and fungal spores, in the air of an industrial area of Gwalior. It was observed that these components also contribute a lot in the air along with abiotic components with fluctuating amount during various months.

9202-020. Datta Tanima R, Jain AK (Sch S(d Bot, Jiwaji Univ, Gwalior 474011). **Aerobiological studies at Gwalior-fungal spores in textile mill area.** *Bionature*, **11** (2) (1991) 77-81 [9 Ref].

Fungal spores of an industrial area have been studied from October, 1987 to April, 1988. Several types of fungal spores including Alternaria, Aspergillus, Bipolaris, Haplospora etc., were trapped over the slides. Maximum spores were recorded in January and minimum in March. A correlation has been made between occurrence of spores and climatic factors.

9202-021. Deborrah S Paul Mary, Muthusubramanian P (E Univ, Dept Env, Sch Energy, Env Natural Resources, Madurai, 625021). **Airborne lead in the environment of Madurai.** *Indian J Environ Prot*, **11** (11) (1991), 817-821 [7 Ref].

Concentration of air borne lead have been determined at urban road sites and also in residential areas of Madurai city, South India over both 8 hr and 24 hr sampling periods. The concentration of lead have been analysed using US-EPA method. The values of 8 hr sampling were always higher than 24 hr sampling. The levels of Pb measured near to traffic points or near to road side are higher than the sites which are away from traffic area.

9202-022. Kandpal JB, Maheshwari RC (Indian Inst Techno, Cent Rural Dev Appropriate Techno, Hauz Khas, New Delhi 110016). **Gaseous and particulate emission estimation from biomass combustion.** *Indian J Environ Prot*, **11** (9) (1991), 693-695 [6 Ref].

Biomass fuel during its combustion produces a number of components which are released in the environment. Carbon monoxide, carbon dioxide, nitrogen oxide and particulate are the main pollutant of biomass combustion. During the present study carbon monoxide and carbon dioxide were determined by gas chromatography while nitrogen oxide was determined spectrophotometrically.

9202-023. Mahadevan TN, Sitaraman V, Mohan Rao AM, Negi BS, Pandit GG, Meenakshy V, Nambi KSV (Environ Assessment Div, Hlth Phys Div, Bhabha Atom Res Cent, Bombay 400085). **Impact of the Gulf oil well fires over the Indian subcontinent: an environmental assessment study.** *Encology*, **6** (2) (1991), 1-5 [10 Ref].

The study attempts at a first approximation evaluation of the environmental impact over India of the continuous burning of oil wells in the Gulf region. The results indicate marginal increase in atmospheric turbidity at distances 2000 km. to cause any major changes in the mean surface temperatures or weather pattern over the Indian subcontinent. The concentration ratio of vanadium and nickel in aerosol samples from the BARC site at Bombay-do not indicate any additional contribution from the oil well combustion source. The sulphur levels are also within the normal variations observed. Oil and grease levels in seawater samples collected around the Bombay coast do not show any abnormal concentration typical of oil slicks.

9202-024. Meenakshi Thanga, Mahadevan Anandavalli (Cent Future Std, Madurai Kamaraj Univ, Madurai 625021). **Ambient air quality in Madurai city.** *Polln Res*, **10** (3) (1991), 161-164 [5 Ref].

Study reports results of an ambient air quality survey in Madurai city of south India SPM concentration varied from 200 to 500 $\mu\text{g}/\text{m}^3$, NO_2 from 50 to 170 $\mu\text{g}/\text{m}^3$ and SO_2 from 10 to 25 $\mu\text{g}/\text{m}^3$.

9202-025. Mukherjee S, Ray MK (Dev Consultants Ltd, Enviroprotection Div, 24 B, Park St, Calcutta 700016). **Significance of humidity on ambient SPM dispersion-macro and micro level case studies.** *Indian J Environ Prot*, **11** (9) (1991), 683-688 [6 Ref].

Quantitative effects of the 3 major meteorological parameters, namely relative humidity, solar radiation and wind speed on the level of suspended particulate matter in ambient air have been investigated. It has been observed that apart from solar radiation and wind speed, the effects of which on the transport of air pollutants have already been well established, the relative humidity of the ambient air also plays a dominant role on the concentrations of suspended particulate matter in ambient air and thus could form a significant parameter in the dispersion and modelling studies.

9202-026. Rao IN, Rao PR, Rao MH (Natl Thermal Power Corpn, Dept Environ Engng, Core-6, 7th Floor, Scope Complex, Lodi Rd, New Delhi-110003). **A statistical analysis of ambient air quality data.** *Indian J Environ Prot*, **11** (10) (1991), 771-773 [2 Ref].

The Ramagundam Super Thermal Power Project is located in the vicinity of south Godavari coal field of Karimnagar district of Andhra Pradesh. In order to assess the state of the environment during the operation of the plant, the monitoring programme was undertaken. A statistical analysis of variance for the ambient air quality collected during the period 1986-89 was done to assess the impact on the environment in the township due to the operation of the plant.

9202--027. Saha AK (Inst Radiophys Electronics, 92, Achdya Prafulla Chander Rd, Calcutta 700009). **History of the atmosphere and the greenhouse effect.** *Sci Cult*, **57** (5&6) (1991), 103-111 [15 Ref].

An outline is given of how greenhouse effect, due to the atmospheric gases, has maintained a conducive environment for life to evolve and survive, along with changing luminosity of the sun. Comparisons are made with the neighbouring planets Venus and Mars. Some speculations are made as to whether changes in global temperature, in the last 10 centuries or so, were due to solar luminosity variations associated with solar activity cycles.

9202-028. Sen Roy N, Prasad K (Meteorol Office, New Delhi. 110003). **Climate change and global scientific response.** *Vayumandal*, **21** (3 & 4) (1991), 69-82 [9 Ref].

The scientific effort needed for predictive understanding of the different factors that influence climate and the mechanism through which they interact with climate is so

stupendous that it is beyond the capacity of a single country to handle the problem alone and in isolation. Present paper outlines the salient features of climate change and the response of the global scientific community to this problem.

9202-029. Singh AB, Chatteni M, Singh BP, Gangal SV (Coun Scient Indl Res, Cent Biocheml, Delhi Univ Campus, Delhi). **Air borne viable fungi in library: before and after agitation of books.** *Indian J Aerobiology*, **3** (1&2) (1990), 32-38 [8 Ref].

A survey of airborne viable fungi was carried out for two consecutive years (Jan. 1988-Dec. 1989) in V.P. Chest Institute Library, Delhi. Samples were collected at fortnightly intervals in different sections of the library, using Andersen Volumetric Sampler. The sampler was operated for 10 mts each time, before and after agitation of books. Six major types are analysed for their prevalence and variation in the concentration before and after agitation of books. A total of 39 fungal forms were identified.

9202-030. Singh Alka, Singh AB, Bhatnagar AK, Gangal SV (Coun Scient Indl Res, Cent Biocheml, Delhi Univ, Delhi). **Prevalence of aspergilli in a bakery environment.** *Indian J Aerobiology*, **3** (1 & 2) (1990), 15-21 [20 Ref].

Air spora of a large bakery- was studied from April 1989 to March 1990 using Andersen Six Stage Volumetric sampler. Altogether 71 fungal forms were isolated. A detailed analysis of the 16 species of *Aspergillus* encountered in the bakery is presented.

9202-031. Tewari Archana, Shukla NP (Harcourt Butler Technol Inst, Cheml Engng Dept, Kanpur 208002). **Scrubbing of sulphur dioxide in sparged columns by potassium hydroxide solutions.** *Indian J Environ Prot*, **11** (11) (1991), 826-829 [9 Ref].

Article deals with the sulphur dioxide reduction using absorption with chemical reaction in the liquid phase. Sulphur dioxide-air mixture as the gas phase and potassium hydroxide solution in the concentration range of 6 to 1120 g/l as the liquid phase were used. Sulphur dioxide reduction varied from 90 to 99.5% depending upon the alkali concentration, liquid volume and the gas velocity in most of the cases.

Water Pollution

9202-032. Banerjee Anup K, Pathak Vandana (Chem Dept, Dr HS Gaur Vishwavidhyalaya, Sagar 470003). **Water quality of some representative coal mines of Madhy'a Pradesh.** *Proc Natl Acad Sci India*, **61** (A) (3) (1991), 445-446 [7 Ref].

The water quality index of some representative coal mines of Madhya Pradesh has been determined on the basis of studied physico-chemical parameters, which included total dissolved solids, turbidity, total hardness, chlorides, biological oxygen demand, dissolved oxygen, total alkalinity and pH.

9202-033. Bhole AG (Dept Environ Engng, Visvesvaraya Regl Coll Engng, Nagpur 440011). **Package defluoridation plant for rural areas.** *Proc Int Conf Rural Water Supply Sanitation Developing Countries*, 4-7 January **1992**, Nagpur, 37-41 [1 Ref].

Ground water with high fluoride concentration required treatment to reduce the same to the required level. The Nalgonda process is one of the well-known processes for removal of excess fluorides. A low cost and easy to operate package treatment plant has been described to treat high fluorides in water.

9202-034. Billore SK (Sch Std Bot, Vikram Univ, UBain 456010, MP). **Nitrate removal in a shallow pond by flooded vegetation.** *J Indian Botl Soc*, **69** (3 & 4) (1990), 231-232 [8 Ref].

Present study evaluates the denitrifying role of two dominant native plant species of a dried pond in nitrate removal when the pond gets flooded with water in the rainy season. The denitrifying role was detected in the laboratory by NO_3^- -N loss in waterlogged soil before and after-incubation at 28°C amended with fine powder of plant species as carbon source and KNO_3 for external NO_3^- N; and a control. The work indicated that the native dead plant species when water-logged remove 94% of the added NO_3^- N.

9202-035. Borgaonkat SS, Gokhble KS (B N Bhandodkar Coll Sci, Thane 400602). **Distribution of copper, zinc, cadmium and lead in Thane Creek and its relation with textural types and organic carbon.** *J Environ Bio*, **13** (1) (1992), 39-45 [16 Ref].

The seasonal changes in intertidal sediments were studied for one year (1984-1985) from two stations. The high concentrations of Cu and Zn were found in premonsoon and monsoon while Pb and Cd in high concentrations in monsoon and post

monsoon. Cu and Zn absorb in silt and clay which was highly significant with organic carbon while Cd and Pb were highly significant with sand.

9202-036. Dayal Gopal, Singh RP (Chem Dept, St Johns Coll, Agra 282002). **Heavy metal contamination of ground waters in Agra city (UP) India.** *Proc Natl Acad Sci, India*, **61** (A) (4) (1991), 569-572 [12 Ref].

Groundwater sample of Agra city were tested to ascertain the existing levels of heavy metals, viz. Cd, Cr, Cu, Ni, Pb, Zn, Fe and Mn besides other physico-chemical parameters and bacteriological quality in order to evaluate the suitability of groundwaters of this city for potability.

9202-037. Dhawan S, Srivastava SC (Dept Zoo, Lucknow Univ, Lucknow 226007). **Pesticide residue analysis of water samples collected from a village experimental pond.** *Env Eco*, **9** (43 (1991), 854-856 [3 Ref].

A village tank was studied for the pesticide residues using gas liquid chromatograph. Alpha, beta and gamma BHC isomers were present in samples collected prior to BHC dusting in adjacent field. The concentration of alpha and beta BHC increased while gamma BHC decreased in samples collected in winter.

9202-038. Gupta Bharat B, Kumar Sanjay (PG Dept Zoo, DS Coll, Aligarh UP). **Bacteriological quality of Aligarh waters.** *J Ecobio*, **3** (2) (1991), 152-156 [20 Ref].

The quantitative analysis of coliform, bacilli in general and specifically Escherichia, E. Coli, Streptococcus faecalis, Leptothrix, and Zoogloea in sewage, pond and underground waters have been done. Poor sanitation and seepage of sewage contaminate even underground water. Proper sewer system treatment of sewage before disposal and sterilization of vegetables before marketing are suggested.

9202-039. Ioshi AB, Parashar RK (Centl Water Comm, Sewa Bhawan, RK Puram, New Delhi 110066). **River water quality sampling: a systematic approach.** *Proc Int Conf Rural Water Supply Sanitation Developing-Countries*, 4-7 January 1992, 151-153 [3 Ref].

River water quality is monitored by various organisations in the country. It is necessary to formulate guidelines that can be adopted uniformly by all the concerned agencies. Considering the experimental data collected by the Central Water Commission (CWC) on the spatial variation of water quality parameters in natural rivers, a procedure

has been evolved for water quality monitoring, and subsequently endorsed by an Expert Committee. Some aspects of this procedure are discussed in this paper.

9202-040. Kannan N, Rajasekaran N, Vallinayagam P (Aiyander Janaki Ammal Coll, Dept Chem (PG), Sivakasi 626124). **Multivariate corelation analysis of water quality parameters of industrial effluents, I match industry.** *Indian J Environ Prot*, **11** (11) (1991), 857-860 [5 Ref].

Multivariate correlation analysis of water quality parameters have been carried out for the characterestic parameters of match industry effluent (sample A and B). The results indicate that there exists large positive correlations of total hardness with that of temporary and permanent hardness, electrical conductivity-total dissolved solids and water quality index values are also correlated with that of anions and cations. Multiple linear regressions equation obtained. These are found to be statistically significant and highly useful in predicting the water quality parameters. Multivariate correlation analysis of water quality parameters of industrial effluents provides an efficient tool for the rapid monitoring of the quality of industrial effluents.

9202-041. Mishra BK, Singh KP (Dept Zoo, MJK Coll, Bettiah 845 438). **Water analysis of some ponds of Sitamarhi distt, in relation to the production of fishes.** *Bull Environ Sci*, **8** (1989), 33-35 [13 Ref] (Late Pub).

Certain ponds of different regions of Sitamarhi district was studied from the fish production point of view. In Sitamarhi distt. there are in numberable ponds for pisciculture purpose but the production is very low. Hence in order to identify the problems which are responsible for low production of fishes, this project has been taken. In this project the water from the different zones of the district was collected and physico-chemical analysis were made and to what extent these waters were suitable for the increase of fish production was assessed.

9202-042. Mishra Ganga Prasad (Govt HS School, Bhad 484336). **Impact of industrial pollution from a cement factory on water quality parameters at Kymore.** *Env Eco*, **9** (4) (1991), 876-880 [12 Ref].

Cement dust when comes in contact with water forms hydroxides which impaired natural water alkalinity. The additions of salts of Ca, Na, K, Mg and Al as hydroxides, sulfates and silicates formed varied hardness of water. All these are responsible for the respiratory and gastro-intestinal diseases of the area around be cement factory.

9202-043. Mohanty RK, Padhan S, Sarangi B (Ispat Coll, Dept Bot, Rourkela 769003). **Some metal pollutants in bottom sediment of polluted water.** *Indian J Environ Prot*, **11** (11) (1991), 813-816 [14 Ref].

Concentration of 7 metals and some environmental parameters have been studied in the bottom sediment of steel plant effluent. The concentration of metals in the sediment were considerably more than the above standing water. Seasonal variations in metals and other parameters were observed. Precipitation of metals into sediment due to alkaline pH of the effluent has been discussed.

9202-044. Ozha DD, Bohra JL, Jain PC (Groundwater Dept, Jodhpur). **Ground water quality in some arid region of western Rajasthan.** *Proc Int Conf Rural Water Supply Sanitation Developing Countries*, 4-7 January, **1992**, Nagpur 23-29 [1 Ref].

Western Rajasthan occupies large area of the Thar desert in India. Nagpur and Jalore, which are parts of arid districts, have some peculiar type of waters. In these districts, besides salinity, problems of high nitrates and fluorides have been extensively observed as also cases of skeletal fluorosis.

9202-045. Pandoy BN, Mishra RD, Mishra SK (PG Dept Zoo, Purnea Coll, Purnea 85430 1) . **Variations in the physico chemical parameters of a pond ecosystem of Purnea.** *Polln Res*, **10** (3) (1991), 189-190 [9 Ref].

A pond centrally located in Purnea, Bihar, has been studied for its water quality, temperature, transparency, pH, CO₂, carbonates, bicarbonates and chloride. Phytoplanktons and zooplanktons were also studied. Five sampling sites were selected for the study. Samples were analysed for different parameters.

9202-046. Patel MK (II)L Chemi Ltd, Qlty Contl Lab, Rourkela 769016). **Time dependence of the pH of rainwater at Rourkela industrial complex.** *Indian J Environ Prot*, **11** (9) (1991), 669-674 [21 Ref].

Paper presents a study of pH and its variation with time in rainwater of Rourkela industrial complex. A total of 3 sampling stations were chosen for the study and from each sampling station 5 samples were collected. The pH variations are found to be from 6.67 to 6.69, 6.70 to 6.93 and 6.72 to 6.94 for the 3 sampling stations.

9202-047. Patel SK (Vikram Univ, Sch Std Geo, Ujjain). **Study of groundwater pollution in and around Ujjain city.** *Indian J Environ Prot*, **11** (11) (1991), 822-825 [6 Ref].

The study area is situated on the bank of river Kshipra. The well samples collected near the waste disposal represent groundwater pollution in the region. In these regions the degradation in groundwater quality is mainly due to disposal of industrial and municipal sewage waste. Presence of thick alluvium in north-western portion may also attributes the degradation of groundwater quality.

9202-048. Pathak Vandana, Shrivastava JP, Banerjee AK (Dept Chem, Dr. HS Gour Univ, Sagar 470003). **Microbiological screening of Pathar Khera coal mine water from Satpura region of Madhya Pradesh.** *J Environ Bio*, **13** (1) (1992), 21-25 [72 Ref].

The finding in the present work is thriving of Thiobacillus ferrooxidans at an alkaline pH (8-8.5). The heavy metal concentrations is high. The calculated Water Quality Index lies in the range for excessive to moderate pollution and since there is presence of the organism in all the samples -microbiological screening could be w indicator of extent of mine water pollution.

9202-049. Philips Sajju, Sankaran Unni K (Dept Bot. Govt PG Coll, Chhindwara 480001, MP). **Content of metallic ions in water and sediments in reservoirs and rivers receiving ash effluents from thermal power stations.** *Trop Eco*, **32** (2) (1991), 236-244 [31 Ref].

The impact of fly ash and bottom ash disposal into aquatic ecosystems from fossil fuel burning power plants is studied. In India, thermal power stations are discharging large quantities of ash into lotic and lentic ecosystems, polluting vast stretches of various rivers. The number of thermal power stations in India will exceed 100 by the turn of the century. The present work has been undertaken to measure the metallic concentration in water and sediment in lentic and lotic ecosystems receiving ash effluents.

9202-050. Prasad K, Goswami Kalpana, Goswami Naresh K (Dept Bot, Sukhadia Univ, Udaipur 313001). **Pollution potentialities and physiochemical analysis of potable water in the Bichari industrial complex of Udaipur (Rajasthan) India.** *Bull Env Sci*, **9** (2) (1991), 1-5 [5 Ref]

The effluents of the chemical plants-from Bichari industrial complex is discharging in open and which migrate down and cause large scale pollution of ground water. During recent months, the quality of potable water has acquired serious dimensions and is threatening health, longevity and livelihood of the villagers. The present survey deals with the analysis of physio-chemical parameters . The observed values are discussed in relation to pollution potentialities and quality of potable water in the industrial complex.

9202-051. Ramanjulu S, Suresh A, Suresh Kumar C, Mahendra Varma B, Surendranath B (Dept Bot, Sri Krishnadevaraya Univ, Anantapur 515003). **Trace metal concentration and physico-chemical analysis of ground water of Tadpatri, India.** *Env Eco*, **10**(1) (1992), 213-215 [5 Ref].

The physico-chemical characteristics and concentrations of twelve trace metals in the ground water of Tadpatri (India) were reported and the correlation coefficients between each possible pair of these metals were calculated. Some trace metals, namely zinc, manganese and calcium showed large positive correlations with their counter parts.

9202-052. Ramteke PW, Bhattacharjee JW (Div Aquatic Toxicology, Indl Toxicology Res cent, PB No 80, Mahatma Gandhi Marg, Lucknow 226001). **Bacterial pollution of drinking water sources in north Tripura district.** *Proc Acad Environ Bio*, **1** (1) (1992), 19-26 [13 Ref].

Seventy one drinking water sources were tested for presence of bacterial pollution. Hand pumps and tube wells were found free of bacterial pollution whereas ring wells and dug wells were polluted. Wide-spread bacterial pollution was observed in surface water sources. The significance of bacterial pollution of sources and prevalence of antibiotic resistance among coliforms is discussed in the light of public health problem.

9202-053. Sahu BK, Panda RB, Sinha BK, Nayak A (PG Dep; Chem, Sambalpur Univ, Jyoti Vihar 768019, Orissa). **Water quality index of the river Brahmani at Rourkela industrial complex of Orissa.** *J Ecotoxicol Environ Monit*, **1** (3) (1991), 169-175 [6 Ref].

Water quality index (WQI) is an important parameter which Reflects the collective influence of various physicochemical and biological criteria of water. WQI was calculated by a simple method for five different monitoring stations on the river Brahmani at Rourkela industrial complex considering fifteen numbers of water quality parameters. The pollution load of the river at this zone with reference to WQI has been discussed.

9202-054. Selvapathy P, Sreedhar Pepalla (Cent Environ Std, Coll Engng, Anna Univ, Madras 600025). **Heavy metals removal by water hyacinth.** *J Instn Public Hlth Engrs, India*, **1991** (3) (1991), 11-17 [7 Ref].

Removal of heavy metals from wastewater has been studied using water hyacinth for different initial concentrations for a detention time of 10 days. Results indicated that at lower concentration the general health conditions of plants were normal and removal efficiencies were more. At higher concentrations plants started wilting and removal efficiencies were found to be less. Hence it is concluded that using water hyacinth, heavy metals can be effectively removed where their concentration is less than 20 µg/l.

9202-055. Sharma BK, Sharma LL, Durve VS (Dept Limnology Fisheries, Rajasthan Agric Univ. Udaipur Campus, Udaipur Rajasthan). **Potability of bore-well water in Udaipur city (Rajasthan).** *J Hydrobio*, **7** (1) (1991), 17-24 [5 Ref].

Present study describes the water quality of bore well water of Udaipur city. The result of the bacteriological study exhibited high total coliform count in the first category and the lowest in the third category. These results clearly indicate that bore-well water of Udaipur is not free of contamination as seen by the presence of total and faecal coliform and horides.

9202-056. Shaw BP, Sahu A, Panigrahi AK (Lab Env Toxicol, Berhampur Univ, Berhampur 760007). **Water quality of the Rushikulya river estuary in relation to waste water discharge from a chloralkali plant.** *Polln Res*, **10** (3) (1991), 139-149 [35 Ref].

The impact of the effluent discharged from a chloralkali factory, M/s Jayashree Chemicals (P) Ltd., Ghanjam, on the water quality of the Rushikulya river estuary, was studied. The effluent was found to be significantly deteriorating the physico-chemical status and aesthetic characteristics of the estuarine water. Out of the several characteristics studied, the levels of BOD, COD and mercury, and to some extent the nutrients, were found to be alarming warranting immediate attention. It was concluded that the effluent was not fit for being discharged as such. The estuarine water was completely unfit for supporting aquatic life.

