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February-2018

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Editor's Desk

*I feel extremely honored as a host of the State level Seminar on the theme "**Role of Agro-base industries on sustainable development of Environment**" in our college. On the behalf of organising committee I extend a warm welcome to the delegates, esteemed guests, farmers and all those who are directly or indirectly instrumental in making this seminar grand success.*

Agriculture is an important sector in the Indian economy, although sustainable share of agriculture in GDP has been declining and is still important for nation development. Agro-base industries play a key role in sustainable development of Agriculture. It may solve problems of unemployment in rural area of our country. Day by day our farmer's agricultural income decline due to climatic change and hence agro-base industries will help them to improve income as well as their life style. we are confident to address various issues regarding to Environment with the help of various experts and researchers of the entire country from the filed of Environment

I expressed my esteemed regards to Hon. Smt. Nilimatai Pawar, Sarchitnis, Maratha Vidya