9202-057. Sinde DB, Gandhi MN, Khopkar SM (Indian Inst Techno, Cent Environ Sci Engng, Bombay 4000 76). **Development of water pollution monitoring kit.** *Indian J Environ Prot*, **11** (11) (1991), 801-808 [36 Ref].

A water pollution monitoring field kit is developed for analysis of 16 parameters of water. The simple techniques, like volumetry, visual colourimetry or ring oven technique is used for the purpose. The kit is tested for analysis of water samples from lakes and well. The overall cost of prototype model does not exceed Rs. 6000.

9202-058. Singh DF (Zool Surv India, Western Regl Stn, 1182/2 F.C. Rd, Pune 411005). **Studies on the water quality index of some major rivers of Pune, Maharashtra.** *Proc Acad Environ Bio*, **1** (1) (1992), 61-66 [4 Ref].

Data on the physical and chemical characteristics of five major rivers of Pune, Maharashtra State, were used to calculate the water quality index. These indices show that none of the rivers have a value of 100, i.e., none is fit for direct human consumption. The average value of the water quality index for the five rivers was 76, indicating that these rivers have slight to moderate water pollution. This study also shows that the water quality index can be a useful tool for quick assessment and which takes into consideration all the factors.

9202-059. Sinha SK (Dept Zoo, LS Coll, BU Mnzaffarpur, Bihar). **Bacterial contamination in some rural ponds water of Muzaffarpur (Bihar).** *Polln Res*, **10** (3) (1991), 179-182 [10 Ref].

The total population of coliform bacteria was very high. The number of coliform bacteria varied from 600-1600/100 mL. for Susta pond and 1200-2000/100 mL. for Madhaul pond during the period of investigation.

9202-060. Somasekhar Rao Kaza, Prasad WDN, Someswara, Rao B, Mohana Rao M, Kiska M, Rambabu C (Dept Synthetic Chem, Andhra Univ, PG Cent Nuzvid, AP 521201). **Monitoring the ground waters of Musunur Mandal, Krishna dist, AP.,** *Polln Res*, **10** (3) (1991), 165-171 [4 Ref].

A study was carried out on different types of wells of Musunur Mandal, Krishna District (A.P.) for physico-chemical and bacteriological examination. Dug well waters were found to be relatively harder. Nitrates, fluorides, phosphates, iron and sulphates were found to be within permissible limits. Physico-chemical characteristics of bore well

waters were within the acceptable limits. Water of these wells was free from bacterial contamination.

9202-061. Srivastava JC (R-1, Green Park Extn, New Delhi-110016). **Innovations in water quality monitoring and related surveillance in Indian rural area.** *Proc Int Conf Rural Water Supply Sanitation, Developing Countries*, 4-7 January **1992**, Nagpur, 86-90.

The National Drinking Water Mission -conducted scientific survey of water sources and their quality, establishment of mobile and stationary water quality testing laboratories; provision of indigenously developed portable water testing kits and training for required manpower. Awareness generation about importance of safe water, quality standards and environmental sanitation formed important components of the action-plan of the Mission. All these aspects are now inbuilt into the rural drinking water supply schemes.

9202-062. Tamot Praveen, Khare Satyendra, Shrivastava Pradeep (PG Dept Zoo, Govt Sci Commerce Col, Benazeer, Bhopal 462001). **Limnological studies of Upper lake Bhopal during certain religious activities.** *J Nature Conserv*, **3** (2) (1991), 141-146 [17 Ref].

Upper lake is the lone source of drinking water supply to the capital city of Madhya Pradesh. Efforts have been made to monitor-the changes in water quality of Upper lake before and after immersion of Ganesh and Durga idols. After the immersion of idols, limnological characteristics of Upper lake have shown significant changes. No significant variations were noted in temperature and nitrate values. All changes in limnological parameters were within safe limits.

9202-063. Veer MP, Shanmi appa H, Bhatt UG (Dept Marine Bio, Karnataka Univ, Kodibagh, Karwar 581303). **Copper, chromium and manganese in water and sediment of Kali estuary, Karwar.** *Fishery Techno*, **29** (1) (1992), 27-29 [9 Ref].

Copper, chromium and manganese concentrations in the water and sediment samples along with some physico-chemical parameters were determined at four stations of Kali estuary. The mean concentrations of Cu, Cr and Mn in water were 0.11, 0.044 and 0.327 ppm respectively. The corresponding values for sediment were 7.022, 14.13 and 185.66 ppm on dry weight basis.

9202-064. Venkat Reddy D (Karnataka Regl Engng Coll, Surathkal, Geo Sec, Dept Civil Engng, P Q. Srinivasnagar-574157, DK Mangalore). **Hydrogeochemical studies around Salarnagar Project area, Ranga Reddy district-a case study.** *Indian J Environ Prot*, **11** (9) (1991), 696-700 [4 Ref].

Hydrogeochemical studies were carried out in the Peddavagu river basin of Salarnagar Project on the order to evaluate occurrence, abundance and level of concentration of individual cations and anions affecting quality of water after construction of the Salarnagar Project on the Peddavagu river. Analysed data particularly from the ayacut area of the project showed increase in concentration of calcium, magnesium and chloride.

9202-065. Yadava Rama Nand (Dr BR Ambedkar Environ Prot Cent, Turkmanpur, Gorakhpur 273005). **Impact of low cost latrines on ground water-a case study of Gorakhpur.** *Proc Int Conf Rural Water Supply Sanitation Developing Countries*, 4-7 January **1992**, Nagpur, 42-43 [3 Ref].

The ground water pollution due to low cost latrines is detailed. Ten samples of ground water from different points near low cost latrines in Singhariya and Bichhiya Colony of Gorakhpur Nagar Mahapalika, have been analysed. The results are discussed and remedial measures suggested.

Ecology

9202-066. Adholia Upkar N (Dept Zoo, Motilal Vigyan Mahavidyalaya, Bhopal 462008). **Energy status at primary producer level of Mansarovar Reservoir, Bhopal with reference to *chlorophyll a*.** *Env Eco*, **10** (1) (1992), 46-48 [12 Ref].

Caloric contents of primary producers of mansarovar reservoir Bhopal was determined by trichromatically estimating the chlorophyll-a from the surface, column and bottom of six sampling stations from February 1990 to January 1991. Caloric contents were directly proportional to temperature, dissolved solids, chlorophyll-a values, primary productivity and blue-green algae density.

9202-067. Adholia Upkar N (Dept Zoo, Motilal Vigyan Mahan idyalaya, Bhopal 462008). **Phyto-plankton community in relation to limno-chemistry of Mansarovar Reservoir-Bhopal.** *J Nature Conser*, **3** (2) (1991), 155-168 [21 Ref].

Phytoplankton from surface, column and bottom of six sampling stations were studied in relation to limno-chemical characteristics of a pisciculture Mansarovar reservoir Bhopal. Correlationship within/ between different groups and physico-chemical parameters were interpreted. Very high positive relationship of the phytoplankton with temperature and nutrients was established.

9202-068. Adholia Upkar N (Dept Zoo, Motilal Vigyan Mahavidhyalya Bhopal 462008). **Primary productivity of Mansarovar reservoir, Bhopal.** *Himalayan J Env Zoo*, **5** (2) (1991), 7941 [17 Ref].

Gross production, net production and respiration rates of Mansarovar reservoir Bhopal, were studied from February to December 1990. The values were found increasing from late winter, reaching its peak in summer and declined thereafter. The value were directly proportional to sun shine, temperature, pH, chlorophyll contents and phytoplankton density.

9202-069. Ahmad Syed H, Singh Arun K (Coll Fisheries, Rajendra Agricl Univ, Dholi 843121, Muzaffarpur, Bihar). **Diurnal fluctuations of limno chemical parameters in a fresh-water pond of Dholi (Bihar) India.** *J Hydrobio*, **6** (1) (1990), 33-37 [15 Ref] (Late Recd).

Study deals with the diurnal fluctuations in limno chemical characteristics of a perennial pond. A significant marked correlation coefficient (r) has been observed

between the physico-chemical parameters. An inverse relationship ($r=0.90$ $p > 0.01$) was found between the carbonate and bicarbonate alkalinity.

9202-070. Bhaskaran R, Nambraian VS, Alaguchamy N (PG Res Dept Zoo, APA Coll Arts Cult, Palani 624602). **Phytoplankton productivity in a few tropical ponds.** *J Ecobio*, **3** (4) (1991), 275-284 [24 Ref].

Comparative study on the morphometry physico-chemical and biological features as well as primary productivity was made in five different ponds in and around Palani town. Phytoplankton usually dominated over the zooplankton and existed in its number at a ratio of 14:10. Productivity was high during July due to high temperature and phytoplankton density. Compared to the productivity of temperate ponds the tropical ponds are fifteen times more productive.

9202-071. Bhattacharya DK, Gupta Bahni (Dept Zoo, Univ Kalyani, Kalyani 741235). **Fresh water wetland inhabiting insects of West Bengal.** *Env Eco*, **9** (4) (1991), 995-998 [5 Ref].

Thirty six insect species are added to the insect fauna of the fresh water wetlands of West Bengal. The distribution of the insect families in four microhabitats of fresh water wetlands of the region is considered. A comprehensive account of the insects occurring in the wetland of West Bengal is provided.

9202-072. Birasal NR, Nadkarni VB, Krishnamurthy SR, Bharat SG (Hydrobio Res Lab, Zoo Dept, Karnataka Univ, Dharwad 580003). **The physico-chemical status of the Kali river after-the closure of the Supa Dam: a preliminary report.** *J Fresh water Bio*, **3** (4) (1991), 251-257 [18 Ref].

The newly formed Supa reservoir had low dissolved oxygen. but concurrently high carbon dioxide, hydrogen sulphide, nitrate and phosphate concentrations due to the presence of submerged vegetation. The probable impact of the reservoir water and the down-stream water receiving pollutants while passing through Dandeli industrial area is analysed.

9202-073. Choudhary Sunil K, Nayak Mamta, Singh RB, Bannene P (Polln Res Lab, Dept Bot, TNB Coll, Bhagalpur 812007). **Diurnal variation in some physico-chemical and biological parameters of two ponds at Bhagalpur (Bihar).** *Natl Acad Sci Lett*, **14** (10) (1991), 403-407 [15 Ref].

Four hourly records of some of the physico-chemical and biological parameters in two natural ponds were made over a period of 24 h with a view to find out the relationship between diurnal changes in water factors and phyto/zooplankton density. Statistical analysis of simple correlations revealed direct relationship between water temperature and DO and inverse relationships between zooplankton density, water temperature and DO at statistically significant level ($P < 0.05$). The present diurnal study suggests that the two ponds under investigation are eutrophic in nature.

9202-074. De TK, Choudhury A (Dept Marine Sci, Calcutta Univ, 35, Ballygunge Circular Rd, Calcutta 700019). **Community structure of estuarine net-phytoplankton.** *Env Eco*, **9** (4) (1991), 939-944 [15 Ref].

The hydrographical conditions that prevail at the selected station namely Cheemaguri is presented in detail. Particular emphasis has been given to net-phytoplankton study. Analysis such as relative abundance, dominance richness, evenness indices and species diversity is made to give an elaborate community structure of all available net-phytoplankton.

9202-075. Dutta SPS, Kumar S, Kumar V (Dept Biosci, Univ Jammu, Jammu 180004). **Ecology of macrophytic vegetation in Kunjwani pond, Jammu.** *J Nature Conserv*, **3** (2) (1991), 133-139 [24 Ref].

Investigations on qualitative composition and dry weight biomass of macrophytic flora, in relation to some abiotic factors, were conducted from April (1980) to March, (1990), The biomass of submerged species was found to be greater than that of submerged- one. Submerged and floating plants have shown an inverse seasonal relationship.

9202-076. Dutta SPS, Zutshi N, Puri A (Dept Biosci, Univ Jammu, Jammu 180001). **Ecology of protozoans from some pools, present along the sides of the river Tawsi, near Nagrota, Jammu.** *J Hydrobio*, **6** (1) (1990), 19-24 [10 Ref] (Late Recd).

Twenty one species of protozoans collected from the side pools, present along the sides of the river Tawi, near Nagrota, Jammu, have shown their seasonal prevalence. Their qualitative and quantitative counts remained high during March-May, with annual highest count in the month of May. Seasonal protozoan variation in relation to various abiotic and biotic factors has been observed and discussed.

9202-077. Gaddad Subashchandra M, Reddy R Sudarshan (Dept PG Std Res Microbiol, Gulbarga Univ, Gulbarga 585106). **Effect of pH on the growth and biochemical activities of Eschenchia coli in sewage.** *Env Eco*, **10** (1) (1992), 21-26 [30 Ref]

Escherichia coli, isolated from a stabilization pond was grown in sterile sewage buffered at various pH levels ranging from 6 to 10, and its growth and associated biochemical activities were studied. A pH range of 6-8 was optimum for the growth of E. coli and subsequent BOD reduction. E. Coli was accounted for a considerable BOD reduction. The other biochemical activities, namely catalase activity, protease activity and ammonia release were optimal within a pH range of 7-8.

9202-078. Ghatak DB, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Impacts of various industrial effluents on the Hooghly river ecosystem at Naihatis West Bengal.** *Env Eco*, **10** (1) (1992), 144-150 [27 Ref].

Different industrial effluents produced significant influence on various physico-chemical and biological parameters of the Hooghly river. The phytoplankton, zooplankton and bottom organisms were significantly reduced ($P < 0.05$) at various sampling stations. However, the toxic action might be due to the interaction of various industrial effluents.

9202-079. Govindan VS, Sampath Kumar M (Cent Environ Std, Anna Univ, Madras 600025). **Studies on the relationship between bicarbonate and chlorophyll 'a' in lentic and lotic systems.** *J Indian Botl Soc*, **69** (3&4) (1990), 463-466.

Studies to establish a relationship between bicarbonate and chlorophyll 'a' in lentic and lotic systems were conducted. The results clearly showed a positive correlation coefficient and a linear relationship between bicarbonate, biomass and chlorophyll 'a'. It highlights the fact that the bicarbonates, biomass and chlorophyll 'a' are interdependable variable in a given system.

9202-080 Gupta Maya, Soni OD (Dept Zoo, Univ Sagar, Sagar 470003). **Ecological study of Sagar Lake 1. soil and cultivable fishes.** *Bull Env Sci*, **9** (2) (1991), 15-17 [11 Ref].

Monthly collections of the soil samples and the cultivable fishes were made from different sampling stations of the Sagar lake and the monthly variation of the chemical parameters of the soil and the population of the cultivable fishes was recorded. The data was analysed statistically to obtain the correlation coefficient between different

parameters of the soil and the cultivable fishes. However, the cultivable fishes do not show any marked correlation of high degree.

9202-081. Kapoor R, Bilgrami KS, Sahay S S (Univ Dept Bot, Bhagalpur Univ, Bhagalpur 812007). **Toxic effect of heavy metal gradients on bacterial community of river Ganga.** *Natl Acad Sci Lett*, **14** (10) (1991), 393-395 [8 Ref].

Agar plate supplementation method was used to assess the tolerance level of bacteria to four heavy metals commonly found in Ganga waters at Bhagalpur. Different concentration gradients (0.01 mM-1mM) of these metals were used. Colony counts revealed that bacteria are sensitive to heavy metals.

9202-082. Kartha KN, Rao KS (Sch Std Zoo, Vikram Univ, UBain 456010). **Environmental status of Gandhisagar reservoir.** *Fishery Techno*, **29** (1) (1992), 14-20 [27 Ref].

A study on the limnology, biota and productivity of Gandhisagar reservoir (Chambal river, Madhya Pradesh) was conducted. Gandhisagar reservoir was observed to have moderate nutrient concentrations conducive to fish growth. The qualitative abundance of planktonic population was high. The dominant phytoplankton, zooplankton, macrozoobenthos and microzoobenthos are presented in the text.

9202-083. Kaushik S, Agarkar MS, Saksena DN (Sch Std Zoo, Jiwaji Univ, Gwalior 474011, MP). **Water quality and periodicity of phytoplanktonic algae in Chambal tal, Gwalior, Madhya Pradesh.** *Bionature*, **11** (2) (1991), 87-94 [31 Ref].

A study of the seasonal fluctuation of phytoplanktonic algae in relation to water quality of Chambal tal, situated on Fort, Gwalior has been carried out for a period of one year i.e., from January 1989 to December 1989. The physico-chemical characteristics revealed the alkaliphilous nature and mesothermophilic condition of the tank water. On application the indices of Nygaard and Palmer it was revealed that the present water body is highly eutrophic.

9202-084. Kodarkar MS, Muley EV, Rao Vasant (PG Dept Zoo, Vivek Vardhini Coll, Hyderabad). **Toxic algal blooms in the lake Hussainsagar, Hyderabad.** *J Aquatic Bio*, **6** (1&2) (1991), 13-18 [20 Ref].

Hyper-eutrophic lake, Hussainsagar sustains algal blooms throughout the year. Blooming has a direct correlation with pH, temperature, DO and available phosphates

contributed by treated sewage and sedimentary cycle. Control of toxic blue green algae should be given top priority in conservation of any water body. With reference to Hussainsagar two pronged strategy of reducing the nutrient loading from the catchment on one hand and removal of nutrients through harvesting algae and water hyacinth on the other are suggested.

9202- 085. Kulshrestha SK, Shrivastava Manisha, George MP, Saxena Rashni, Tiwari Archana, Joshi Malini (Dept Zoo, Motilal Vigyan Mahavidyalaya, Bhopal 462008). **Seasonal variations in macrozoobenthic organisms of Mansarovar Reservoir, Bhopal.** *Proc Natl Acad Sci India*, **61** (B) (2) (1991), 153-161 [11 Ref].

Macrozoobenthic organism of the reservoir have shown seasonal variations in relation to certain physico-chemical characteristics. A total of 37 species including 13 molluses, 13 oligochaetes, 3 chironomids and 8 others have been collected. The role of macrozoobenthic organisms as indicators of pollution has been emphasized using diversity indices and correlation matrix.

9202-086. Kumar S, Dutta SPS (Dept Biosci, Univ Jammu, Jammu 180004). **Studies on phytoplanktonic population dynamics in Kunjwani Pond, Jammu.** *J Bydrobio*, **7** (1) (1991). 55-59 [22 Ref].

Studies on phytoplanktonic dynamics in Kunjwani Pond, Jammu were conducted at four stations. Twenty one phytoplanktonic species were recorded, of which the Chlorophyceae was represented by ten species, Bacillariophyceae by seven, Euglenophyceae by two and Cyanophyceae and Dinophyceae by one species each.

9202-087. Kumar S, Dutta SPS, Malhotra YR, Kumari V (Dept Bio Sci, Univ Jammu, Jammu). **An ecological study of rotifers in Kunjwani pond, Jammu.** *J Hydrobio*, **7** (1) (1991), 41-45 [22 Ref].

Investigations were made on the ecology of rotifers of Kunjwani pond Jammu from April 1989 to March 1990. Twenty eight species of rotifers have shown their seasonal presence. Qualitative rotifer diversity remained low from August to March and high from April to July.

9202-088 Kumar Surenta, Sharma LL (Dept Limnology Fisheries, Rajasthan Agricul Univ, Udaipur Campus, Udaipur 313001). **Comparative physico-chemical limnology of lakes Pichhola and Fatehsagar, Udaipur (Rajasthan).** *Polln Res*, **10** (3) (1991), 173-178 [15 Ref].

Physico-chemical limnology of two lakes of Udaipur, Rajasthan was studied during June-August, 1987 representing late summer and monsoon periods. The comparative data on physico-chemical factors in both the water bodies were more or less the same and thus find limited use for comparing trophic status of water bodies in question.

9202-089. Kumari Nand, Datta Munshi J (P G Dept Bot, Bhagalpur Univ, Bhagalpur 812007). **Monthly variations in biomass of a floating-leaved plant, *Trapa bispinosa* Roxb, in a wetland of Bhagalpur in relation to abiotic factors.** *J Freshwater Bio*, **3** (4) (1991), 309-313 [19 Ref].

Growth pattern of *Trapa bispinosa* Roxb. locally known as 'Singhara' in a wetland of Bhagalpur was investigated during 1988. Maximum biomass (318.06 ± 10.58 g dry weight m^2) was recorded in Nov. Physico-chemical properties of water greatly influenced the growth of the vegetation. Temperature, pH, free carbon dioxide, bicarbonate alkalinity and nitrate nitrogen showed significant correlation with the biomass of *T. bispinosa* Roxb.

9202-090. Majoo Sanjeeb (Banaras Hindu Univ, Dept Cheml Engng Techno? Inst Techno, Varanasi 221005). **Impact of habitation on hydrobiology of lake Pichola, Udaipur.** *Indian J Environ Prot*, **11** (11) (1991), 853-856.

Present investigation shows the values of nutrients in the investigated lake are higher than that of ISI standard of portable water. On the basis of values of nitrate (1.52 ppm), chloride (104.98 ppm), BOD (34.8 ppm), and phosphate (1.75 ppm), the lake may be placed under the hard-calcareous, nutrient rich and eutrophic one. Some suggestions has been made on the basis of water quality and causes of pollution.

9202-091. Malhotra YR, Gupta K, Khajuria Anil. (Dept Biosci, Univ Jammu, Jammu 180001). **On the diel activity of benthic macro invertebrates in relation to some physico-chemical parameters of Lake Mansar, Jammu.** *J Hydrobio*, **7** (1) (1991), 11-15 [23 Ref]

The diel fluctuations of some physico chemical parameters and benthic macro-invertebrates were investigated from lake Mansar. Most of the macrobenthic invertebrates were found to be day active species. On the contrary some aquatic beetles were found to be night active species.

9202-092. Manoharan M (Sch Energy, Env Nat Resource, Madurai Kamaraj Univ, Madurai 625021). **Bio-accumulation of metals in some edible marine bivalves of Portonova.** *J Nature Conserv*, **3** (2) (1991), 219-223 [15 Ref].

Study was undertaken to establish a base line for phosphorus, copper, zinc, chromium, lead, arsenic potassium and calcium in *Anadara granosa*, *Crassostrea madrasensis*, *Donax cuneatus*, *Donax scortum*, *Meretrix meretrix* and *Perna viridis* for comparison with possible future contamination in marine and estuarine ecosystem of Portonova.

9202-093. Meena Kumari B (Centl Inst Fisheries-Techno, Matsyapuri P.O., Cochin 684029). **Bio-fouling in Cochin harbour.** *Proc Acad Environ Bio*, **1** (1) (1992), 7-18 [46 Ref].

Of all the hydrographical factors, salinity fluctuation consequent to monsoon was very marked and it ranged between 0.9% to 32.6%. The primary settlers were several groups of bacteria, fungi, diatoms and protozoans. *Balanus amphitrite cornmunis*, the most important fouling animal was observed to grow upto 22 mm in rostro-carinal diameter after a period of 165 days. The LC₅₀ values found for *Perna viridis* employing different heavy metals showed copper, mercury and tri butyl tin oxide as most toxic in the order of toxicity.

9202-094. Mitra D, Mukharjee Debasis, Roy AB, Ray S (Dept Math, Jadavpur Univ, Calcutta 700032). **Permanent co-existence in a resource-base competition system.** *Ecol Modelling*, **60** (1) (1992), 77-85 [15 Ref].

Paper deals with the permanent coexistence and global stability of a simple Lotka-Volterra type mathematical model of a living resource supporting two competing predators. The result include the sufficient condition for uniform persistence (or permanence) of the system. It is also shown that the system is globally asymptotically stable.

9202-095. Mullick Suparna, Ronar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Chronic effects of mixture of heavy metals, petroleum product and detergent on the fish *Oreochromis mossambicus* and aquatic ecosystem.** *J Env Eco*, **10** (1) (1992), 235-241 [19 Ref]

Chronic effects of sublethal concentrations of heavy metals detergent and petroleum hydrocarbon mixture on fish *Oreochromis mossambicus* and other

parameters of aquatic ecosystem are discussed. All live parameters decreased at all concentrations. Fish yield was reduced at 10.55 and 5.27 ppm and fecundity was increased at all concentrations. Fish yield was reduced at 10.55 and 5.27 ppm and fecundity was increased at all concentrations.

9202-096. Oberoi RC, Sharma AK, Moorti TV (Dept Agric Eco, Himachal Pradesh Krishi Vishvavidyalya, Palampur 176062 Himachal Pradesh). **Environment, socio-cultural system and economic development in cold desert of western Himalayas (a study of Spiti valley of Himachal Pradesh).** *J Human Eco*, **3** (1) (19923, 1-7 [8 Ref].

This paper is based on a study in the Spiti sub-division of Himachal Pradesh and it aims at suggesting guidelines for development programme in such cold desert area. The study suggested that to combat the environmental and ecological stress, the water conservation should find highest priority in our planning process for the overall development of the valley. Secondly, immediate afforestation is needed on large scale to cover the denuded, fugged, trecless ancultivable land for providing greenery, fuel-wood and fodder.

9202-097. Panda RB, Sahu BK, Sinha BK, Nayak A (PG Dept Chem, Sambalpur Univ, Jyoti Vihar 768019). **A comparative study and diurnal variation of physico chemical characteristics of river, well and pond water at Rourkela Industrial Complex of Orissa.** *J Ecoto3cico Environ Monit*, **1** (3) (1991), 206-217 [25 Ref].

Investigation deals with a comparative study of physico-chemical characteristics of water samples of the river Brahmani along with a few wells and ponds of Rourkela industrial complex prior to and after the discharge of effluent of the steel and fertilizer plants into the river. Some chemical criteria and the diurnal variation of number of such parameters at some of these sources have been compared and discussed.

9202-098. Pandey BN, Pandey BL, Siddique AQ, Kumar V (Dept Zoo, Magadh Univ, Bodh-Gaya, Bihar). **Evaluation of bottom biota through species diversity in a polluted tank at Gaya. Himalayan.** *J Env Zoo*, **5** (2) (,991), 144-146 [11 Ref].

Paper deals with the evaluation of bottom biota through species diversity in a polluted. Rabindra Sarovar tank at Gaya. The dominant species were Chironomous and Vivipara bengalensis. The physicbchemical parameters of the ponds have also been studied.

9202-099. Pandey DD, Vihari Saket (Eco Res Lab, Dept Bot, SPM Coll. Biharshariff 803101). **Biomass and primary productivity of two cultivars of sunflowers.** *Env Eco*, **9** (4) (1991), 860-862 [6 Ref].

Present study was carried to assess the biomass and primary productivity of two cultivars Modern and KSP-7 of sunflower at field conditions. The biomass of different parts of two cultivars increased upto 90 days and afterwards it decreased. The biomass and net primary productivity were found to be comparatively higher of cultivar Modern than that of KSP-7.

9202-100. Panday VP (B G A-Biofertilizer Proj, Coun Sci Techno, UP, Lucknow 226006). **Effect of industrial pollution on algal flora with special reference to opium effluent.** *J Environ Res*, **1** (2) (1991), 38-46 [17 Ref].

The study reveals that the blue green algae dominated during all the seasons at different sites. The seasonal variation in the algal flora growing in polluted habitats shows that the maximum number of algae were collected from the water logged field affected with the effluent and minimum from the sides and bottom of open drain near factory through which effluent runs.

9202-101. Panigrahi AK, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Pollutional impact of petroleum refinery effluent in presence of non toxic detergent on aquatic ecosystem.** *Env Eco*, **10** (1) (1992), 92-96 [24 Ref].

Petroleum refinery effluent produced severe pollutional impact on aquatic ecosystem in presence of nonionic detergent sandozin NIS. Water quality parameters reduced significantly at all concentrations. Zooplankton population reduced significantly at all concentrations and phytoplankton population reduced only at higher concentrations. Reduction of bottom organisms was also observed at higher levels of the mixture of pollutants.

9202-102. Patralekh LN (Dept Bot, Deoghar Coll, B-Deogarh 814 I 13). **Bacterial density in the Ganges at Bhagalpur, Bihar.** *J Ecobio*, **3** (2) (1991), 102-105 [9 Ref].

Monthly fluctuations in; bacterial population in the Ganges at Bhagalpur was found very regular showing bimodal peaks. Its higher density was recorded in monsoon months while the lower in the summer. Paecal contamination and the presence of indicator microorganisms clearly indicate the unpotable quality of Ganga water.

9202-103. Rai DN, Sharma UP (PG Dept Zod, Bhagalpur Univ, Bhagalpur Bihar). **Co-relation between macrophytic biomass and macro-invertebrate community structure in wetlands of north Bihar.** *Int J Eco Environ Sci*, **17** (1) (1991), 27-36 [19 Ref].

Monthly biomass of different aquatic weeds in three wetlands of North Bihar was estimated by harvesting method. *Eichhornia crassipes* found to be one of the most productive species providing better habitat to invertebrate fauna. The invertebrate species belonged to six major groups with a total of 53 species. Wetland infested with *Euryale ferox* supported 45 invertebrate species followed by wetland infested with *Cyperus* (35) and *Eichhornia* (20) species.

9202-104. Ramalishnan N, Ganesan NC, Karupusamy A (Dept Bot, Govt Arts Coll. Tiruvannamalai 606603). **Hydrographical studies on five drinking water bodies at Tiruvannamalai, Tami Nadu.** *J Ecobio*, **3** (9 (1991), 289-293 [18 Ref].

The physico-chemical parameters of five drinking water sources at Tiruvannamalai have been analysed to assess the water quality for drinking purposes. All parameters except dissolved oxygen, calcium and magnesium are within the permissible limit.

9202-105. Saha LC, Pandit B (Limnological Lab, Univ Dept Bot, Bhagalpur Univ, Bhagalpur 812007). **Dynamics of primary productivity between lentic and lotic system in relation to abiotic factors.** *J Indian Botl Soc*, **69** (3&4) (1990), 213-217 [22 Ref].

Gross primary productivity ranged from 0.75 mg C/l/d to 1.89 mg C/l/d in ponds and 0.65 mg C/l/d to 1.84 mg C/l/d in river. The value of N.P.P. varied from 0.21 mg C/l/d to 1.31 mg C/l/d and 0.29 mg C/l/d to 1.32 mg C/l/d in pond and riverine system respectively. Community respiration fluctuated between 0.39 mg C/l/d to 0.93 mg C/l/d in ponds and 0.30 mg C/l/d to 1.02 mg C/l/d in river water. The average value of P/R ratio was higher in lotic system (1.65) than that of lentic value (1.05) during the present investigation.

9202-106. Saha Sunil Kumar (Dept Zoo, R D & D J (PG) Coll, Munger 811201). **Ecological conditions of thermal springs of Rishikund Munger.** *J Freshwater Bio*, **3** (4) (1991), 303-307 [8 Ref].

Paper deals with the ecological conditions of thermal springs of Rishikund, Munger. The pH is on acidic side (5.8 to 6.2) due to the presence of free CO₂ and low bicarbonate alkalinity. Phytoplankton was mainly represented by Myxophyceae (2 species), Chlorophyceae (5 species) and Bacillariophyceae 16 species).

9202-107. Samuel, Johnson (Dept Zoo, Mar Thoma Coll, Tiruvalla 682103, Kerala). **Preliminary studies on the ecology of chironomid larvae Polypellum inilicum of Sasthamoota Lake, Kerala.** *J Zool Soc Kerala*, **1** (1) (1991), 61-67 [22 Ref].

Effect of factors like temperature, oxygen, carbon dioxide, pH, alkalinity, Secchi Disc transparency and the nature of the substratum on the density and distribution of the larvae was studied, Seasonal variations in the density of the larvae were also looked into. The study revealed that the O₂ and CO₂ concentrations and the nature of the substratum were the main factors which affected the density and distribution of the larvae.

9202-108. Sarkar SK (Dept Zoo, Netaji Nagar Day Coll, Regent Park, Calcutta 700040). **Composition and changes of benthic macro-invertebrates of a lentic pond in Calcutta.** *Geobios*, **19** (1) (1992), 10-14 [13 Ref].

The abundance, variations and correlations of different groups of bottom fauna with abiotic factors of soil was significant and exhibited distinct relationship among themselves. Their monthly distribution and number also varied. Molluscan species strongly dominated all the year round, while Arthropods and Annelidan populations were comparable.

9202-109. Sharma OP, Saini UP (Dept Limnology Fisheries, Rajasthan Agricul Univ, Udaipur Campus, Udaipur 310231). **Mustard oilcake: a potential sources for the production of zooplankton.** *J Hydrobio*, **6** (1) (1990), 1-6 [9 Ref] (Late Recd).

Present experiment was conducted in cement cisterns with different doses of mustard oilcake for a period of 21 days and their results have been discussed in relation to zooplankton production and water characteristics. No significant effects were

observed on water chemistry, though the zooplankton population was significantly high in all the treated cisterns.

9202-110. Sharma Sanjay, Mishra Smriti R, Yadav RK (Sch Std Zoo, Jiwaji Univ, Gwalior 474011). **Diurnal cycle of physico-chemical characteristics of Matsya Sarovar, Gwalior.** *Env Eco*, **10** (1) (1992), 127-129 [10 Ref]

The diurnal variations in physico-chemical characteristics of a freshwater Matsya Sarovar tank were studied during summer season. The temperature was noted to be maximum during mid-day. Dissolved oxygen showed their maxima at 1600 hours, while highest value of free carbon dioxide was observed at 0800 hours.

9202-111. Shyam Radhey (Dept Zoo, Utkal Univ. Vanivihar, Bhubaneswar 751004). **Comparative dynamics of zoo plankton in a tropical freshwater swamp and in newly constructed ponds in swampy area.** *J Appl Zoo Res*, **2** (2) (1991), 80-84 [12 Ref].

Ecodynamics of zooplankton in an India freshwater swamp and newly constructed ponds in the swampy area during November, 1981 to October, 1983 are presented. The protozoans, rotifers, cladocerans, copepods and ostracods constituted main groups of zooplankton. The water hyacinth covered zone of the swamp was dominated by protozoans. Whereas the clear zone was dominated by copepods.

9202-112. Singh Balwant, Pande LK (Sch Environ Sci, Jawaharlal Nehru Univ, New Delhi- 110067). **Statistical medsanical approach to ecosystems.** *Proc Natl Acad Sci, India*, **61** (A) (4) (1991), 543-555 [14 Ref].

Paper discuss a model of interacting multispecies ecosystems which leads to such a distribution. The distribution is derived from the statistical mechanical approach to the model. The approach is valid for both even as well as odd numbered ecosystems. This is an improvement over earlier results which work essentially only for even numbered ecosystems.

9202-113. Singh SK, Kumari Usha, Singh SK, Yadav JNP (Dept Zoo, R S Coll, Bihar Univ, Muzaffarpuri Bihar). **Studies on biotic parameters of Sikandarpur lake, Muzaffarpur, Bihar.** *J Mendel*, **8** (3 & 4) (1991), 133-135 [17 Ref]

During the study of biotic parameters zooplanktons and phytoplanktons were found dominant in different months. Phytoplanktons attained the peak in May, June and

October, whereas zooplanktons from March to June, Even different groups of planktons showed peak periods in different seasons of a year. Summer season and post-rainy season were the best period for phytoplanktonic growth.

9202-114. Sltvastava Poonam, Srivastava KN, Sinha AK (Env Res Cent, Feroze Gandhi Coll, Raebareli 229001). **A comparative study of haematology of Gangetic fishes with special reference to sex and pollution.** *Adv Biosci*, **10** (2) (1991), 101-106 [14 Ref].

Important haematological parameters have been studied in five food valued Gangetic fishes harbouring between Kalakankar (Pratapgarh) and Phaphamau (Allahabad). Total erythrocyte counts and packed cell volume were observed higher in males while MCH in females of all the selected species. The most interesting observation was that the total erythrocytes and haemoglobin percentage were lower and MCH value was higher in these Gangetic fishes than that of fishes of other fresh bodies. These observations have been discussed in relation to water quality of the river Ganga.

9202-115. Swarnalatha N, Narsihg Rao A (Phyco River Eco Lab, Osmania Univ, Hyderabad 500007). **Ecological aspects of Microcystis bloom.** *J Mendel*, **8** (3&4) (1991), 167-172 [31 Ref].

Microcystic aeruginosa which is an aggregative colonial and mucilaginous form of cyanobacterium formed continuous blooms throughout the period of observation in Banjara lake excepting summer season which witnessed dominance of *Oscillatoria limosa* over *Microcystis* bloom. The species thrived well in all the environmental conditions irrespective of the variation in nutrient concentrations except little density change. It is also indicated that pollution of lake waters is of highest degree which is the best single indicator of organic pollution.

9202-116. Vijay Kumar K, Paul Ravindra (Dept Zoo, Karnataka Univ, Dharwad 580003). **Diurnal fluctuations in some physico-chemical parameters of tank and moat in Gulbarga, Karnataka.** *J Nature Conserv*, **3** (2) (1991) 109-113 [10 Ref].

Diurnal variations of some physico-chemical parameters studied from two water bodies in Gulbarga-Viz. Jagath Tank and the adjacent moat, are presented here. Free carbon dioxide was noticed to be high during night hours while, pH values decreased. The nutrient concentrations also exhibited a decreasing trend during night hours, but a sharp increase during the day. The release of free carbon dioxide as a result of

respiratory activity of planktonic organisms could be responsible to increased total alkalinity values during night hours.

9202-117. Wadhvani K, Srivastava Madhu S, Chatterjee S, Srivastava SK (Myco Lab, Bot Dept, Lucknow Univ, Lucknow 226007). **Fungi as environmental pollutants some case studies.** *Proc Acad Environ Bio*, 1 (1) (1992), 27-32 [14 Ref].

Twenty fungal taxa (eight Aspergilli) were analysed for their allergenic effects, following skintesting method on fifty three patients (including both males and females) ranging between age group of 10 to 65 years. The common types which affected the patients of all age groups were *Alternaria alternata*, *Aspergillus falvus*, *A. nidulans*, *A. niger*, *A. ustus*, *Monili sp.*, *Ustilago msydis* and wheat dust. The symptoms were sneezing, rhinitis, breathlessness and chest pain. The diagnosis in most of the cases was bronchial asthma.

9202-118. Zaidi SGA, Yeragi SG (Dept Zoo, Maharashtra Coll, Bombay 400008). **Effect of environmental factors on zooplankton (biomass) production in South Bombay coastal waters.** *Proc Acad Environ Bio*, 1 (1) (1992), 45-51 [9 Ref].

Zooplankton production is under the control of a variety of environmental factors. BOD and temperature show a negative influence due to an equitable climate and presence of plenty of nutrients. However, other factors were found to control the production in the order as $DO > NO_3 > PO_4 > Salinity$.

Nature and Natural Resources Conservation

9202-119. Abraham Nelson P, Balabishan M (Dept Zoo, Univ Kerala, Karivattom 695581, Thiruvananthapuram, Kerala). **Deteriorating forest habitat and wildlife in Wynad, Kerala.** *J Zool Soc Kerala*, **1** (1) (1991), 1-8 [12 Ref].

Tropical evergreen semi-evergreen, deciduous forests and grasslands and marshy areas represented the natural vegetation in Wild. 23 species of large and medium sized mammals were observed during the study period between 1985-1989. Moist deciduous forests had majority of the wildlife forms observed in Wynad area. Human interaction is deteriorating the existing natural vegetation. Further deterioration of the natural forest may upset the existence of many of the animals in this hilly plateau. The need for conservation of natural habitats and sustainable management of natural resources are discussed.

9202-120. Aminuddin, Girach RD (Surv Medicinal Plants Unit, Regl Res Inst Unani Med, Bhadrak 756100). Ethnobotanical studies on Bondo tribe of district Koraput (Orissa), India. *Ethnobotany*, **3** (1 & 2) (1991), 15-19 [11 Ref].

First-hand information on various aspects of ethnobotany relating to 44 plant species of 31 families collected from Bondo tribal community of district Koraput is presented for ethnobotanical record. The plant species are enumerated alphabetically with their botanical name, family, tribal name, locality and voucher specimen number.

9202 -121. Biswas Asit K. **Water for sustainable development: a global perspective.** *Wasteland News*, **7** (2) (1991), 18-21.

During the past few years more and more planners and decision-makers have to realize the critical importance of efficient water management for sustainable development of their countries. Compared to earlier generation of projects, new sources of water are becoming scarce, more expensive to develop and require more expertise and technological know how for planning, design and implementation. Accordingly, decision-makers are beginning to realize that water can no longer be considered to be a cheap resource, which can be used, abused or squandered without much consequence for mankind's future.

9202 -122. Gauniyal Anil K, Singh Anil K, Virmani OP (Centl Inst Medicinal Aromatic Plants, Lucknow). **Major medicinal plants as foreign exchange earner.** *Wasteland News*, **7** (2) (1991), 11-15.

Paper suggest coordinated efforts of concerned agencies for promoting cultivation of identified medicinal plants to ensure their regular supply and stabilisation of raw material prices. There is also the need for encouraging export of finished products, rather than raw materials. It is optimistic about widening the commercial horizon of medicinal plants with modern technology and expertise which are now available within the country.

9202-123. Gogoi P, Borthakur SK (Dept Bot, Dhemaji Coll, Dhemaji 787057, Assam). **Plants in religion cultural beliefs of the Tai Khamtis of Assam (India).** *Ethnobotany*, **3** (1 & 2) (1991), 89-95 [4 Ref].

Present communication is on the plants associated with religio-cultural beliefs of the Tai Khamtis of Assam and Arunachal Pradesh. The plants related to the religious and cultural traditions are grouped into four main categories: Fruits plants cultivated in the Buddhist temple-yards, cultivated ornamental plants around temple-yards, plants used as offerings and adornments, and plants used in Buddhistic and traditional faiths and rituals. In addition, plants used in religio-cultural activities are also dealt with.

9202-124. Hembrom PP (Divisional Forest Office, P.O. Maheshmunda, Dist Giridih, Bihar 815312). **Tribal medicine in Chotanagpur and Santhal Parganas of Bihar, India.** *Ethnobotany*, **3** (1 & 2) (1991), 97-99.

A brief account of some general aspects of tribal medicine, like the kind of medicinemen and diagnosis-of diseases, is given. A few prescriptions for polio, asthma, tuberculosis, epilepsy, cancer and leprosy are given as examples of the vast ethnomedicinal heritage of the region.

9202-125. Jha Vidhyanath, Choudhary UN, Saraswati KC (Dept Bot, CM Sci Coll, Darbhanga 846004, Bihar). **Botanical aspects of an ethno-veterinary prescription in Mithila, North Bihar (India).** *Ethnobotany*, **3** (1 & 2), 101-104 [6 Ref].

This paper deals with 23 plants utilized as veterinary medicine in Darbhanga district and emphasizes the need for a comprehensive ethnobotanical survey of the entire North Bihar.

9202-126. Ragupathy S, Mahadevan A (Cent Adv Std Bot, Univ Madras, Guindy Campus, Madras 600025). **Ethnobotany of Kodiakkarai Reserve Forest, Tamil Nadu, South India.** *Ethnobotany*, **3** (1 & 2) (1991), 79-82 [3 Ref].

The Trulas, one of the primitive tribes, are distributed in the coastal areas of Thanjavur district. They live on the outskirts of Kodiakkarai Reserve forest. They are herbalists and are frequently employed to collect medicinal plants available in the forest. The life of Trulas is strongly influenced by 54 species used for food, wood, domestic, medicinal, ritual and other economic purposes.

9202-127. Raina Anil K, Jamwal PS (Floristic Std Div, Regl Res Lab, Canal Rd, Jammu Tawi 180001). **Environmental stress and conservation strategies for Bunium persicum (Kalazira).** *Proc Acad Environ Bio*, **1** (1) (1992), 75-79 [4 Ref].

Bunium persicum (Boiss.) Fedtsch (Kalazira) grows wild in the dry temperate areas of Jammu and Kashmir and Himachal Pradesh. The plant is under various biotic and abiotic pressures and in the communication some points have been highlighted to divert the pressure and relieve the plant from environmental stresses.

9202-128. Sangha Gian Singh (T'ujab State Coun Sci Techno, SCO 2935-36, Sector 22-C, Chandigarh 160022). **Concept for landscape development and nature conservation.** *Encology*, **6** (7) (1991), 21-24 [13 Ref].

Very few legal basis have been enforced over the last few decades in order to enable more effective counter-measures to be taken against the interference in ecological balance of nature and the landscape. Taking into account the shortcomings of the regulations, some basic aspects, strategies etc; for the preservation of landscape and nature conservation have been given.

9202 129. Venkateswarlu T, Lakshminarayana KV (Zool Surv India, 100 Santhome High Rd, Madras 600028). **Study of aquatic mammals-an imperative need.** *Env Eco*, **9** (4) (1991), 863-866 [2 Ref].

A list of aquatic mammals is presented in this paper. The threat of aquatic pollution is mounting on the water borne mammals, most of which are already disappearing. To save these mammals, their habits, breeding biology, seasonal migration and impact of pollutants on them are proposed to be studied.

Health and Toxicology

9202-130. Anand Mohini, Gopal Krishna, Gulati Anil, Srimal Rikhab Chand, Ray Prasad Kumar (Indl Toxic Res Cent, MG Marg, Lucknow 226001). **Alternation in blood pressure and medullary receptors following exposure of cadmium and lindane to rats.** *Proc Acad Environ Bio*, **1** (1) (1992), 81-86 [7 Ref].

Intraperitoneal administration of cadmium acetate to rats for 6 weeks cause cardiovascular syndromes. It appears that the exposure of cadmium or lindane per se elevated the blood pressure of rats. However, the blood pressure was significantly increased when Cd and lindane were given simultaneously.

9202-131. Balasubramanian S, Ramaswami M (Dept Zoo, Govt Arts Coll, Coimbatore 641018). **Effect of pesticide Sevin on acetyl cholinesterase (AChE) activity in different tissues of Oreochromis mossambicus (Peters).** *J Ecobio*, **3** (2) (1991), 117-122 [15 Ref].

The effect of carbamate pesticide, sevin on the acetyl cholinesterase (AChE) activity of brain, heart and white muscles of a freshwater fish *Oreochromis mossambicus* (Peters) was studied after exposing them in 3 and 25 ppm concentration for 24, 48 and 72 h. The fish exposed to high concentration (25 ppm) showed very sharp decline in AChE activity in brain, heart and muscle tissue. Thus sevin exerts a reversible inhibitory effect on the AChE activity of different tissues of *O. mossambicus*.

9202-132. Baronia AK, Sharma JD, Sahai YN (Toxico Lab, Zoo Dept, Dr H S Gour Univ, Sagar 470003). **Toxic effects of carbaryl in the liver and kidney of *Rathus rathus albino*.** *J Nature Conserv*, **3** (2) (1991), 127-132 [9 Ref].

Histopathological and accumulation studies were carried out to observe the toxic effects produced by carbax a carbamate insecticide, on the liver and kidney of albino rats when it was administered in sub-lethal doses for four to six weeks. Thin layer chromatography was used to detect the carbaryl in the above organs. The study conclusively proved the toxicity of carbaryl on the vital organs of albino rats.

9202-133. Behari Jai, Raj Srivastava 1 Sadhna, Gupta Sanjay, Srivastava RC (Indl Toxic Res Cent, PB No 80, MG Marg, Lucknow 226001). **Effect of liposome encapsulated meso-2,3-dimer-captosuccinic acids (DMSA) on biochemical and trace metal alterations in cadmium exposed rats.** *Bull Environ Contam Toxicol*, **47** (6) (1991), 827-833 [13 Ref].

Present communication deals with the use of liposome encapsulated 2,3-dimercaptosuccinic acid (DN1SA), a known thiol chelator for the treatment of cadmium intoxicated rats which was found to be effective in restoring cadmium mediated biochemical and trace metal alterations. Results indicate that decrease in levels of serum alkaline phosphatase (ALP) and concomitant increase in the activity of this enzyme in urine was observed in cadmium exposed-saline treated rats. Treatment with DMSA resulted in further decrease of this enzyme in serum with significant increase in urine. Administration of liposomal DMSA however was able to restore the loss of ALP through urine.

9202-134. Bhargava S, Pandey Reeta (Dept Zoo, Dr. HS Gour Vishwavidyalaya, Sagar, MP). **A study on the effect of thiourea on Lymnaea stagnalis.** *Himalayan- J Environ Zoo*, **5** (2) (1991), 72-74. [10 Ref].

Spawn of *Lymnaea stagnalis* was exposed to different sublethal concentrations of thiourea for 30 days. The study revealed that during development 8% mortality was observed in control spawn while treated spawn had 50-80% mortality upto gastrula stage.

9202-135. Bhaskar Joshi Mahesh (Dept Eco, Bombay Univ, Bombay). **Cases of reported lead pollution and resultant effects.** *Ecology*, **6** (1), (1991), 8-14.

Present paper is an on the spot report of the incident that took place in Dahanu and Talasari Taluka of Thane District and Dadra & Nagar Haveli during last week of January 1991. Rambhau Mahalgi Prabodhini, a registered Trust in Bombay has investigated reasons for unnaturally high number of cattle death due to lead contamination in three tribal villages of Maharashtra and gave recommendations for development of strategies and collective efforts to create awareness and abatement of pollution.

9202-136. Bhattacharya Lata, Pandoy Awadesh K, Pandey Anil (Endocrino Environ Phys Unit, Sch Std Zoo, Vikram Univ,Ujjain 456010). **Impairment of testicular function in a teleost. Oreochromis mossambicus due to chlorinated insecticide.** *Bull Environ Sci*, **8** (1989), [8 Ref] (Late Pub).

Impaired testicular function was observed after an exposure of an exotic cichlid fish, *Oreochromis mossambicus* to termax. A sublethal chronic exposure resulted in regressed histophysiological profiles of the testis. The changes observed were fibrogenesis in tunica albuginea, abnormal configuration of seminiferous tubules desformed primaxy and secondary spennatocytes, atrophier interstitial cells and significant fall in the gonosomatic index.

9202-137. Bose Chhanda (Dept Zoo, Univ Gorakhpur, Gorakhpur 273009). **Malathion and carbaryl induced changes in enzymes of the cockroach *Periplaneta amencana*.** *Proc Natl Acad Sci. India*, **61**(B) (2) (1991), 187-194 [20 Ref].

Effect of an organophosphorus pesticide (malathion) and a carbamate (carbaryl) on the activity of alkaline and acid phosphatases have been determined in three tissues of the cockroach *Periplaneta americana*. Observations show that both the pesticides increased the activity of acid phosphatase differentially in these tissues. Malathion was found to be more active than carbaryl.

9202-138. Chattopadhyay BP, Mazumdar PK (Regl Occupl Hlth Cent, (Eastern), 3 Dr. M Ishaque Rd, Calcutta 700016). **A study of pulmonary function in the workers in Darjeeling (West Bengal) with special reference to their occupation.** *Indian J Occupl Hlth*, **35** (1) 1992), 9-13 [18 Ref].

A study has been carried out to assess the pulmonary function status of the tea plantation workers of Darjerling. One hundred and sixty nine workers of either sex are covered. The smoker workers of plukers group showed significantly lower values in VC, FEV₁, FEV_{1%} and FET_{25-75%} in comparison to non-smokers. Pulmonary function impairment noted among workers were 3.70% restrictive type, 8.64% obstructive type and 1.23% combined type in males and 3.41% obstructive type in females.

9202-139. Chattopadhyay BP, Sayed HN (Regl Ocupl Hlth Cent, 3, Dr. M Ishaque Rd, Calcutta 700016). **Pulmonary function studies in glass bangle workers.** *Indian J Occupl Hlth*. **34** (4) 1991), 167-175 [37 Ref].

Pulmonary function measurements were made in two hundred six glass bangles factory workers and seventy three general work environment workers (unexposed) considered as the control subjects of this study at Firozabad, U.P. It has been found that the values of exposed and control workers did not change significantly, although mean difference of values were observed. In some parameter, exposed workers of different processes have little higher values than the control. It has also been observed that non-smoker workers of control and exposed group have higher mean values than the smokers. The lung function values were declined with the advancement of age in both categories of workers.

9202-140. Chidambaram N (Zool Surv India, Marine Biol Stn, 100, Santhome High Rd, Madras 600028). **The green mussel *Perna viridis* as an indicator of copper pollution along Madras coast, Bay of Bengal.** *Indian J Environ Prot*, **11**(10) (1991), 727-732 [25 Ref].

In order to refine the utilization of *Perna viridis* as a pollution indicator species, the relationship between copper concentration and size, and sex of the mussel are investigated. Besides, multiple stepwise linear regression analysis is also performed to find the influence of environmental factors, namely water temperature, pH, salinity, dissolved oxygen, COD and BOD, and also copper in the samples of water and sediments on the concentration of copper in the whole-body tissue of mussels. Significant results are reported.

9202 -141. Chidambaram N, Sastry CA (Indian Inst Techno, Cent Biosci Biotechno, Madras 600036). **Some aspects of Selenium accumulation in a freshwater teleost fish, *Oreochromis mossambicus* (Peters).** *Indian J Environ Prot*, **11** (10) (1991), 761-770 [63 Ref].

Samples of water, sediments and fish, *Oreochromis mossambicus*, were collected to assess the changes in the selenium load and environmental factors in the aquatic ecosystem, and its influence on accumulation of selenium in fish. Water temperature, pH, salinity, DO, COD and BOD and selenium concentration in water, sediments and in whole-body and various tissues of fish were determined.

9202-142. Chinoy Niloufer J, Pradeep PK, Sequeira Eveline (Dept Zoo, Univ Sch Sci, Gujarat Univ, Ahmedabad 380009). **Effect of fluoride ingestion on the physiology of reproductive organs of male rat.** *J Environ Bio*, **13** (1) (1992), 55-61 [17 Ref].

Oral administration of sodium fluoride (NaF) (5 and 10 mg/kg body weight/ day) for 30 days to adult male rats, brought about a reduction in body weight especially by high dose (10 mg/kg body weight). In fluorotic rats, testicular cholesterol and serum testosterone levels were not affected. However, succinate dehydrogenase activity in testis was inhibited.

9202-143. Chockalingam S, Manoharan T (Zool Res Lab, Thiagarajar Coll, Madurai 625009). **Synergistic effects of plant products with methyl parathion against *Aegocera venulia* (Lepidoptera: Agaristidae).** *J Ecobio*, **3** (2) (1991), 110-112 [8 Ref].

Synergistic effect of plant products on a lepidopteran insect, *Aegocera venulia* was studied. LC₅₀ values of six insecticides against final instar larvae of *A. venulia* indicate that methyl parathion is the most effective larvicide among the tested insecticides. Of the eight plant product tested, Solasodine showed a maximum synergistic activity with methyl parathion by having a high synergistic factor (1.67).

9202-144. Chockalingam S, Manoharan T (Zool Res Lab, Thiagarajar Coll, Madurai 625009). **Effect of sublethal concentrations of solasodine-methyl parathion mixture on food utilization of final instar larvae of *Aegocera venulia* (Lepidoptera: Agaristidae).** *J Ecobio*, **3** (2) (1991), 185-188 [18 Ref].

The impact of sublethal concentrations of methyl parathion-solasodine mixture on food utilization of final instar larvae of *Aegocera venulia* was studied. The food consumption and conversion were reduced due to treatment. Gross and net conversion efficiencies showed a significant decline with increasing concentrations of the toxicant.

9202 -145. Devi Vasundharas Srilatha M, Chitra T (Dept Zoo, Univ Coll Women, Koti, Hyderabad 500001). **Effects of chemicals on the metabolism of *Clarias batrachus*, Linnaeus.** *J Aquatic Bio*, **6** (1 & 2) (1991), 42-47 [9 Ref].

Fish *Clarias batrachus*, Linnaeus were subjected to the specific pollutant; a mixture of HgCl₂ and phenol. The LC₅₀ concentrations were estimated as HgCl₂ 1 ppm and phenol 10 ppm. Control samples were also maintained simultaneously. Exposure time was maintained upto 120 hrs. The analysis was carried on for the estimation of glucose, cholesterol and protein. No significant variation was observed in the amount of

blood glucose. Pituitary samples showed increase in protein content and decrease in glycogen at 72 hrs.

9202 -146. Dharwadkar Suniti, Wade AE (Dept Chem, Biochem Unit, SB Coll (Sci), Aurangabad 431001). **Metabolism of an environmental pollutant -benzo(a)-Pyrene: role of dietary fat and inducers.** *Proc Acad Environ Bio*, **1** (1) (1992), 39-43 [12 Ref].

The effect of inducers of monooxy-genase system in the presence and in the absence of dietary fat type on rat liver microsomal Benzo (a) pyrene hydroxylase activity was studied. It was observed that the induction of the enzyme activity by an inducer-3 methyl cholanthrene did not require any dietary fat! It seems that type of inducer and type of dietary fat play an important roll in determining level of Benzopyrene hydroxylase activity which generally reflects total Benzo (a) pyrene metabolism.

9202-147. Ghatak DB, Konar SK (Dept Zoo, Fisheries Lab, Kalyani Univ, Kalyani 741235). **Chronic effects of mixture of pesticides, heavy metal, detergent and petroleum hydrocarbon in various combinations on fish.** *Env Eco*, **9** (4) (1991), 829-836 [45 Ref].

Heavy metal cadmium, detergent parnol J, pesticide DDVP and petroleum hydrocarbon n-heptane discharged together in various combinations into water showed synergistic effect on aquatic life. Even non-lethal (LC₅₀) dose of these combination of mixture of toxicants showed synergistic effect on various fish parameters.

9202-148. Ghodasara NB, Rathod RA, Vyas JB, Parikh DJ, Chattopadhyay P, Kashyap SK (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Paint aerosols and heavy metals in the work environment of paint spray section of the transport workshop.** *Indian J Indl Med*, **37** (4) (1991), 149-155 [17 Ref].

Environmental hygiene survey was carried out to asses the paint aerosol pollution in the work environment of paint spray section of a transport workshop. Air samples, paint samples were analysed to estimate the lead and other heavy metals. Total aerosol concentration in the work environment was found in the range of 7.84 to 104.8 mg/m³. Results revealed that in paint spray section aerosol pollution is very high yet heavy metal pollution was found below the threshold limit values.

9202-149. Ghosh TK, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Acute toxicity of dye factory effluent on fish and fish food organisms and its effects on feeding and respiratory behaviour of fish.** *Env Eco*, **10** (1) (1992), 173-178 [14 Ref].

Discharge of dye factory effluent (DFE) in the river Churni and its effects on fish and fish food organisms were studied. Respiratory and feeding behaviour of exposed fish were significantly influenced by DFE. Plankton *Diaptomus forbesi* was found highly sensitive to dye factory effluent.

9202-150. Gill Tejendra S, Pande Jaishree, Tewari Hema (Dept Anat, Thomas Jefferson Univ, 1020 Locust Street, Philadelphia, Pennsylvania 19107, USA). **Hemopathological change associated with experimental aldicarb poisoning in fish (*Puntius conchonius* Hamilton).** *Bull Environ Contam Toxicol*, **47** (4) (1991), 628-633 [23 Ref].

Present investigation was undertaken to evaluate the adverse effects of aldicarb on a non-target organism-*Puntius conchonius*. Circulating populations of leucocytes (small and large lymphocytes, neutrophils, monocytes, basophils, and thrombocytes) and erythrocytes and hemoglobin content were chosen as indicative parameters of experimental aldicarb poisoning over a 4 week exposure period at sublethal concentration. In addition, the aldicarb exposed fish were allowed recovery for a week in clean water to see if the blood changes were reversible. The results of the study revealed pronounced lymphocytosis and marked thrombocytosis which persisted even after recovery for a week in clean water.

9202-151. Gill Tejendra S, Tewari Hema, Pande Jaishree, Lal Sudha (Dept Anat, Thomas Jefferson Univ, 1020 Locust street, Philadelphia, Pennsylvania 19107, USA). **In vivo tissues enzymes activities in the rosy barb (*Barbus conchonius* Hamilton) experimentally exposed to lead.** *Bull Environ Contam Toxicol*, **47** (6) (1991), 939-946 [27 Ref].

The effects of acute Pb poisoning on the enzymes concerned with membrane transport, neuro transmission and energy metabolism in selected tissues of the rosy barb *Barbus conchonius*, a freshwater fish have been studied. Overall, experimental Pb poisoning seriously impairs the enzyme systems in the rosy barb. Alterations in the activities of enzymes regulating membrane transport seem to be the result of tissue

damage caused by toxic cations. Changes in the AchE may be related to a direct neurotoxic effect.

9202-152. Gopalakrishna Pillai AG, Ravindran K (Cent Inst Fisheries Techno, Kochi 682029). **Influence of environmental variables on corrosion of carbon steel.** *Fishery Techno*, **29** (1) (1992), 1-4 [14 Ref].

The influence of environmental variables on corrosion of carbon steel in the Cochin Harbour waters was investigated. The coefficients of correlation between days of exposure and fouling, corrosion rate were worked out and polynomials for the same were determined. The coefficient of correlation between days of exposure and corrosion rate was significant at 0.1% level.

9202-153. Gowrinathan KP, Rao VNR (Cent Adv Std Bot, Univ Madras, Madras 600025). **Interactive effect of heavy metals on the growth of diatoms.** *J Indian Botl Soc*, **69** (3 & 4) (1990), 233-236 [8 Ref].

Interactive effect of heavy metals on growth of *Cyclotella meneghiniana* Kotz and *Nitzschia obtusa* Wm. Sm. was studied with different combinations of Hg, Cu, Cd, Zn, Pb and Cr. Antagonistic and cumulative responses were mostly observed in many of the combinations of heavy metals in both the diatoms. In some treatments, additive and synergistic responses were also observed.

9202-154. Haniffa MA, Arul Selvan S (PG Dept Zoo, St. Xavier's Coll, Palayankottai 627002). **Haematological and biochemical effects of textile-mill effluent on the freshwater fish *Oreochromis mossambicus* (Trewaves).** *Uttar Pradesh J Zoo*, **11**(1) (1991), 62-66 [31 Ref].

Oreochromis mossambicus were exposed to sublethal concentrations of mixed textilemill effluent to study the haematological and biochemical changes as a function of effluent concentration and exposure duration. Increase in concentration produced a dose dependent elevation in haemoglobin and a decrease in mean corpuscular haemoglobin. Irrespective of the exposure duration, increase in concentration caused decrement in carbohydrate, protein fat and ash contents.

9202-155. Harold Philp G, Malla Reddy Bt Ramamurthi R (Dept Zoo, SK Umv, Anantapur 515003). **Alterations in the histopathology and G-6-PDH activity in tissues of *Mus booduga* after oral benzenhexachloride feeding.** *Env Eco*, **9** (4) (1991), 887-890 [19 Ref].

Mice, *Mus booduga* was fed orally with sublethal concentration (50 mg/ kg body weight) of BHC for 1,5 and 15 days. After the stipulated time, tissues such as brain, liver and muscle were isolated and used for the assay of G-6-PDH activity and brain was processed for histopathological examination. The activity of G-6-PDH increased in all the tissues and significant changes were noticed in the brain tissue integrity at all periods of exposure. These studies indicate that BHC even in sublethal concentration can cause deleterious effects.

9202-156. Husain K, Vijayaraghavan R, Raza SK, Saxena SP (Div Pharmacology, Defence Res Dev Estb, Gwalior 474002). **Acute inhalation toxicity of disopropyl phosphorofluoridate in rats.** *Indian J Environ Toxicol*, 1 (13 (1991), 47- 52 [15 Ref].

The acute inhalation toxicity of disopropyl phosphorofluoridate (DFP) was carried out in rats at different time intervals. DFP in a concentration of 100 gm.m³ for varying times of exposure significantly inhibited acetylcholinesterase (AChE) activity in cerebral and peripheral tissues, raised the level of blood glucose and depleted glycogen from cerebral as well as peripheral tissues. In the present study it was observed that initially the lung and blood cholinesterase was inhibited followed by maximum inhibition in the blood after 40 min of exposure when the animals were critical.

9202-157. Jaysuria S, Subramanian AM, Varadaraj G (Dept Zoo, Holy Cross Coll, Nagercoil 629004). **Effects of detergents on the oxygen consumption of the catfish *Mystus vittatus*.** *J Ecobio*, 3 (3) (1991), 217-220 [13 Ref].

Detergents like Surf and Nirma were selected to find out their effect on the survival and oxygen consumption of the fish *Mystus vittatus*. LC₅₀ values at 24,48,72 & 96 h for the fish ranged between 37-46 ppm in Surf and 33-43 ppm in Nirma. Apparently Nirma potentiated the toxicity of Surf.

9202-158. Jebanesan A, Angels J (PG Res Dept Zoo, Loyola Coll, Madras 600034). **Acute toxicity of K-othrine to the aquatic hemipterans, *Ranatra lififormis* (Fabr.), *Ranatra elongata* (Fabr), *Anisops bouvieri* (Kirkaldy) and *Diplonychus indicus* (Venk & Rao).** *Polln Res*, 10 (3) (1991), 157-160 [11 Ref].

Acute toxicity of a pyrethroid compound K-Othrine to the aquatic hemipterans *Ranatra filiformis*, *Ranatra elongata*, *Anisops bouvieri* and *Diplonychus indicus* were studied using static bioassay method. *D. indicus* is the resistant species followed by *R. elongata*, *R. filiformis* and finally *A. bouvieri*.

9202-159. Jeyachandran R, George VK (Unit Ecophysio, Dept Bot, St Joseph's Coll, Tiruchirapalli 620000). **Zinc toxicity and its alleviation by calcium salts in alga *Scenedesmus acutus* 273.** *J Ecotoxicol Environ Monit*, **1** (3) (1991), 180-184 [12 Ref].

Toxicity of Zn²⁺ and its alleviation by the supplementation of CaCl₂ and Ca(NO₃)₂ on growth and pigment composition of *Scenedesmus acutus* grown in urea media was investigated. The result showed that ZnSO₄ beyond 0.4 ppm causes decline in growth and abnormality. The treatments supplemented with the calcium salts were found to show enhanced growth and greater amount of protochlorophyll, chlorophyll-a and b and carotenoids in general.

9202-160. Tha AN, Sharma T (Cytogenetic Lab, Cent Adv Std Zoa, Banaras Hindu Univ, Varanasi 221005). **Enhanced frequency of chromosome aberrations in workers occupationally exposed to diagnostic X-rays.** *Mutation Res*, **260** (4) (1991), 343-348 [26 Ref].

To estimate the level of radiation exposure of personnel handling diagnostic X-ray machines, the yield of chromosomal aberrations was analysed in peripheral blood lymphocyte cultures. These occupationally exposed individuals showed higher frequencies of dicentricies as well as acentrics than normal controls. The increase in the aberration yields in this personnel underscores the need of adoptin, measures to avoid or minimise such overexposure.

9202-161. Joshi SC, Pandit HK, Sin&h SK. Vijaywat JK (Sch Std Zoo, Vikram UrLiv, Ujjain 456010 MP). **Malathion induced changes in the oxygen consumption rhythm of the fish *Mystus tengare* (Ham).** *J Hydrobio*, **9** (1) (1991), 67-69 [7 Ref].

The fish, *Mystus tengara* (Ham.) possesses three peaks pattern during its circadian rhythm of oxygen consumption (m/kg/hr). Malathion (0.05 ml/l) changes the magnitude of the rate of oxygen consumption and also modulates the timing.

9202-162. Kabra RA, KuLkarni KM (Environ Physio Lab, PG Dept Zoo, Govt Vidarbha Mahavidyalaya, Amravati 444604). **Cythion toxicity effects on food consumption and growth in the fish *Channa orientalis* (Sch).** *Adv Biosci*, **10** (2) (1991), 61-68 [21 Ref].

Channa orientalis was exposed to sublethal levels of cythion. Cythion treatment significantly affected the rate of feeding, absorption, metabolism and conversion. All

these rates decreased with increasing concentrations of cythion. Inhibition of food consumption and elevated maintenance cost might be responsible for reduction in growth and conversion efficiencies.

9202-163. Kashedikar P (Dept Zoo, Govt Holkar Sci Coll, Indore, 452001 MP). **Effect of malathion exposure on the intestinal eosinophilic response of albino mice experimentally infected with Hymenolepis nana.** *J Hydrobio*, **6** (1) (1990), 7-9 [4 Ref] (Late Recd).

Experiments were carried out in 7-9 weeks old female swiss albino mice. Intestinal eosinophilia was found to be a regular feature of Hymenolepis nana infection and the response was correlated to the various phases of the infection. The study reveals the importance of eosinophilic response of the mice in combating the tissue injury caused both by the parasites as well as the insecticide.

9202-164. Khandekar RN, Tripathi RM, Raghunath Radha, Nambi KSV (Environ Assessment Div, Bhabha Atom Res Cent, Bombay 400085). **Environmental lead and human poisoning.** *Encology*, **6** (1) (1991), 1-7 [17 Ref].

The measurements of lead in air, water, and soil have been carried out in Greater Bombay. The blood lead levels in adults and child population were also measured. The various sources identified were ayurvedic medicines taken for arthritis, employment in living near leather, battery and metal smelting industries and application of sindoor powder on forehead. A summary is also presented of the results obtained from samples collected at Talasari village where wide-spread environmental lead poisoning was reported.

9202-165. Khangarot BS, Takroo Renu, Singh RR, Srivastava SP (Indl Toxic Res Cent, PB No. 80, MG Marg, Lucknow 266 001). **Toxicity and bioconcentration of hexachlorocyclohexane (HCH) in an air-breathing catfish, Saccobranthus fossilis (Bloch).** *Bull Environ Contam Toxicol*, **46** (6) (1991), 904-911 [15 Ref].

Studies on toxicity and bioconcentration of commercial grade t. I HCH to a freshwater, air-breathing catfish, Saccobranthus fossilis revealed behavioral changes viz. increased erratic, opercular movement, surfacing, difficulty in respiration and loss of equilibrium. (LC₅₀) values revealed marked increase in the sensitivity of fish with

exposure time. The bioconcentration of HCH was rapid in gills compared to other tissues.

91202-166. Krishna Murthi V, Sridhara Rama Rao BS (Regl Occupl Hlth Cent (Southern), (India Coun Medl Res), Centl Lib Block, BMC Camp, Bangalore 560002). **Work environment surveillance with reference to managanese pollution in ferro alloy plants.** *Asian Env*, **13** (4) (1991), 25-35 [12 Ref].

The study aimed at the assessment of manganese pollution in different job processes of three major ferro alloy plants in Karnataka State. The study comprises of work environmental study and biological monitoring. Though the blood manganese levels were within the range reported by WHO group, the study indicates that the workers at furnace area are exposed to higher levels of air manganese and heat stress.

9202-167. Kumar P, Rastogi SK, Gupta BN, Hussain Tanveer (Indl Toxic Res Cent, PB No 80, MG Marg, Lucknow 226001). **Psychological responses to thermal strees in a glass bangle factory.** *J Soc Occupl Med*, **41** (4) (1991), 157-160 [20 Ref].

Behavioural studies were conducted on a random sample of 38 glass bangle workers engaged in various occupations and exposed to high ambient temperature and radiant heat during their work in the glass bangle industries at Firozabad, India. The mean scores of immediate memory were much lower in the exposed population than in the controls thereby indicating impairment of immediate memory in the study group. The visuo-motor coordination and vigilance were also significantly affected. Visual perception showed a downward trend among the glass bangle workers, although the MPI test indicated no personality changes.

9202-168. Kundu Rahul, Lakshmi R, Mausun AP (Marine Bio Lab, Dept Biosci, Saurashtra Univ, Rajkot 360005). **The entry of mercury through the membrane: an enzy-mological study using a tolerant fish Boleopthalmus dentatus.** *Proc Acad Environ Bio*, **1** (1) (1992), 1-6 [16 Ref].

The effect of sublethal concentrations of mercuric chloride on the membrane permeability of six major organs in a very tolerant coastal teleost, *Boleopthalmus dentatus*, are discussed. Fishes were exposed to four sublethal concentration of Hg (II) for three different durations. The results show a dose and duration dependent inhibition in all the tissues. This inhibition was probably due to binding Hg (II) to the sulphydB1-bond at the active site of the ATPase.

9202-169. Lomte VS, Mule MB (Dept Environ Sci, Marathwada Univ, Aurangabad 431004). **Effect of rogor (dimethoate 30% EC) on glycogen content of freshwater snail *Welanoides tuberculatus*.** *Proc Acad Environ Bio*, **1** (1) (1992), 101-108 [12 Ref].

The animals were exposed to 48 h TLm (6.55 ppm). After 24, 48 and 72 h treatment, the glycogen contents of whole body, foot, digestive gland and mantle were estimated. It was observed that the glycogen content was significantly decreased in all body tissues after treatment by rogor. In control the glycogen content in whole body, foot, digestive gland and mantle is 2.08%, 2.52%, 3.0% and 1.01%, respectively. In treated snails the glycogen content after 72 h treatment in whole body, foot, digestive gland and mantle is 1.51%, 1.59%, 1.12% and 0.51%, respectively.

9202 170. Madhukumar G, Thomas Shyni (Dept Zoo, NSS Hindu Coll, Changanacherry 686101, Kerala). **Peripheral haematology of *Rana hexadactyla* Lesson exposed to sub lethal concentrations of ekalux.** *J Zool Soc Kerala*, **1** (1) (1991), 39-42 [12 Ref].

Peripheral haematological parameters of *Rana hexadactyla* Lesson exposed to sublethal concentrations of ekalux at room temperature for 24 hrs were analysed. TEC, Hb and Ht increased with increasing concentration of the pesticide suggesting some sort of compensatory reaction by the animal to overcome hypoxia. The results indicate that sublethal concentration of ekalux induced microcytic anaemia in *R. hexadactyla*.

9202-171. Madhwani KP, Ghuliani KK, Nayar S (Dept Community Med, Mahatma Gandhi Inst Medl Sci, Sewagram 442101). **FEV₁, measurements for 3 consecutive days after holiday in ginning mill employees.** *Indian J Indl Med*, **37** (4) (1991), 164-178 [15 Ref].

Lung function tests of ginning mill employees on three consecutive days (pre-shift and post-shift) for three consecutive occasions after a holiday (Friday) were performed. FEV₁ decline in lung function during a work-shift was comparatively maximum on first working day after a holiday, than on the subsequent days, and is a useful parameter for early detection of respiratory disorders among the employees of ginning mills.

9202-172. Magare SR, Kulkarni AB (Dept Zoo, Marathwada Univ, Aurangabad 431004). **Laboratory evaluation of piscidin activity of some medicinal plants in a fish, *Nemacheilus sinuatus*.** *Proc Acad Environ Bio*, **1** (1) (1992), 53-56 [4 Ref].

Aquaous extracts of the medicinal plants were screened for their possible stupefying activity or piscidal value in the fish *Nemacheilussinuatus*. Active constituents of these medicinal plant extracts in water decided chemical nature of active principle(s). These were found to be haemolytic, complex organic non-nitrogenous substances, like saponis. Of the plants tested, *Sapindus trifolians* and *Acacia rugata* exhibited highest potentiality.

9202-173. Mani K (Neyveli Lignite Corp Hosp, Neyveli). **Pointers for work related diseases in mining.** *Indian J Indl Med*, **37** (4) (1991), 182-188 [2 Ref].

A point prevalence study to find out the presence of pointers for Work Related Disease (WRD) was undertaken in two groups of mines. The study revealed that OHS units are not functioning properly, PME is incomplete in most cases, so the picture of WRD is somewhat hazy in our country. An integrated, systemic and co-ordinated approach with full coverage of PME is suggested to find out the WRD.

9202-174. Martin ER (M Dept Zoo, KTHM Coll, Nasik 422002, MS). **Behavioural dysfunction of *Labeo rohita* to acid stress.** *Himalayan J Environ Zoo*, **5** (2) (1991), 61-64 [14 Ref].

Behavioural dysfunction of *Labeo rohita* to acid stress was studied. The fishes showed an avoidance behaviour. The behavioural pattern showed variation with light and sound. The horizontal, vertical and ventilatory movements showed variation. The physiological aspect to this behaviour changes are discussed.

9202-175. Mary Chandravathy V, Reddy SLN (Dept Zoo, Osmgna Univ, Hyderabad 500007). **In vivo recovery in the glycogen metabolism in liver and muscle of a freshwater fish *Anabas scandens* after exposure to lead nitrate.** *Indian J Environ Toxicol*, **1**(1) (1991), 53-58 [26 Ref].

Freshwater fish, *Anabas scandens* were exposed to sublethal concentration of lead nitrate (10 ppm) for-a period of 15 days. The results revealed that the glycogen levels reduced significantly with an elevation in active and total glycogen phosphorase activities in liver and muscle during exposure. On transferring to toxicant free water the metabolities- and enzymes slowly and progressively recovered to near normal levels.

9202-176. Mathur AK, Gupta BN, Singh A, Singh S, Shanker Ravi, Narang S (Indl Toxico Res cent, Mahatma Gandhi Marg, PB. 80 Lucknow). **Hepato-toxicity of nickel sodium lauryl sulphate and their combination after repeated dermal application in guinea pigs.** *J Environ Sci Hlth*, **126** (8), (1991), 1333-1343 [16 Ref].

Guinea pigs were dermally exposed to nickel (Ni), sodium lauryl sulphate (SLS) alone and in combination for 7 and 14 days. Their combination however produced slightly more changes in above parameters. The-exposure to Ni produced focal areas of inflammatory reaction and SLS shrunken hepatic cords with loss of cytoplasmic details. However, their combination produced wide spread degeneration and necrosis of hepatocytes. It is concluded that industrial workers or populations exposed to these two chemicals together are more prone to hepatic toxicity due to dermal absorption.

9202-177. Md Rafi G, Srinivas T, Reddy SJ, Reddy DC, Ramamurthi R (Pesticide Indl Toxico Cent, Dept Zoo, Sri Venkateswara Univ, Tirupati 517502). **Acute and chronic toxicity of endosulfan to crab: effect on lipid metabolism.** *Bull Environ Contarn Toxico*, **47** (6) (1991) 918-924 [17 Ref].

Paper presents the effects of endosulfan on lipid metabolism in *Oziotelphusa senex senex*. Results indicate that there was a significant and gradual increase in total lipid (IL) content of the hepatopancreas and claw muscle of crabs as a function of exposure period. The free fatty acid content increased and glycerol content decreased as a function of exposure period.

9202-178. Mehta FR (Naval Cheml Metallurg Lab, Naval Dockyards, Bombay). **Lead absorption in workers handling lead products.** *Indian J Indl Med*, **37** (4) (1991). 171-175 [7 Ref].

Blood lead levels of 180 workers employed in various workshops have been determined employing atomic absorption spectrophotometric technique. The mean blood lead concentration was 60.09 ± 25.05 $\mu\text{mg}/100$ ml. Blood lead levels of workers employed in paint, battey, foundry and sheet metal shops have been compared.

9202-179. Mishra K, Pandey AK, Kashedikar P (Dept Zoo, HoLkar Sci Coll, Indore MP). **Studies on the dimethoate induced changes in the pituitary of Heteropneustes fossilis (Bloch).** *J Hydr. Bio*, **7** (1) (1991), 65-66 [7 Ref].

Present study is carried out to see the deteriorating effect of dimethoate (Rogor) on the pituitary of *Heteropneustes fossilis*. Results indicates that dle acidophils and

cyanophils of the pituitary show vacuolization, liquification of cytoplasm and degenerative changes in the neurohypophysis. The various cells are damaged, thus affect the functioning of pituitary. It is concluded that dimethoate (Rogor) exposure disturbs the pituitary gonadal hormonal axis of the fish *Heteropneustes fossilis*.

9202-180. Mishra Dilip K, Tripathy Praful C, Hota Ashok K (Sch Life Sci, Sambalpur Univ, Jyoti Vihar 768019, Orissa). **Toxicity of kilex carbaryl to a freshwater teleost *Channa punctatus* (Bloch).** *J Appl Zoo Res*, **2** (2) (1991), 96-98 [10 Ref].

Kilex carbaryl a contact and stomach poison is being used to control insect pests in the rice cultivation. Its toxic potency in solution decreased with an increase in exposure period in air. The carbaryl was less toxic to fresh water fish *Channa punctatus*.

9202-181. Mishra Virendra, Pandey Shri Dhar, Viswanathan PN (Ecotoxic Sec, Indl Toxic Res Cent, PB No. 80, Mahatma Gandhi Marg, Lucknow-226 001). **Retardation of biodegradation of linear alkyl benzene sulphonate by a sublethal concentrations of mercuric chloride.** *Bull Environ Contam Toxicol*, **47** (4) (1991), 561-564 [10 Ref].

Studies on biodegradation profile of linear alkyl benzene sulphonate (LAS) showed substantial decrease in the presence of Hg in the system. Further investigations reveals that the biodegradable compound could become recalcitrant because of the inhibition of bio-transformation capacity of ecosystem under multiple chemical stress.

9202-182. Mohan Rao N, Kartha GP, Patel TS, Kulkarni PK, Kashyap SK (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Indoor air pollution and respiratory health, a comparison between women exposed to traditional fuel pollutants with that of modern fuel.** *Indian J Environ Prot*, **11** (11) (1991), 839-892 [14 Ref].

In the study respiratory symptoms, radiological fixings, pulmonary function test (PFT) values were compared in females using cattle dung as cooking fuel and with those using kerosene, LPG. The PFT values of females using traditional fuel is compared with shopkeepers exposed to outdoor air pollutants to determine which one is more hazardous. The results revealed higher morbidity of respiratory symptoms, significant reduction in VC and FEF 25-75 to percentage predicted value, significantly higher prevalence of pulmonary impairment in females using traditional fuel than modern fuel.

9202-183. Mohan Rao N, Kashyap SK, Saiyed HN, Kulkarni PK, Purohit AK, Patel BD (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Pulmonary function studies in child labourers.** *Indian J Occupl Hlth*, **35** (1) (1992), 25-29 [11 Ref].

Pulmonary function has been studied in children engaged in wool carpet industry, slate pencil industry and in diamond cutting and polishing. High prevalence of restrictive pulmonary ventilatory impairment, reduced value of percentage of predicted FEF_{25-75%} were exhibited by these workers. This study provides a base line data for a detailed epidemiological study among child labourers.

9202-184. Mohan Rao N, Parikh JR, Malvankar MG, Kulkarni PK, Patel BD, ChattelJee BB, Kashyap SK (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Acute and chronic changes in ventilatory lung function in textile workers.** *Indian J Environ Prot*, **11** (9) (1991), 654-658 [19 Ref].

Lung function tests were measured in 148 workers exposed to cotton dust in different departments of a textile mill and 108 control workers for assessment of acute and chronic changes in ventilatory function due to exposure to cotton dust. This investigation revealed chronic pulmonary dysfunction of moderate to severe category in 71.4% byssinotics and 40.1% in non-byssinotics. Smoking has an additive effect over dust exposure in causing decline in ventilatory function.

9202-185. Mohan Rao N, Patel TS, Raiyani CV, Kulkarni PK, Aggarwal AL, Kashyap SK, Chatterjee SK (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **A dose-response relationship between pollution index and pulmonary function in shopkeepers exposed to auto exhaust.** *Indian J Environ Prot*, **11** (10) (1991), 737-740 [16 Ref].

A dose-response study between NO_x pollutant level and pulmonary function value is assessed in shopkeepers by relating pollution index with the percentage predicted VC and FEV₁% value. The results demonstrated that smoking has an additive effect over NO_x exposure in producing pulmonary impairment. In any traffic junctions, the number of years of exposure to produce pulmonary impairment is less in smokers than nonsmokers.

9202-186. Mullick, Suparna, Konar SK (Fisheries Lab, Dept ZOD, Kalyani Univ, Kalyani 741235). **Combined influence of heavy metals, petroleum products, detergents,**

pesticides and fertilizer on the worms *Branchixra sowerbyi*. *Env Eco*, **9** (4) (1991), 1032-1037 [23 Ref].

Combined influence of heavy metals (Zn, Cu, Fe and Pb), petroleum product (n-hexane), detergent (paranol J), pesticides (endosulfan and DDVP) and fertilizers (nitrogen from urea and phosphate from single superphosphate) on the worm *Branchiura sowerbyi* was studied. Altogether ten mixtures were tried, of which four-metal mixture was found to be most lethal to the worms.

9202-187. Nagabhushanam R, Machale PR, Katyayani RV, Reddy PS, Sarojini R (Dept Zoo, Marathwada Univ, Aurangabad 431004). **Erythrophoretic responses induced by naphthalene in freshwater prawn, *Caridina rajadhari*.** *J Ecotoxicol Environ Monit*, **1** (3) (1991), 185-191 [20 Ref].

Naphthalene dispersed the red chromatophores of white background adapted *Caridina rajadhari*. It has no effect on dispersed red chromatophores. Dispersing response observed was concentration dependent. Naphthalene reduced the red chromatophore dispersing potencies of central nervous tissues.

9202-188. Neeraja P, Santhi K (Dept Zoo, SV Univ, Tirupati 517501). **Effect of ammonium sulphate on the levels of phosphatases in the liver and kidney of the freshwater fish *Oreochromis mossambicus*.** *Proc Acad Environ Bio*, **1**(1) (1992), 57-60 [13 Ref].

Attempt has been made to study the effect of ammonia on phosphatases in liver and kidney of a fresh water fish, *Oreochromis mossambicus* under in vivo conditions. Ammonium sulphate is used as an ammonium salt to create ammonia stress. Fishes were exposed to 200 ppm concentration. 4 significant rise in the activity of acid and alkaline phosphatases was recorded in liver and kidney tissue of *Oreochromis mossambicus* at 60 days following exposure to a sublethal concentration (200 ppm) of ammonium sulphate.

9202-189. Noor Alam Md, ShaE Md (Dept Zoo, Giridih Coll, Giridih-815301). **Toxicity of two agricultural chemicals metacid 50 and ekalux EC 25 to tadpoles of *Rana tigrina*.** *Env Eco*, **9** (4) (1991), 870-872 [12 Ref].

Attempt was made to study the toxicity of metacid 50 and ekalux EC 25 to tadpoles of the frog, *Rana tigrina*. LC₅₀ and LC₁₀₀ of metacid were 9.5 and 10.25 ppm

and those of ekalux were 8.75 and 9.5 ppm, respectively. Ekalux was more toxic to the tadpoles than metacid.

9202-190. Ojha Supriya, Norton SP, Shrivastava Nidhi, Jain Seema (Dept Zoo, MV Mahavidyalaya Bhopal 462008). **Effect of dietary malathion in three successive generations of albino rats.** *Env Eco*, **9** (4) (1991), 1007-1010 [9 Ref].

Malathion is one of the organophosphorus insecticide, commonly used by the farmers. In present experiment the wheat grains were treated with malathion at different doses and orally fed to the albino rats, to study the effect of malathion in three successive generations of rats.

9202-191. Oommen Manu, George Sanll, Mathew Thomas (Dept Zoo, Mar Thoma Coll, Tiruvalla 689103, Kerala). **Effect of metacid on the primary production in an artificial freshwater pond ecosystem.** *J Zool Soc Rerala*, **1** (1) (1991), 79-81 [11 Ref].

The effect of metacid on the primary production of an artificial freshwater pond ecosystem was studied. Gross and net production was found to be nil whereas respiration showed an increase in higher concentrations of metacid. The possible reasons are discussed

9202-192. Panigrahi AK, Konar SK (Pisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Influence of petroleum refinery effluent in presence of non-ionic detergent sandozin NIS on fish.** *Env Eco*, **10** (1) (1992), 55-59 [24 Ref].

Ninety-day outdoor chronic tests were conducted on fish *Tilapia mossambica* using constant level of 11.88 mg/liter of nonionic detergent, sandozin MS with different sublethal levels of petroleum refinery as toxicants. Exposed fish showed abnormal behavior at higher concentrations. Thus sublethal levels of petroleum refinery effluent in presence of nonionic detergent reduced the fish yield.

9202-193. Pisiva Ravi Shankar, Pand Peetambar (Dept Zoo, PG Coll Sci, Osmania Univ, Saifabad, Hyderabad (500004, AP). **Physiological responses of *Notopterus notopterus* (Pallas) during benzothiazepine and benzoxazipine derivatives toxicity.** *Polln Res*, **10** (3) (1991), 151-155 [14 Ref].

The effect of sublethal concentrations of benzothiazepine and benzoxazipine (4.0 ppm) derivatives on oxygen consumption and biochemical contents in liver, muscle, gill

and kidney tissues of *Notopterus notopterus* has been studied. Oxygen consumption increases upto 48 hrs, then decreased gradually to 96 hrs of exposure period.

9202-194. Prakasam VR, Azariah Jayapaul (Zoo Res Lab, Fatima Coll, Quilon 691001, Kerala). **Toxic effect of Hg on the tissue respiration of monascidian, *Ascidiella aspersa*.** *J Ecobio*, **3** (2) (1991), 106-109 [14 Ref].

The toxicity of Hg on the tolerance and tissue respiration of an ascidian, *Ascidiella aspersa* was studied. It was found that LC_{50} -24 h value was 0.45 mg $HgCl_2/l$ (0.33 mg Hg/l). The normal oxygen uptake rates of pharynx and mantle tissues of *A. aspersa* were $16.49 + 0.64 \mu l O_2/hr/mg$ and $11.46 \pm 1.02 \mu l O_2/hr/mg$ respectively. At a lethal concentration of 0.6 mg $HgCl_2/l$ (0.44 mg Hg/l) both tissues showed decreased oxygen uptake rates of 12.86 ± 1.19 (pharynx) and $10.19 \pm 0.83 \mu l/h/mg$ (mantle).

9202-195. Prakasam VR, D'Cruz Shalate, Sibi L (Zoo Res Lab, Fatima Mata National Coll, Quilon 691001). **Opposite responses of the heart of crab, *Ocypode platytarsis* on exposure to Hg in amphibious situations.** *Polln Res*, **10** (3) (1991), 135-138 [11 Ref].

The heart rate of shore carbi *Ocypode platytarsis* was observed in aerial and aquatic media by removing a piece of carpace. In aerial situation, the normal heart rate recorded was 95.69 per minute and in sea water medium the rate was low (66.39 per minute). It was found that $HgCl_2$ produced bradycardia in the crab. Sea water combined with $HgCl_2$ showed acceleration of heart rate, indicating neutralization of toxicity effect.

9202-196. Prakash Ram (Dept Biosci, Pac Natural Sci, Jamia Millia Islamia-Centl Univ, New Delhi -110025). **Protection by methionine against manganese toxicity in liver and kidney of rat.** *J Tissue Res*, **1** (1&2) (1991), 21-27 [21 Ref].

Attempts have been made to record the therapeutic value of the methionine against manganese toxicity in liver and kidney of the rat. Results show that methionine is effective to reduce the manganese ions burden in these tissues and to decrease the toxicity level. The mechanism of detoxication has also been discussed herewith.

9202-197. Prasad M S (Dept Zoo, Bihar Univ, Muzaffarpur-842001 Bihar). **SEM study on the effects of crude oil on the gills and air breathing organs of climbing perch, *Anabas testudineus*.** *Bull Environ Contam Toxicol*, **47** (46) (1991) 882-889 [13 Ref].

Comparative studies on toxicity of crude oil on morphological changes in the epithelia of gills and air breathing organs of climbing perch, *Anabas testudineus* at SEM level have been carried out. Fish exposed to crude oil solutions showed swelling of the epithelial cells increase in mucus secretion and filling up of interlamellar space with hyperplastic epithelial or mucous cells. Besides this, gill tissue showed a series of pathological alterations such as lesions in the epithelial layer, hypertrophic mucous cells and sloughing of the epithelial layer as well as vacuolization in the gill lamellae.

9202-198. Pundir R, Saxena AB (Dept Zoo, Holkar Sci Coll, Indore 452001). **Chronic toxic exposure of cadmium on the pituitary gland of fish *Puntius ticto* and pattern of recoument.** *J Environ Bio*, **13** (1) (1992), 69-74 [13 Ref].

Puntius ticto exposed to safe concentration (30 days) showed striking changes in the cell type of pituitary gland. The cells depicted deformed shape, vacuolization and exhaustion of cytoplasm. The diameter of thyrotrops and gonadotrops also decreased.

9202-199. Pundir Rekha (Dept Zoo, Holkar Sci Coll, Indore, MP). **Studies on effect of estradiol and cadmium acetate on the ovary of fish *Lebistes reticulatus* (Peters).** *J Hydrobio*, **7** (1) (1991), 51-54 [8 Ref].

Present study describes the effect of estradiol and cadmium acetate on the ovary of fish *Lebistes reticulatus*. The observation indicates that ovarian recrudescence in heavy metal treatment. Study also demonstrates the endocrine regulation of reproduction in relation to heavy metal toxicity.

9202-200. Pundir Rekha, Saxena AB (Dept Zoo, Holkar Sci Coll, Devi Ahilya Vishwavidyalya, Indore MP). **Studies on pesticide toxicity to fresh water fish *Channa punctatus*.** *J Hydrobio*, **7** (1) (1991), 61-63 [10 Ref].

In static tests the acute incipient lethal levels (96 h) and threshold toxicity levels of Nuvan, Dimecron and Aldrisun were 0.04, 0.50, 0.07, 0.035, 0.40 and 0.03 ml respectively. The minimum acceptable toxicant concentration (LCO) for this fish was set at 0.01 ml/L for Nuvan, 0.1 ml/L for Dimecron and 0.01 ml/L for Aldrisun respectively.

9202-201. Radhakrishniah K, Suresh A, Urmila Devi B, Sivaramkrishna B (Div Metal Polln Std, Dept Zoo, Sri Krishnadevaraya Univ, Anantapur 515003, AP). **Effect of mercury on the lipid metabolic profiles in the organs of Cyprinus carpio (Linnaeus).** *J Mendel*, **8** (3&4) (1991), 123-125 [13 Ref].

Total lipid content showed a gradual decrease in brain, liver and muscle of *Cyprinus carpio*, at all exposure periods of lethal concentration of mercury with a relative increase in lipase activity, levels of free fatty acids and glycerol. Whereas in sublethal concentration, increase in the total lipids and lipase activity were observed in all the exposure periods. Levels of free fatty acids and glycerol showed an initial increase at 1 day followed by subsequent decrease at 15 and 30 days of exposure to sublethal concentration of mercury.

9202-202. Radhakrishnaiah K, Venkataramana P, Suresh A, Sivaramkrishna B (Dept Zoo, Sri Krishnadevaraya Univ, Anantapur 515003). **Effects of lethal and sublethal concentrations of copper on glycolysis in liver and muscle of the freshwater teleost, Labeo rohita (Hamilton).** *J Environ Bio*, **13** (1) (1992), 63-68 [23 Ref].

Blood glucose level increased in *Labeo rohita* after 1,2 and 3 days of exposure to lethal (1.0 mg/l) and 1, 15 and 30 days of exposures to sublethal (0.2 mg/l) concentrations of copper, with a corresponding decrease in its liver glycogen content and increase in the activities of liver glycogen phosphorylase and glucose-6-phosphatase.

9202-203. Raghunath C, Sivagutu M, Anbudurai PR, James MR, Balakumar T (Unit of Stress Physiol and Plant Biochem, Dept Bot, The American Coll, Madurai 625 002). **Tolerance to aluminium toxicity: certain basic biochemical aspects.** *Bull Environ Contam Toxicol*, **47** (6) (1991) 858-863 [16 Ref].

Studies on biochemical aspects related to aluminium tolerance with specific reference to metabolic inhibitors, 2,4-dinitrophenol (DNP) and cycloheximide and induction of tolerance to aluminium by A1 pretreatment have revealed 77% reduction in root growth with DNP -concomitant increase in A1 uptake by 60%. The differences in A1 uptake and root growth brought about by DNP were significant.

9202-204. Rajendra Kumar M, Chouhan Sunita, Mishra KD (Dept Zoo, Aquaculture Env, SSL Jain Coll, Vidisha 464001). **Toxicity of paper mill effluent to fish, Puntius sophor.** *J Tissue Res*, **1** (1&2) (1991), 41-48 [26 Ref].

Toxicity of paper mill effluent was studied to fish, Puntius sophore. Acute toxicity was studied by static bioassay tests with replacement of effluent dilutions after every 24 h. Tests were conducted in two groups. In pup first dilution were aerated. Whereas in group second dilutions were not aerated. LC₅₀ for 96 hour was estimated 1.5% whereas in second test it was recorded 16.5%.

9202-205. Rajyalakshmi A, Umamaheshwar Reddy P (Dept Zoo, Osmania Univ, Hyderabad 500007). **Carbaryl induced changes in the lipid metabolism of the scorpion, Neterometrus fulvipes (Koch) and the embryos during the gestation period.** *J Environ Bio*, **13** (1) (1992), 13-19 (23 Ref).

Treatment of Heterometrus fulvipes during early gestation period with sublethal doses of carbaryl for 15 and 30 days resulted in decreased embryonic weight and hepatosomatic weight. Total lipids, phospholipids and cholesterol of hepatopancreas and haemolymph of maternal animals and embryos of treated females registered a depletion, the depletion being greater in those animals treated for 30 days.

9202-206. Ramachandran TV (Bhabha Atom Res Cent, Polln Monit Sec, Trombay, Bombay 400085). **Population exposure to low-level ionising radiation.** *Indian J Environ Prot*, **11** (9) (1991), 659-665.

A review is given of the ionising radiation environment covering natural and artificial sources. It is seen that with currently accepted quality factors, the progeny of radon-222 makes the largest single contributor to human exposure. Medical usage is the greatest artificial source. Stochastic effects of radiation and the usual approach to protection from radiation are discussed briefly.

9202-207. Rastogi SK, Gupta BN, Husain Tanveer, Srivastava Seema. (Indl Toxic Res Cont, Mahatma Gandhi Marg, Lucknow 226001). **Pulmonary function evaluation of welders.** *Indian J Environ Prot*, **11** (9) (1991), 648-653 [22 Ref].

Spirometric functions were recorded in a group of 57 male welders in the age range of 21 to 47 year (mean age: 33.2 ± 1.37 year) exposed to welding fumes and gased (mean exposure: 11.4 ± 1.23 year) during welding of joint faces of moulded brass articles and compared with the findings obtained in a reference group (n=64) never

exposed to welding gases. The significant impairment observed in the lung functions of the welders may be attributed to cigarette smoking since non-smoking welders and controls exhibited similar values of FVC and FEV₁. The study failed to show any significant correlation between the length of exposure and lung function parameters even after adjusting for smoking effects.

9202-208. Rastogi SK, Husain Tanveer (Epidemiology Div, Indl Toxicology Res Cent, PB 80, Mahatma Gandhi Marg, Lucknow 226001). **Pulmonary hazards in food spice industries-a review.** *Indian J Occup Health*, **34** (4) (1991), 152-154 [15 Ref].

This review highlights the respiratory problems encountered by the industrial workers exposed to food spice dusts and also deals with the possible mechanisms responsible for pulmonary disorders.

9202-209. Rastogi SK, Husain Tanveer, Gupta BN, Garg N (Indl Toxicology Res Cent, Epidemiology Div, Mahatma Gandhi Marg, Lucknow 226001). **Prevalence of respiratory symptoms and spirometric abnormalities in Lucknow city.** *Indian J Environ Prot*, **11** (10) (1991), 741-749.[27 Ref].

In a cross-sectional study, 348 male subjects in the age group of 14 to 60 years residing in different localities of Lucknow city were investigated for the respiratory symptoms and spirometric abnormalities. The study showed that 9.1% and 13.2% population suffered from productive and dry cough, respectively while 7.1% subjects had exertional dyspnoea of varying grades.

9202-210. Rastogi SK, Savastava Seema, Husain Tanveer (Epidemiology Div, Indl Toxicology Res cent, PB No. 80 MG Marg, Lucknow 226001). **Pulmonary diseases caused by organic dusts in agricultural workers-a review.** *J Environ Res*, **1**(2) (1992), 1-6 [18 Ref].

Paper reviews the available information on pulmonary diseases related to organic dust exposure in the farm environment and the specific agents and mechanism of these diseases so that respiratory morbidity resulting from these diseases could at least be minimised if not prevented.

9202-211. Ravinder Reddy T (Dept Zoo, Kakatiya Univ, Warangal 506009). **Effect of mercuric chloride on protein metabolism of a freshwater mussel *Parreysia rugosa* (Gmelin).** *J Ecotoxicol Environ Monit*, **1**(3) (1991), 230-233 [3 Ref].

Influence of sublethal concentrations of mercury (0.5 ppm) on the protein metabolism of foot, mantle, gill of a freshwater mussel, *Parreysia rugosa* (G) were studied. The levels of total proteins and RNA decreased, but free amino acids (FAA)? proteolytic activity and the levels of amino acid metabolizing enzymes, AAT, AIAT and GDH increased in all the tissues indicating the breakdown of proteins for energy production.

9202-212. Reddy PS, Nagabhushanam R, Sarojini.R (Dept Zoo, Marathwada Univ, Aturangabad 431004). **Lethal and sublethal impact of tributyl tin oxide on organotin antifouling compound on-behavioural responses of the prawn, *Cardina rajadhar*.** *Proc Acad-Environ Bio*, **1** (1) (1992), 33-37 [18 Ref].

In the present study certain behavioural dysfunctions of the prawn, *Cardina rajadhar* caused by tributyl tin oxide was noticed. Results of avoidance/preference experiment showed that prolonged exposure to sublethal concentrations exhibit preferential response of the prawn towards contaminated media. Thus the abnormal response is an early indication of poisoning of organotin antifouling compound in the prawn, *Cardina rajadhar* where they modulate neurophysiological dysfunction.

9202-213. Roy Chowdhury A (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Reproductive health care delivery system in occupational hazards-a review.** *Indian J Occupl Hlth*, **34** (4) (1991), 147-150 [15 Ref].

Gradual increase in the number of toxic chemicals in industry to which workers are exposed and these substances may ham present or even future generations. Therefore, maintenance and promotion of male and female reproductive functions are of prime importance to improve the quality of life. Paper contains a description and an assessment of experimental and epidemiological studies and suggest means of control, as well as collection of references to feedback the scientific information.

9202-214. Ruparelia SG, Verma Yogendra, Saiyed SR, Rawal UM (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Changes in differential white blood cell (WBC) count in fish, *Sarotherodon mossambica* (Peters) under prolonged exposure to cadmium.** *Indian J Environ Toxicol*, **1**(1) (1991), 59-64 [21 Ref].

Freshwater fish, Tilapia (*Sarotherodon mossambica*) were exposed to cadmium (0.1, 1.0 and 10.0 ppm) upto 45 days. Prolonged exposure to cadmium altered the differential white blood cell (WBC) count in fish which exhibited thrombocytosis and neutrophilia along with the increased population of large lymphocytes and lower number of small lymphocytes as well as monocytes. The exposed fish showed a cytological shift between small and large lymphocytes.

9202-215. Saha Mohan (Hindustan Copper Ltd, Khetri Copper Complex Hosp, Khetrinagar, Rajasthan 333504). **Accidents in copper industry.** *Indian J Indl Med*, **37** (4) (1991), 156-163 [4 Ref].

A total of all accidents occurring in the manufacturing and maintenance units of Khetri Copper Complex over a period of 10 years (1980 to 1989) have been analysed. The findings of this study is in conformity with the observation of ILO that a large percentage (65%) of all accidents arise from ordinary, everyday causes. A correlation of accidents with various parameters like age, man days lost and fatalities have also been highlighted.

9202-216. Saralakumari D, Ramalaishna Rao P (Dept Biochem, Sri Krishna-Devaraya Univ., Anantapur 515 003). **Red blood cell glucose metabolism in human chronic fluoride toxicity.** *Bull Environ Contam Toxicol*, **47** (6) (1991), 834-839 [20 Ref].

Present study has been undertaken with a view to assess the changes in glucose metabolism and related enzymes in erythrocytes of humans consuming toxic dose of fluoride for prolonged periods. The chronic intoxication with fluoride appear to results in inhibition of glycolysis and alterations in the glucose metabolism.

9202-217. Sarojini R, Khan AK, Nagabhusanam R (Dept Zoo, Marathwada Univ, Aurangabad 431004). **Petroleum hydrocarbon toxicity to the methane crab, *Ozium rugulosus* and *Pagurus kulkarnii*.** *Uttar Pradesh J Zoo*, **11** (1) (1991), 13-14 [8 Ref]

The effect of diesel and petrol show that *Ozium rugulosus* was more susceptible than *Pagurus kulkarnii* to hydrocarbon toxicity. Diesel was more toxic than petrol to both the crab species at the sub-acute levels, but during chronic exposures reverse results were obtained.

9202-218. Selvanayagam M, Thattheyus Joseph A (Unit Environ Sci, Dept Zoo, Loyola Coll, Madras 600084). **Effect of nickel and chromium on the vertebrae of the scale carp, *Cyprinus carpio communis*.** *J Tissue Res*, **1** (1) (1991), 29-33 [20 Ref].

Scale carp fingerlings were exposed to the sublethal concentrations of nickel 2.5, 5.0 and 10.0 mg/l and chromium 15, 30 and 60 mg/l for 30 days. The vertebral deformities were observed with the help of radiographs and changes in the vertebral mineral content were also noted.

9202-219. Sen Gargi, Behera Milan Kumar, Patel PN (Fisheries Lab, PG Dept Zoo, GM Coll Sambalpur 768004). **Toxicity of zinc to the fish *Channa punctatus* (Bloch) with behavioral, morphological and skeletal abnormalities.** *Env Eco*, **9** (4) (1991), 1023-1027 [23 Ref].

The impact of zinc toxicity on *Channa punctatus* (Bloch) was worked out. The 96-hour LC₅₀ of zinc was found to be 23.07 ppm. At fish showed pronounced fright reaction, erratic opercular movement and swimming pattern, copious mucus secretion and tetanic coma when exposed to doses of more than 12 ppm. Scattered disturbances in pigmentation and frequent haemorrhages followed by necrosis of fin regions were observed.

9202-220. Sengar CBS, Kumar Animesh (EST Consultants (P) Ltd, A-1/71 A Panchsheel Enclave, New Delhi-110017). **Sampling and analytical techniques for the determination of mercury and its compounds in the environment- a review.** *Indian J Environ Prot*, **11** (11) (1991), 843-852 [162 Ref].

A number of instrumental methods for mercury analysis have been reviewed time to time, but information is scattered and not quite extensive in terms of sample collection, separation and determination of mercury and its compounds in environmental samples. An attempt has been made in this article to gather the scattered information on the subject and compare various techniques in terms of sensitivity and applicability to environmental samples.

9202-221. Sharma Arvind, Sharma MS (Dept Zoo, Coll Sci, Sukhadia Univ, Udaipur 313001). **Histopathology of zinc to developing *Lebistes reticulatus* (Peters) and *Cyprinus carpio* (Linnaeus).** *Polln Res*, **10** (3) (1991), 183-188 [13 Ref].

changes in various cellular constituents of gill, liver and intestine of *Lebistes reticulatus* and *Cyprinus carpio* were studied after exposure to zinc. The changes were,

hypertrophy, disruption of epithelial cells and cellular debris in the gills. Vacuolization necrosis and swollen cells in the liver.

9202-222. Sharma YK, Yadav PC, Kashyap SK (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Development of device for detection of exact end of inspiration for ideal chest radiography.** *Indian J Indl Med*, **37** (4) (1991), 176-181 [3 Ref].

A device named "Peak Inspiratory Phase Detector" has been designed and developed for improving the film quality in chest radiography. The use of this device ascertains the consistent phase of Peak Inspiration during chest radiography for epidemiological surveys, study of occupational lung diseases, clinical practice, follow-up studies on pneumoconiosis, chest stereo-radiography and calculating thoracic gas volume.

9202-223. Sheela M, Muniandy S (P G Res Dept Zoo, APA Coll Art Cult, Palani 624602). **Impacts of pesticide dimethoate on the body consumption, add and alkaline phosphatases in different tissues of the fish, Lepidocephalichthys thermalis.** *Env Eco*, **10** (1) (1992), 220-223 [21 Ref].

Effect of dimethoate on protein, carbohydrate and lipid content of muscle and liver in *Lepidocephalichthys thermalis* was studied at different sublethal concentrations. Protein, carbohydrate and lipid content of muscle and liver decreased with increasing concentrations of dimethoate.

9202-224. Shukla Archana, Shukla M (Cheml Engng Dept, HB Technol Inst, Kanpur 208002). **Metal pollution and chromium toxkity.** *J Esiron Res*, **1** (2) (1991), 47-52 [21 Ref].

The present article deals with the toxic effects of trivalent and hexavalent chromium on humans and animals. The hexavalent form of chromium has been found to be more toxic and carcinogenic.

9202-225. Singh Chandra Bhushan, Singh SP (Algal Res Lab, Cent Adv Std Bot, Banaras Hindu Univ, Varanasi 221005). **Protective effects of Ca²⁺ Mg²⁺, Cu²⁺ and Ni²⁺ on mercury and methylmercury toxicity to a cyanobacterium.** *Ecotoxico Environ Safety*, **23** (1) (1992), 1-10 [21 Ref].

Toxicological investigations of the impact of inorganic mercury (Hg^{2+}) and methylmercury (CH_3Hg^+) in terms of growth, NH_4^+ uptake, in vivo glutamine synthetase (transferase) activity, and regulation of toxicity by Ca^{2+} , Mg^{2+} , Cu^{2+} , and Ni^{2+} in the diazobiotic cyanobacterium *Nostoc calcicola* Breb have been completed. Photoautotrophic growth of the cyanobacterium was extremely sensitive to both mercury compounds, CH_3Hg^+ being 2.5 times more toxic than Hg^{2+} .

9202-226. Singh Javardhan, Sinha Rajesh Kumar (Dept Zoo, Gaya Coll, Gaya). **Toxic effect of zinc sulphate on the olfactory epithelium of *Channa gachua* Ham.** *J Mendel*, **8** (3&4) (1991), 225-226 [3 Ref].

Advancement of civilisation has resulted in increasing technological use of heavy metals in industries, zinc sulphate is widely used in the manufacture of alloys and cause injury to the animals. In the present investigations an attempt has been made to investigate the effect of zinc sulphate on the olfactory epithelium of a fresh water fish *Channa gachua* Harn.

9202-227. Singh Narendra N, Srivastava Anil Kishore, Srivastava Anil K (Dept Zoo, Kamla Nehru Inst Phyl Socl Sci, Sultanpur 228 118). **Effect of sublethal concentration of propoxure on some hematological parameters of freshwater Indian catfish, *Heteropneustes fossilis*.** *J Nature Conserv*, **3** (2) (1991), 121-125 [27 Ref].

The Indian catfish *Heteropneustes fossilis*, when exposed to a sublethal concentration of a carbamate pesticide propoxure (1.61 ppm) for seven days evoked a significant decrease in total erythrocyte count, total leucocyte count, hematocrit & hemoglobin concentration. However, a significant increase was observed in the concentration of thrombocyte count and clotting time.

9202-228. Singh PB (Reproductive Toxicology Lab, PG Dept Zoo, TD Coll, Jaunpur UP); **Impact of malathion and γ -BHC on lipid metabolism in the freshwater female catfish, *Heteropneustes fossilis*.** *Ecotoxicology Environ Safety*, **23** (1)(1992), 22-32 [23 Ref].

Female *Heteropneustes fossilis* were exposed to sublethal concentrations of malathion and γ -BHC for 4 weeks during different phases of their annual reproductive cycle. The impact of these pesticides on free fatty acids, monoglycerides, diglycerides, triglycerides, phospholipids, free cholesterol, and esterified cholesterol in the liver, plasma, and ovary was assessed.

9202-229. Sreedevi P, Suresh A, Sivaramkrishna B, Prabhavathi B, Radhakrishnaiah K Dept Zoo, Sri Krishnadevaraya Univ, Anantapur 515003, AP). **Bioaccumulation of nickel in the organs of the freshwater fish, *Cyprinus carpio*, and the freshwater mussel, *Lamellidens marginalis*, under lethal and sublethal nickel stress.** *Chemosphere*, **24** (1) (1992), 29-36 [27 Ref].

Nickel concentration, increased significantly in the gill, kidney, liver, brain and white muscle of the freshwater fish, *Cyprinus carpio*, and in the ctenidium, hepatopancreas, mantle, adductor muscle and foot of the freshwater mussel, *Lamellidens marginalis*, at 1, 2, 3 and 4 days on exposure to lethal and at 1, 5, 10 and 15 days on exposure to sublethal concentrations of nickel.

9202-230. Srinivasan K, Mahadevappa KL, Radhakrishna-murthy R (Centt Food Techno Res Inst, Mysore-570 013). **Toxicity of, and - Hexachlorocyclohexane in rats of different ages.** *Bull Environ Contam, Toxicol*, **47** (4) (1991) 623-627 [10 Ref]

Studies on and -and Hexachlorocyclohexane in rate of various age groups revealed increase in liver weights by dietary HCH isomers. The increases was higher in younger rats as compared to aged ones. HCH isomers did not affect the kidney weight in the rats of higher age groups. Similarly, testis weights were unaffected by HCH isomers in rats of all the age groups. The hepatomegaly produced by dietary HCH isomers is dependent on the age of the animals for a given dosage.

9202-231. Srivastava RS (33, Indrapuri Colony, Indore 452001). **Studies on the effect of BHC on the ovarian histology of a cat fish.** *Bull Environ Sci*, **8** (1989), 29-31 [9 Ref] (Late Pub).

Treatment of *Heteropneustes fossilis* with benzene hexa chloride (1.0 ppm and 2.5 ppm sublethal concentrations) for 15 days revealed histopathological abnormalities in the ovary. The treated fishes showed reduction in their gonosomatic index. The damages were directly related with the dose and duration of exposure of the insecticide, BHC.

9202-232. Srivastava VK, Varshney N, Pandey DC, Jaiswal A (Cataract Res Lab, Dept Chem, Gorakhpur Univ, Gorakhpur 273009). **Impact of industrial effluents on cataract formation in humans.** *J Environ Res*, **1** (2) (1991), 28-37 [29 Ref].

The biochemical profile of cataractous lenses were investigated and it was observed that the contents of several parameters of cataract belonging to distillery area decreased significantly. It is suggested that oxidative damage and industrial effluents may have synergistic effect resulting in such a change in the properties of cataractous lenses.

9202-233. Sultana Safia, Uma Devi V, Nagendra Prasad M (Dept Zoo, Andhra Univ, Waltair, Visakhapatnam 530003). **Effect of heavy metals on the respiration of the catfish *Mystus gulio*.** *J Ecotoxicol Environ Monit*, **1** (3) (1991), 234-237 [11 Ref].

The effect of different concentrations of PbNO₃ and CdCl₂ on the oxygen consumption of *Mystus gulio* was studied. From the results it is evident that cadmium is more potent inhibitor of oxygen consumption than lead.

9202-234. Surendranath P, Ghouse Lazam S, Ramana Rao KV (Div Toxicol, Dept Marine Zoo, SV Univ PG Cent, Kavali 524202, AP). **Effect of kelthane on biochemical composition and calorific value of penaeid prawn, *Metapenaeus monoceros* (Fabricius).** *Natl Acad Sci Lett*, **14** (7) (1991), 303-305 [10 Ref].

Biochemical composition, of prawn, *Metapenaeus monoceros* was studied under kelthane exposure. Total carbohydrates and proteins decreased while free amino acids and total lipids showed elevation on kelthane treatments. The nutritive value (digestibility of protein) and the calorific values decreased as a function of exposure period.

9202-235. Swamy KV, Murali Mohan P (Dept Zoo, SV Univ, Tirupati 517502). **Behavioural changes in relation to cholinesterase inhibition and tolerance during chronic sublethal dosing of three organophosphate insecticides in albino rats.** *Adv Biosci*, **10** (2) (1991), 41-52 [23 Ref].

Three organophosphates viz., phosphamidon, monocrotophos and phosalone were orally administered to albino rats at graded doses of 1/2, 1/4, 1/8 of LD₅₀ for a period of 16 days. It was found that after the 16 days of daily treatment 1/4 LD₅₀ dosed animals have shown no significant changes. There was no recovery in 1/2 LD₅₀ treated animals and complete mortality was noted by the end of the 7th day. Based on these observations a shot dose of 1/2 LD₅₀ was given on the starting day followed by a

maintenance dose of 1/4 LD₅₀ and the Ache levels in total brain, and behavioral changes were monitored. It was found that the cumulative mortality in these three batches of animals was 10-20%. The signs of OP toxicity progressed till the 7-9 days of treatment and were later attenuated followed by complete disappearance, clearly indicating behavioral tolerance.

9202-236. Tiwari Vandana, Chauhan RKS (Sch Std Bot, Jiwaji Univ, Gwalior 474011). **Atlatoxin detection in milk samples of cattle.** *Natl Acad Sci Lett*, **14** (10) (1991), 391-392 [6 Ref].

Occurrence of aflatoxin M₁, which is a hydroxylated metabolite of aflatoxin B₁, has been detected in the milk samples collected from buffalo, cow, sheep, goat and camel. Aflatoxin M₁ has been reported from most of the milk samples of buffalo, cow and goat. Minor traces have also been observed from those of sheep and camel. Traces of unmetabolized aflatoxin B₁ were also reported in buffalo and camel milk.

9202-237. Trivedi SP, Sethi N, Singh RK, Singh P (Dept Zoo, Univ Lucknow, Lucknow 226007). **Fertilizer, calcium ammonium nitrate (CAN) induced Haematotoxic stress to fresh water teleost, Clarias batrachus.** *Biol Memoirs*, **17** (3) (1991), 117-121 [12 Ref].

Fertilizer CAN decreased haemoglobin, red blood cell count and haematocrit 24.05, 28.68 and 34.91% respectively below control in fish, *Clarias batrachus*, total leucocyte count (TLC), at higher concentrations and shorter exposures increased gradually and reached the peak when the fishes died.

9202-238. Vaidya PK, Goyal KG, Singh Vikram (Pesticide Residue Unit, Agricul Res Stn, Rajasthan Agricul Univ, Durgapura Jaipur 302018). **Evaluation of endosulfan residue in Okra (*Abelmoschus esculanxus*) fruit.** *Ah Biosci*, **10** (2) (1991), 107-110 [4 Ref].

A field study was carried out to assess the magnitude of toxicant endosulfan in Okra (*Abelmoschus esculantus*). The fruit crop was sprayed with endosulfan (35 EC) at its lower dosing schedule (0.5 Kg ai/ ha) as well as the massive dosing schedule (1.0 kg ai/ha). The initial average deposits of endosulfan in okra fruit were 5.88 and 8.67 ppm at the lower dosing schedule and the massive dosing schedule, respectively.

9202-239. Varadaraj G, Subramanian MA (M Res Dept Zoo, CN Coll, Erode 638004). **Toxic effect of paper and pulp mill effluent on different parameters of bioenergetics in the fingerlings of *Oreochromis mossambicus*.** *Env Eco*, **9** (4) (1991) 857-859 [14 Ref].

Survival studies were made by using the fingerlings of *Oreochromis mossambicus* and paper and pulp mill effluent. The LC₅₀ 96-hour value was 6% of the effluent. The fingerlings were reared separately at 1,2,3,4 and 5% of the effluent for three weeks. Different parameters of bioenergetics were estimated.

9202-240. Varma Daya R (Dept Pharmac Therapenutics Mc Gill Univ, Montreal Quebec, Canada H3 G1 Y6). **Pregnancy complications in Bhopal women exposed to methyl isocyanate vapour.** *J Environ Sci Hlth*, **A26** (8) (1991), 1437-1447 [11 -Ref].

This study was done to determine the effects of the methyl isocyanate (MIC) spill from the Union Carbide pesticide plant at Bhopal on December 3, 1984 on the course of pregnancy. Pregnancy loss was higher in women who were in their first (58.8%) than in those who were in their second (42.1%) or third (40.1%) trimester of pregnancy during the MIC spill. Of the 273 surviving children born to MIC-exposed women, the status of 200 could be determined in 1990; 20 of these 200 had died before reaching the age of five years. It is suggested that exposure to MIC resulted in a significantly higher pregnancy loss and neonatal mortality.

9202-241. Varma PC, Jha C, Mian S, Sinha SB, Gupta VS (Proj Dev India Ltd, Sindri 828122, Dhanbad). **Effect of temperature on overall collection efficiency of the arsenite procedure for determination of nitrogen dioxide in ambient air.** *Indian J Environ Prot*, **11**(9) (1991), 666-668 [3 Ref].

In view of the prevailing atmospheric temperature in a country like India where maximum temperature goes upto 45°C, studies on the effect of temperature on overall collection efficiency of the arsenite procedure have been carried out using different absorbing reagent volumes. A series of studies using 50 ml, 35 ml, and 20 ml absorbing solution have been carried out. An increase in overall collection efficiency of 5.1%, 3.8% and 3.0% for 50 ml, 35 ml and 20 ml solution, respectively were observed.

9202-242. Vijaya Lakshmi V, Uma Devi G, Prasad M, Venkata Subbaiah MC, Govindappa S (Fish Physio Div, Dept Zoo, Sri Venkateswara Univ, Tirupati 517502).

Effect of environmental acidity on branchial metabolism of fresh water fish *Cyprinus carpio*. *Env Eco*, **10 (1) (1992), 39-42 [21 Ref].**

Fresh water fish *Cyprinus carpio* were acclimated to sublethal acidic medium. The tissue of acclimated fish had high suppression in the oxygen consumption, maintenance of alkali reserves, mobilization of lipids into metabolism and sparing of carbohydrates. Which were associated with the development of acid resistance. The tissue of non-acclimated fish could not exhibit these characters and hence there was mortality in this group of fish. -Hence acclimation as a physiological means of developing acid resistance in fresh water fish was suggested.

Wastes

9202-243. Ayengar Bharathan, Satya Sai PM, Anand Babu (t, Lal KB, Amalraj RV (Bhabha Atom Res Cent, Centralised Waste Manag Facility, Fuel Precessing Nuclear Waste Manag Group, Kalpakkam 603102). **Treatment of uranium bearing waste arising from solvent recovery unit of uranium processing plant.** *Indian J Environ Prot*, **11**(11) (1991), 833-838 [8 Ref].

During the regeneration of tributyl phosphate in uranium plant, a sizable volume of liquid waste containing about 70 mg/l of uranium, along with high concentrations of nitrates and carbonates, is generated. Laboratory studies revealed that the waste was not amenable to conventional treatment methods, including co-precipitation, owing to high concentration of carbonates, with which uranium forms a stable carbonato complex. Studies reveal the application potential of ion -exchange process not only in the treatment of uranium bearing wastes but also in the recovery of uranium.

9202-244. Bansal TK (Thapar Inst Engng Techno, Dept Applied Sci, Patiala 147001). **A study on recovery of chromium from plating effluent by reverse osmosis.** *Indian J Environ Prot*, **11** (10) (1991), 733-736 [9 Ref].

Chromium plating wastewater is treated by reverse osmosis at an applied pressure of 400 psig using DDS HR-98 membranes having total surface area of 0.182 m³. Permeate flux rate is 61 l/hr/m². TDS of feed is reduced by 97% and, total Cr content is reduced by 98%. Electrolytic oxidation of Cr³⁺ is done to keep its level below the critical value in the plating bath on the reuse of retentate.

9202-245. Chitra S, Chandran Sandhya, Sasidhar P, Lal KB, Amalraj RV (Bhabha Atom Res Cent, Centralised Waste Manag Facility Fuel Reprocessing Nuclear Waste Manag Group, Kalpakkam 603102). **Biodegradation of surfactant bearing wastes.** *Indian J Environ Prot*, **11** (9) (1991), 689-692 [6 Ref].

In nuclear industry, during decontamination of protective wears and contaminated materials, detergents are employed to bring down the level of radioactive contamination within safe limits. However, the surfactant present in these wastes interferes in the chemical treatment process, reducing the decontamination factor. Biodegradation is an efficient and ecologically same method for surfactant removal. A surfactant degrading culture was isolated and inoculated separately into simulated effluents containing 1% yeast extract and 5-100 ppm sodium lauryl sulphate (SLS) and 1% yeast extract and 5-100 ppm of commercial detergent, respectively.

9202-246. Chopra AK, Patrick Nirmal IC (Dept Zoo, Gurukul Kangri Univ, Haridwar 249404). **Characterization of pollution domestic sewage entering river Ganga at Rishikesh.** *Himalayan J Env Zoo*, **5** (2) (1991), 126-129 [13 Ref].

The pollution potential of domestic sewage entering the river Ganga at Rishikesh indicated that physico-chemical parameters were within the permissible limit for the discharge of sewage into the river water. The bacteriological and biological parameters showed that the pollution potential was under moderate category.

9202-247. Deshpande VP, Pande SP, Gadkari SK, Saxena KL (Natl Environ Engng Res Inst, Nagpur). **Acid mine drainage treatment.** *J Environ Sci Hlth*, **A26** (8) (1991), 1387-1408 [10 Ref].

Studies were conducted at Churcha underground mines of collieries of South Eastern Coal Fields (Coal) India Ltd) on the acidic mine waters with a view to evolve effective treatment system. The results of treatability studies along with viable treatment options are discussed in the paper.

9202-248. Devi Pratibha (Dept Bot, Osmania Univ, Coll Women Hyderabad). **Growth estimates of sewage irrigated coriander and fenugreek.** *Adv Plant Sci*, **4** (2) (1991), 394-396 [9 Ref].

A comparative study was conducted by sowing the seeds of *Coriandrum sativum* (coriander) and *Trigonella foenum-graecum* (fenugreek) in a sewage irrigated field and comparing its growth responses with controls maintained in an ordinary field irrigated

with tap water. The results show clearly that there was an increase in yield. The significant values hence emphasize the fact that the sewage irrigated plants showed an increased growth and higher yield in comparison with-the control.

9202-249. Dhabadgaonkar SM (Dept Environ Engng, Visvesvaraya Regl Coll Engng, Nagpur 440011). **Appropriate technology for disposal of domestic wastes in rural and semi-urban areas.** Proc Int Conf Rurs' Water Supply Sanitation Developing Countries, 4-7 January 1992, Nagpur 61-64 [3 Ref].

Protected water supply and sanitation are key factors in promoting health and well-being of a society. It has also been realised that, without proper sanitation facilities, good water supply alone cannot ensure full protection from health hazards. Paper presents an appropriate technology to accomplish effective disposal of domestic wastes in rural and semurban areas.

9202-250. Gautam DD, Kumar K, Bishnoi S (Lab Plant Eco, Dept Bot, Dungan (Autonomous) Coll, Bikaner-334001). **Effect of dairy effluent on seed germination of some rabi and kharif crop plants.** *J Environ Bio*, **13** (1) (1992), 7-12 [15 Ref].

An attempt has been made to assess the physico-chemical characteristics of dairy effluent and the effect of various concentrations (25, 50, 75 & 100%) (v/v) on seed germination of some rabi and kharif crop plants. The germination percentage was maximum in 25% effluent concentration whereas germination was at par with that of control in all test crop plants in 50% concentration. The inhibitory effect was observed when treated with 75 and 100% effluent.

9202- 251. Joshi Annupna, Desa PD (Dept Microbio, Bhavan's Coll, Bombay 400058). **Use of a bioreactor in the treatment of phenolic emuents.** *Proc Acad Environ Bio*, **1** (1) (1992), 67-74 [3 Ref].

A bench-scale tower bioreactor in which a biofilm of a mixed microbial population was allowed to develop and was utilised for the removal of phenol from an industrial effluent. A continuous rate of 15 mg phenol degradation per hour could be achieved with the modest aeration device. Use of such a bioreactor on large scale, in the treatment of phenolic effluents would prove to be compact, inexpensive and effective means for preventing water pollution.

9202-252. Kalia VC, Kumar A, Jain SR, Joshi AP (CSIR Cent Biocheml, Mall Rd, Delhi Univ Capmus, Delhi). **Methanogenesis of dumping wheat grains and recycling of the effluent.** *Resources, Conserv Recycling*, **6** (2) (1992), 161-166 [17 Ref].

Paper presents the use of dumping wheat grains for methane generation and also the results of experiments performed for recycling the effluent of the methanogenic stage. Methanogens seem to find 3% TS DWS a more conducive physiological environment, on the basis of reduction in organic solids. It is remarkable to note that at 6% TS DWS the biogas production has been very poor, in spite of the fact that OS reduction was approx. 50.1%. An increased emphasis on water conservation, achievable by recycling of the effluent. Recycling of the effluent, although affecting the total biogas production efficiency, did not, however, affect the quality of the biogas.

9202-253. Kaul SN, Nandy T, Mukherjee PK (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Biological unit processes -an overview.** *Indian J Environ Prot.* **11** (9) (1991), 641-647.

As the biological method of treatment is the most effective and economical method of treatment for organic and certain inorganic waste in India, an attempt has been made to present an overview of the various biological unit processes currently in practice.

9202-254. Kavian MF, Ghatnekar SD (Biotechno Resource Cent, G/1, Adinath, Shaikh Misry Rd, Antop Hill, Bombay 400037). **Bio-management of dairy effluents using culture of red earthworms (*Lumbricus rubellus*).** *Indian J Environ Prot*, **11** (9) (1991), 680-682 [4 Ref].

Treatment of dairy wastewater by the active sludge produces an excess of active sludge. This is usually dehydrated to cake and then discarded. Paper describes experiments in which earthworms were cultured in sludge cake derived from dairy waste and presents data on their growth and reproductive rates and the change in composition of the bedding material and food.

9202-255. Kehri Harbans Kaur, Chandra Sudhir (Dept Bot, Univ Allahabad, Allahabad 211002). **Mycorrhizal association in crops under sewage farming.** *J Indian Botl Soc*, **69** (3 & 4) (1990). 267-269 [15 Ref].

comparative assessment of the VA-mycorrhizal status in 18 crops irrigated with civic sewage and water indicated that sewage irrigation was favourable for the

mycorrhiza formation in a number of crops. However, in certain other crops including *Saccharum officinarum*, it exhibited a suppressing effect. Under both the types of irrigation, the intramatrical growth of the symbiont within the roots and its extramatrical sporulation failed to show any relation with each other.

9202-256. Malhotra YR, Gupta K, Khajuria Anil, Sharma K (Dept Biosci, Univ Jammu, Jammu). **Effect of domestic sewage on ovaries of *Puntius ticto* (Ham).** *J Hydrobio*, **6** (1) (1990), 3942 [17 Ref] (Late Recd).

Report deals with the effect of untreated domestic sewage on ovaries of *Puntius ticto* for a period of 90 days. Results revealed that there is retardation in the overall activity of ovaries.

9202 257. Mishra PC, Patri Manorama, Panda Madhumita (Sch Life Sci, Sambalpur Univ, Jyotivihar 768019). **Growth of water hyacinth and its efficiency in the removal of pollution load from industrial waste water.** *J Ecotoxicol Environ Monit*, **1** (3) (1991), 218-224 [8 Ref].

Studies on growth of water hyacinth *Eichhornia crassipes* in industrial wastewaters indicated that the increase in leaf area and total fresh weight of the plant was maximum in fertilizer wastewater possibly due to the availability of more Nitrogenous nutrients.

9202-258. Mukherji DP, Das AC, Choudhury DK (Microbiol Lab, Proj Dev India Ltd, Sindri, Bihar). **Removal of nitrogen from fertilizer factory effluent by biological process of treatment, 2. denitrification.** *Fertilizer Tech*, **21** (1-4) (1989), 1-6 [10 Ref] (Late Pub).

The process of denitrification for removal of oxidised nitrogen from water has been studied. Biological reduction of nitrate has been achieved by using methanol and molasses as organic substrate. The rate of loss of nitrogen is dependent on the amount of substrate supplied and the period of retention time allowed. 89.15 and 98.2 per cent losses of oxidised nitrogen had been recorded in 24 hours by the B.O.D. load of 775 mg/l and 1620 mg/l supplied by methanol and molasses respectively. The ratio of nitrogen lost to B.O.D. load supplied has been found to be 1 :1.8 and 1: 3.5 for methanol and molasses respectively.

9202-259. Mukherji SN (Monit Cell, Public Hlth Engng Dte, Govt WB, W.B). **House hold and community sanitation systems in rural West Bengal.** Prot Int Conf Rural Water Suply Sanitation Developing Countries, 4-7 Janurary 1992, Nagpur, 103-108 [8 Ref].

Pour Flush Latrine is ideal for rural household and community if soil and ground water conditions are favourable. Community latrines should meet cultural attitudes and privacy concept of community and are best managed through voluntary organisations with levy of user's charge. But in rural India, involvement of Panchayat Bodies and institutions are ideally suited. Sample study indicates that modvation, educadon and participation of beneficiaries and specially women in rural sanitation programme can make it successful.

9202-260. Narasimha Rao P, Narasimharao Y (Regl Agricl Res Stn, Andhra Pradesh Agric Univ, Lam 522034). **Quality of effluent water discharged from paper board industry and its effect on alluvial soil crops.** *Indian J Agnc Sci*, **62** (1) (1992), 9-12 [9 Ref].

The quality of water from Godavari river and of that after its discharge along with effluents from paperboard industry changed from medium salinity with low sodium hazard to high salinity with low sodium hazard. Residual sodium carbonate was absent in such a water, and on irrigation it did not create any soil problem. This effluent water could be safely used for irrigation of rice and cotton on alluvial soil having loamy to sandy-loam texutre. But irrigation of tobacco and chilli with this effluent water led to poor-quality produce and reduced crop yield.

9202-261. Ramesh Y, Ramanujan MP (Dept Bot, Cent PG Std Pondicherry 605008). **Effect of drainage effluents on seedling growth of -groundnut.** *Adv Plant Sci*, **4** (2) (1991), 425-429 [14 Ref].

Effects of two drainage canals effectively vize Grand canal and Upper canal on germination and seedling growth of groundnut, was studied. The physical and chemical characteristics of the two drainage effluents indicate that they are not much polluted.

9202-262. Reddy RC, Rao PM, Rao IR, Vittal Rao M, Krishna D, Reddy PJ (Natl Environ Engng Res Inst, NEERI Zonal Lab, Hyderabad). **Statistical evaluation of waste water characteristics and treatment from a typical cellulose manufacturing plant.** *Asian Env*, **13** (4) (1991), 14-24 [4 Ref]

The spent liquor is highly coloured with very high pH, suspended solids concentration, COD and BOD, whereas the washings from bleach section are relatively dilute with near neutral pH and with low COD and BOD values. But washing contain a lot of cellulose Elbres. Based on the studies three alternative treatment methods were developed. Statistical analysis like correlations and regressions have also been carried out to study the inter-relationships among the various parameters.

9202-263. Sharma N(Hindustan Paper Corpn Ltd, Nagaon Paper Mill, Centl Lab, Kagajnagar-782413). **Colour removal in pulp mill waste.** *Indian J Environ Prot*, **11** (9) (1991), 675-679 [12 Ref].

A laboratory scale colour removal study was carried out in pulp mill waste using hypo sludge as coagulating agent. A significant improvement in reducing pollution load was observed in terms of colour, SS, COD and BOD. Constant monitoring of pH and free chlorine content in the combined effluent is very much essential by seeing the alkaline nature and chlorine content in hypo sludge.

9202-264. Sihorwala TA, Mukhene PK, Kulkarni H (Sri GS Inst Techno Sci, Dept Civil Engng, 23 Park Rd, Indore 452003). **Upflow anaerobic fixed film fixed bed reactor system for treating eather finishing (tannery) waste water.** *Indian J Environ Prot*, **11** (11) (1991), 830-832.

Anaerobic packed bed reactors are best suited to warm, strong and mainly soluble organic wastes. Production of microbial biomass is small and power requirements are much lower than for competitive aerobic system. Anaerobic packed bed reactors give higher COD removal than anaerobic digesters. This anaerobic packed bed reactors can be used for almost all types of industrial wastes containing organic matters.

9202-265. Singh BP (Regl Res Lab, Bhubaneswar 751013). **Formation and treatment of oily wastewater in mineral oil production-a scientific approach.** *Indian J Environ Prot*, **11** (11) (1991), 809-812 [10 Ref].

Paper deals about the formation and treatment of oily wastewater in the mineral oil production and different parameters responsible for the stability of oily wastewater. It also deals with surface science of the subject and oil removal methods-their advantages and disadvantages.

9202-266. Sinha Rajiv K, Rawat Ratna (Indira Gandhi Cent Human Eco, Env Population Std, Univ. Rajasthan, Jaipur 302004). **Waste recycling and reutilization: essential for environmental safety and sustainable development-a case study.** *Ecobio*, **3** (3) (1991), 193-198 [4 Ref].

Waste is an inevitable by-product of human activities. Nearly 700-900 tonnes per day of MSW is generated in Jaipur of which paper waste constitute 90 tonnes/day and cotton waste 70 tonnes/day. The technology is simple, less chemical and energy intensive and non-polluting. It is partly automatic and partly manual. The raw material is mechanically grinded with tap water to get a "leathery pulp" which is spread, compressed and sun dried to get thin sheet of papers.

9202-267. Varma Manish C, Singh Narendra Kr, Dutta Munshi Jyoti S (PG Dept Zoo, Bhagalpur Univ, Bhagalpur 812007). **Impact of industrial effluents on aquatic biota of river Subernarekha at Ghatsila.** *Proc Acad Environ Bio*, **1** (1) (1992), 87-99 [16 Ref].

The liquid industrial waste of Hindustan Copper Limited at Ghatsila (Singhbhum) considerably modify the physico-chemical characters affecting biota of river Subernarekha. The acidic effluent with high concentration of heavy metals increase substantially these contaminants in the river water. The heavy metal concentrations has been estimated in the river water, algal bloom and in fishes, the values of which were maximum at mixing zone followed by down and upstream.

9202-268. Venkataraman Jayshree, Kaul SN (Natl Environ Engng Pses Inst, Nagpur 440020). **Some salient mathematical considerations for various types of anaerobic bio reactors.** *Asian Env*, **13** (4) (1991), 36-61 [29 Ref].

Various types of bioreactors have been described particularly for anaerobic wastewater treatment. Mechanism and composition of biofilm formation has been discussed. Some models applicable to various types of bioreactors have also been dealt with which may be of immense use to the field of engineers.

Forestry and Environment

9202-269. Dagar JC, Sharma AK (Centl Agricl Res Inst, Port Blair 744101). **Litterfall beneath *Rhizophora apiculata* in mangrove forests of Andamans, India.** *Trop Eco*, **32** (2) (1991), 231-235 [17 Ref].

Over a period of one year a total dry weight of litterfall of 1030 and 808 g² was collected at Chiriatapu and Sippighat, respectively. Leaves contributed 71.2 and 69.29 to total litterfall on respective sites. The remainder was contributed by stipules, twigs, and reproductive parts. The maximum litterfall was observed in August and September but seasonal trends were not pronounced. Both the sites are under human interference.

9202-270. Hegde NG (BAIF Dev Res Foundation, Punc). **Scope for agroforestry to meet our fodder needs.** *Wasteland News*, **7** (2) (1992), 30-24 [3 Ref].

There is tremendous pressure on agricultural land to produce food and so fodder production can be taken up on barren lands using tree species. Depending upon the productivity of the land and moisture availability, the fodder trees can be managed under different systems mainly to adopt intensive fodder production, use lopped fodder from timber trees or harvest pods and fruits as a source of concentrate. This will not only improve the supply of cattle feed but also help in improving the eco-system and environment.

9202-271. Juwarkar AS, Juwarkar Asha, Pal AS, Sudhakar Babu P, Meshram SU (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Biotechnology in forestry and wasteland development.** *Illustrated Biodigest*, **4** (5&6) (1990), 107- 115 [7 Ref].

Biotechnology describes a number of powerful techniques such as tissue culture, cloning of genes, embryo culture, apical meristem culture, mutations and recombinant DNA technology, by means of which life forms can be manipulated and altered at the most basic level so that they develop desired properties. Production of biofertilizers, biopesticides and plant growth nutrients can also increase forestry yields to manyfolds.

9202-272. Manikhuri RK (GB Pant Inst Himalayan Env Dev, Garhwal Univ Camp, office, HAPPRC, PB 14, Srinagar Garhwal UP. 246174). **Nutritional value of some lesser-known wild food plants and their role in tribal nutrition. A case study in northeast India.** *Trop Sci*, **31** (4) (1991), 397-405 [9 Ref].

People of the Nishi tribe of Arunchal Pradesh in north-eastern India use wild plants for food. The collection of wild plants is secondary to the agricultural crops and animal products that provide the mainstay of the Nishis' diet. These plants were analysed for their energy, protein, carbohydrate, fat and elemental contents and were studied for their role in nutrition.

9202-273 Ramawat KG, Nandwani Dilip (Plant Biotechno Lab, Dept Bot, Univ Jodhpur, Jodhpur 342001). **Arid-land afforestation by tissue culture.** *Bionature*, **11** (2) (1991), 103-109 [29 Ref].

Great Indian desert is one of the most thickly populated deserts of the world and this exerts a great pressure on its natural resources for fuel, fodder, timber and medicinal plants. This has resulted in sharp depletion of natural population of plants, particularly already thinly scattered tree species. Plant tissue culture techniques have been used to propagate a large number of plant species of the region. The results obtained on *Prosopis* species and on other plants are discussed in the light of immediate need and impact of new technology to fulfil the future requirement.

9202-274. Singh JS, Singh Lalji, Pandey CB (Dept Bot, Banaras Hindu Univ, Varanasi 221005). **Savannization of dry tropical forest increases carbon flux relative to storage.** *Curr Sci*, **61** (7) (1991), 477-480 [19 Ref].

A study of dry tropical forest and savanna derived from it suggests that, although carbon stored in the savanna vegetation was less than half of that in the forest, carbon input through net primary production was similar. Studies indicate that conversion of dry tropical forest into savanna increases carbon flux relative to storage. This has implications for global carbon budget studies.

9202-275. Tewari DN (Indian Coun Forestry Res Edn, Dehra Dun). **Forest and tribal** *Indian Forester*, **117** (11) (1991), 984-989 [3 Ref].

The National Forest Policy 1988 recognises the symbiotic relationship between the tribal people and forests. For strengthening this relationship it is necessary to involve tribals in regeneration and protection of forests through sharing of usufruct and by

providing gainful employment to them. In the context of growing unrest in the tribal belts of the country, forestry sector must act as a nodal agency for alleviation of poverty. Only forestry programmes can generate productive and gainful employment and other opportunities to secure better food, clothing, shelter and health.

Energy and Environment

9202-276. Arora Sadhna (Dept Processing Agricul Structures, Punjab Agricul Univ, Ludhiana 141004). *The drying and thermal efficiencies of paddy straw in a biomass furnace.* *Int J Trop Agric*, **8** (2) (1990), 166-170 [5 Ref].

Paddy straw bales used as fuel for drying paddy in an indirectly fired biomass furnace gave a drying efficiency of 45.2 per cent and a thermal efficiency of 60.2 per cent. The paddy was dried from 19.8 to 13.8 per cent m.c.w.b. in 44 h.

9202-277. Bhatt BP, Todaria NP (Dept Forestry, HNB Garhwal Univ, Srinagar, Garhwal 246174 UP). **Fuelwood characteristics of some Indian mountain species.** *Forest Eco Manage*, **47** (1-4) (1992), 363-366 [8 Ref].

Qualitative analysis of 20 indigenous mountain taxa of Garhwal Himalaya proved that temperate species are best suited as firewood as they contain high density wood, low ash and moisture fractions, high biomass to ash ratio and low nitrogen percentage. Results showed that *Anogeissus latifolia* (a tropical taxa) has the highest Fuelwood Value Index (FVI).

9202-278. Gadge SR, Madansure VN (Dept Electrical Other Energy Sources, Punjabrao Krishi Vidyapeeth, Krishinagar, Akola 444104 M.S). **Development of an efficient low cost biogas burner.** *New Agriculturist*, **2** (1) (1991), 27-30 [6 Ref].

Paper reports the design, performance characteristics of an efficient single pot clay vase biogas burner useful for cooking purposes. It gives an efficiency of 52.5 per cent at 257.28 lph gas flow rate at 9.5 cm of water column pressure. This low cost burner is an innovation over the existing commercial type of cast iron burner and could be a boon in our rural life to the family size biogas plants.

9202- 279. Kahlon SS, Kalra KL, Arora M, Verma P (Dept Microbio, Punjab Agricul Univ, Ludhiana 141004). **Waterhyacinth -an answer to liquid fuel.** *J Tissue Res*, **1**(1 & 2) (1991) 49-57 [21 Ref].

The water-hyacinth (*Eichornia crassipes*) having high rate of propagation is the most problematic aquatic plant in several parts of the tropics and subtropics, especially in the developing countries. Various parameters which effect enzymatic hydrolysis are studied. Higher yield of alcohol was achieved from enzymatic saccharified hydrolysate, compared to the acid treated hydrolysate and the optimum conditions for high alcohol yields was 8% yeast inoculum and 36h fermentation.

9202-280. Kumar M, Gupta RC (Dept Metallurg Engng, Inst Techno, Banaras Hindu Univ, Varanasi 221005). **Power generation from biomass.** *Encology*, **6** (7) (1991), 9-15 [15 Ref].

In view of energy and environmental considerations, efforts have been made to suggest the use of biomass as renewable and non-polluting source of energy for power generation. This paper presents the results of the proximate analysis and energy content of various components of Acacia and Eucalyptus trees and their impact on power generation.

Plant and Pollution

9202-281. Aggarwal Nidhi, Laura Jitendra Singh, Sheoran Inder Singh (Dept Chem Biochem, Haryana Agricul Univ, Hisar 125004). **Effect of cadmium and nickel on germination, early seedling growth and photosynthesis of wheat and pigeon pea.** *Int J Trop Agric*, **8** (2) (1990), 141-147 [6 Ref] (Late Recd).

The experiments were conducted in petri dishes and sand culture to study the effect of different concs of Cd and Ni on germination, early seedling growth and dry matter production of wheat and pigeon pea. The overall results show that wheat was more tolerant than pigeonpea and Cd more toxic than Ni, and the toxicity of metals was less in culture than in sand solution culture.

9202-282. Ahammad KJ, Yunus Mohammed, Singh SN, Srivastava Kanti, Singh Nandita, Pandey Viveic Mishra Jyoti (Environ Bot Lab, Natl Res Inst Lucknow). **Study of plants in relation to pollution.** *Myforestt.* **27** (4) (1991), 355-360.

A detailed and systematic investigation was carried out to study the effects of air pollutants on plants. Apart from regular vegetational surveys and transplant studies, air quality monitoring (SO₂ and suspended particulate 'SPM') was also carried out from time

to time. The study showed that the road transections at Alambagh, where maximum traffic density was recorded also revealed highest level of pollutants. Whereas the road stretches with leaner traffic density correspondingly showed lower levels of pollutants. The levels of sulphate and lead were estimated in the foliage of plants growing along the road with maximum levels of SO_4 and Pb burdens in plants collected with Enimum traffic load.

9202-283. Amitha K, Rao Digamber (Dept Bot, Kakatiya Univ, Warangal 506009). **Effect of atrazine on seed germination and seedling growth of *Vigna sinensis* (L) Savi.** *J Swamy Botl Club*, **8** (1 & 2) (1991), 41-43 [12 Ref].

Investigations were undertaken to study the effect of atrazine with regards to seed germination and seedling growth. The seeds were treated with 500, 1000, 1500 and 2,000 ppm aqueous solution of atrazine for varying durations (4, 8 and 12h). The atrazine treatments increased germination percentage and seedling growth in certain concentrations. There was decrease in fresh and dry weight with increasing concentrations and longer durations.

9202-284. Anbazhagan M, Bhagwat KA (Maharaja Sayajirao Univ Baroda, Vadodara, Gujarat 390002). **Influence of fumigation of sulphur dioxide, ammonia, nitrogendioxide alone and in mixture on growth of rice (*Oryza sativa*).** *Indian J Agricul Sci*, **62** (2) (1992), 106-109 [16 Ref].

An experiment was conducted during 1987-88 to study the response of 21-day-old plants of 'GR 3', 'TKM0' and 'CO 3' rice (*Oryza sativa* L.) to air pollutants. The varieties were fumigated with sulphur dioxide (SO_2), ammonia (NH_3) and nitrogen dioxide (NO_2) alone and in combinations. 'CO 43' was sensitive to SO_2 , NH_3 and NO_2 ; 'TKM9' to NH_3 ; and 'GR3' to NO_2 fumigation. 'GR3' was not affected by NA and 'TKM9' by NO_2 alone. All the varieties were sensitive to combination of $\text{SO}_2 + \text{NO}_2$.

9202-285. Ayer Saraswati K, Bedi SJ (Eco Environ Res Lab, Dept Bot, M S Univ Boroda, Baroda 391002). **Effect of industrial air pollution on *Triticum aestivum* L. Var J-24 (Wheat).** *Proc Natl Acad Sci, India*, **61** (B) (2) (1991) 223-229 [20 Ref].

Paper presented data on the impact of industrial air pollution from various heavy and medium chemical industries in and around Baroda on growth performance, biomass accumulaiton, biochemical changes and grain yield in wheat plants growing in the vicinity of polluted industrial zones. The level of damage to various parameters was

correlated with sulfur accumulation in plants and ambient SO₂ concentration prevailing in the different zones.

9202-286. Bishnoi S, Gautam DD (Dept Bot, Dungar (Autonomous) Coll, Bikaner, Rajasthan). **Effect of dairy effluent on seed germination and seedling growth of some crop plants.** *Int J Eco Environ Sci*, **17** (1) (1991), 67-71 [13 Ref].

The effect of various concentrations of dairy effluent (25,50,75 and 100% v/v) on seed germination and seedling growth of some kharif crops has been assessed. With increasing effluent concentration, the percent germination decreases gradually. The diluted effluent can/ however, be used as a liquidfertilizer as it promotes seedling growth.

9202-287. Dixit CK, Roy AN (Plant Disease Lab, Agra Coll Agra 282002). **Sulphur and phenolic content of sea same plants in ambient atmosphere of Mathura refinery.** *Proc Natl Acad Sci, India*, **61** (B) (4) (1991), 439-443 [15 Ref].

The sulphur accumulated in the leaves of Sesamun indicum L. remained higher at polluted sites in comparison to reference site and in the case of phenolic content the reverse trend was found in the ambient atmosphere of Mathura refinery.

9202-288. Mehta BH, Barhate KD (Dept Chem, Univ Bombay, Vidhyanagari, Bombay 4(B)98). **Mineral content of cowpea cultivated in polluted water of Bombay.** *J Ecotoxeco Environ Monit*, **1** (3) (1991), 225-229 [6 Ref].

Cowpea leaves cultivated in the polluted areas near western and central suburban railway lines was selected for the study of their mineral content and proximate analysis. These mineral levels are influenced by the water polluted by the effluent used for cultivation. However, mineral levels of toxic elements like Cr and Pb are not affected to great extent.

9202-289. Misra RN, Panigrahi GN, Patra KS (Dept Bot, Govt Sci Coll, Chatrapur 761020, Orissa). **Studies on phytotoxicity of paper mill effluents on Oryza sativa L. Var. I R 36.** *Bionature*, **11**(2) (1991), 99-101 [12 Ref].

Phytotoxicity of paper mill effluents on *Oryza sativa* L. var. IR 36 was studied. The effluent significantly inhibited germination, root and shoot growth and also affected chlorophyll content, sugar, protein, aminoacids and nucleic acids in different degrees. The level of biochemical characteristics and the effluent treatment was negatively correlated and was highly significant ($P < 0.001$).

9202-290. Mohapatra A, Panigrahi AK (Lab Environ Toxicol, Dept Bot, Berhampur Univ, Berhampur-7, Orissa). **Effect of mercuric chloride on the pigment content of a mulberry plant.** *Polln Res*, **10** (3) (1991), 123-133 [24 Ref].

Effect of mercuric chloride on the pigment content of mulberry leaf was tested. After exposure to the toxicant, an initial increase followed by a decrease in different pigments were observed. The decrease/increase in parameters were due to the dichotomous behaviour of the heavy metal, mercury.

9202-291. Patel Pramod Kumar, Ramesh Kumar KT, Pushpalatha K (Bot Dept, Sch Sci, Gujarat Univ, Ahmedabad 380009). **Effects of pharmaceutical factory effluent on growth and yield of mustard (*Brassica juncea* L.).** *Adv Plant Sci*, **4** (2) (1991), 208-217 [19 Ref].

The crop of *Brassica juncea* L. var T. 59 was grown in the field after the seeds were subjected to presoaking treatment with different concentrations of pharmaceutical factory effluent. The effluent in lower concentrations stimulated the percentage of germination, stem height, root length as well as yield production while higher concentrations of effluent showed adverse effect.

9202-292. Rao MV, Dubey PS (Seh Std Bot, Vikram Univ, Ujjain 456010). **Detoxifying mechanism: Probable role in determining the plant response to SO₂ under different light intensities.** *Indian J Environ Toxicol*, **1** (1)(1991), 39-45 [29 Ref].

The response of 30 day old wheat crop (*Triticum durum* L. cv Raj 1555) exposed to 138 µg/m³ SO₂ for 30 days under low, normal and high light intensities was assayed as stomatal conductances, transpiration rate, foliar sulphate, chlorophyll a, chlorophyll-b, leaf area dry weight ratio, foliar protein, free amino acid, peroxidase (POD) and superoxide dismutase (SOD) activities. Conductances of plants exposed to SO₂ under low light conditions decreased significantly than that of the plants exposed to SO₂ under high and normal light conditions. However, no significant differences in accumulated foliar sulphate content was observed among plants exposed to SO₂ under different light conditions. But the alterations in chlorophyll-a, chlorophyll-b, leaf area dry weight ratio, foliar protein, free amino acid were severe in plants exposed to SO₂ under low light intensity than plants exposed to SO₂ under high and normal light conditions.

9202-293. Rao Srinath (Dept Bot, Gulbarga Univ, Gulbarga 585106, Karnataka). **Effect of cement dust pollution on plants.** *J Swamy Botl Club*, **8** (1 & 2) (1991), 35-39 [15 Ref].

It was noticed that plants growing around polluted sites showed visible leaf injury symptoms like marginal necrosis, interveinal necrosis and leaf tip burns. The chlorophyll content was reduced between 12.40%. Stomatal frequency decreased. Polyphenol content of the leaves was much higher in the polluted sites when compared with those of unpolluted sites. Germination and seedling growth was hampered in some crop plants when grown on soil polluted with cement dust. Activities of certain enzymes involved in metabolism were hampered by cement dust pollution.

9202-294. Raza SH, Murthy MSR (Eco Environ Std Lab, Dept Bot, Osmania Univ, Hyderabad 500007). **Influence of soil and aerial environment on natural vegetation of Nacharam industrial complex, Hyderabad.** *Asian J Plant Sci*, **2** (1) (1990), 39-54 [26 Ref].

The assessment of aerial and soil pollution at Nacharam Industrial Complex and its effect on plants is described. No plant is observed near the bank of effluent channel. Maximum density of plants was observed at a distance of 60 meters and beyond. Multiple regression analysis has revealed a negative relationship between soil and plant characters.

9202-295. Salgare SA, Andhyarujina, Shobha (Dept Bot, Inst Sci, Bombay 400032). **Effect of polluted water of Patalganga on the mineral contents of its bank vegetation.** *New Agriculturist*, **2** (1) (1991), 9-14 [12 Ref].

paper deals with the effect of industrial pollution on the mineral contents of the plant species found along the bank of Patalganga river. The plant species were collected from unaffected area of upstream, along the mid-way of upstream and lowstream and highly polluted lowstream sites. The inhibition was observed in the inorganic contents like sodium, potassium, lithium, calcium, magnesium, iron and phosphorus of the selected four species for this paper. However, there was stimulation in chloride content of the plant species affected by industrially polluted water of Patalganga. It is observed that the lowstream site of Patalganga near Rasayani area is highly polluted in comparison of the midstream area near Mohapada which is comparatively less polluted area.

9202-296. Salgara SA, Iyer MP (Dept Bot, Inst Sci, Bombay 400032). **Effect of auto exhaust pollution at Byculla on the growth performance of some weeds (II harvest) 1.** *Adv Biosci*, **10** (2) (1991), 81-90 [15 Ref].

weeds selected for the present work were *Amaranthus viridis*, *Portulaca qualdrifolla*, *Ricinus comrnunis* and *Tridax procumbens*. Three harvests were made with the fortnight interval of which the first harvesting was started in the month of June. The effect of auto-exhaust pollution on growth performance was studied through the following parameters such as: length of root, length of shoot, ratio of root length to shoot length, oven dry matter of root, shoot and their ratio, etc.

9202-297. Salgara SA, NathPoonam (Dept Bot, Inst Sci, Bombay 400032). **Effect of auto-exhaust pollution at Bandra (east) on the growth performance of some plants -1 (monsoon collection).** *New Agriculturist*, **2** (1) (1991), 43-48 [8 Ref].

Present investigation reveals the effect of auto-exhaust pollution at Bandra (East) on the growth performance of *Bougainvillea spectabilis*, *Cantharanthus roseus*, *Croton stoplight*, *Hibiscus rosa-sinensis*, *Iresine herbest* and *Sanvitalia procumbens*. In growth performance following parameters were studied such as length of shoot, number of leaves, fallen leaves, inflorescences, flaal buds, flowers, fruits, basal area of stem, area of 4th internode, number of branches per plant, etc. The auto-exhaust pollution at Bandra (East) Bombay inhibited most of the above said parameters.

9202-298. Satyanarayana G, Pushpalatha K (Bot Dept, Gujarat Univ, Ahmedabad 380009). **Flyash induced foliar injury and proline metabolism in plants growing near power house.** *Adv Plant Sci*, **4** (2) (1991), 298-303 [14 Ref].

A study was made on the effect of fly ash on *Azadirachta indica* A. Juss, *Ficus glomerata* Roxb., and *Nerium odorum* sol. Three parameters viz. Dust fall, percentage injury and proline accumulation were taken into account. Dust fall and percentage injury were recorded more in the polluted plants. *Ficus* received highest rate of dust fall, due to it's morphological disposition of leaves and also showed more percentage injury. Accumulation of proline was observed more in polluted area compared to control, though *Azadirachta* recorded highest leaves of proline, showing its better adaptability.

9202-299. Sengupta R, Ghosh P (Dept Bot, Univ Kalyani, Kalyani 741235). **Cytological effects of some heavymetals on root tip meristem of Lathurus sativus.** *Env Eco*, **10** (1) (1992), 216-219 [4 Ref].

Cytological effects of two metals cadmium and mercury on the root tip meristem of *Lathurus sativus* were studied. The two metals induced diverse chromosomal abenation in mitotic cells of *L. sativus*, the frequencies of which depended upon the concentration of the metals. The frequency of aberrant cells showed a linear dose-response relationship.

9202-300 Sharma Archana, Naik ML (Dept Bio Sci, Ravishankar Univ, Raipur Raipur 492010). **Effect of steel mill effluent on *Cyamopsis tetragonolba*.** *J Ecobioa*, **3** (2) (1991), 138-143 [14 Ref].

Steel mill effluent irrigation increased pigments and protein concentration in the leaves, as well as ash and nutrient content in almost all the parts of *C. tetragonoloba*. However, treatment decreased the germination percent as well as other germination parameters of seeds. Effluent irrigation to the soil resulted in very significant increase with respect to nitrogen concentration, and with it, several other parameters of the soil also experienced significant effects, due to effluent irrigation.

9202-301. Sharrna MK, Dixit CK, Roy AN sept Bot, Agra Coll, Agra 282002). **Alterations in dry weight fractions and net primary productivity of sesame plants in ambient atmosphere of Mathura refinery.** *Adv Plant Sci*, **4** (2) (1991), 387-390 [12 Ref].

The alterations in dry weight fraction and net primary productivity of *Sesamum indicum* L. in ambient atmosphere of Mathury refinery have been investigated. Results indicates that dry weight fractions of both roots and shoots were lower at polluted sites than at reference site. The shoot weight declined by 24 to 38, 15 to 37 and 21 to 60 per cent over control after 30, 60 and 90 days of plant growth respectively. At respective stages there was a reduction of 16 to 30, 16 to 41 and 20 and 42 per cent in root weight over control at 4 polluted sites. There was fairly high degree of reductions in primary productivity of the plants with respect to corresponding control. Reductions were of the magnitude of 25 to 34, 22 to 32 and 51 to 54 per cent at the polluted sites except at Bhai after 30, 60 and 90 days of plant age.

9202-302. Singh RB (Dept Org Chem, Agra Coll, Agra- 282002). **Effects of sulphur dioxide from Mathura refinery on foliar concentrations of pigments and sulphur in *Madhuca longifolia*.** *J Mendel*, **9** (1) (1992), 21-24 [9 Ref].

To know phytotoxicity of air pollutants, experiments were conducted to compare the relative importance of pollutants concentration, exposure duration and dose of pollutant (SO₂) on *Madhuca longifolia*. Plants were exposed to 0.25, 0.5, 1.0 and 2.0 ppm SO₂ for 8, 4, 2 and 1 hrs respectively, thus keeping the dose constant (2.0 ppm hr). Irrespective of decreasing exposure duration, the foliar injury, pigment concentration of plants were directly proportional to the concentration of SO₂, excluding sulphur which increased with increasing the exposure time.

9202-303. Varghese Mohan, Sivaramkrishna D (Inst Wood Sci Techno, Bangalore 560003). **Studies on wood properties of *Eucalyptus tereticornis* in relation to air pollution.** *My Forest*, **27** (4) (1991), 419-427 [2 Ref].

Wood density, vessel element length, width and frequency and fiber length, lumen width and wall thickness have been studied from core samples of wood of *Eucalyptus tereticornis* from a stand in an air pollution area and another far away from it. The differences between stands is not significant except in the case of vessel frequency. Most of the parameters show highly significant variation within the stands.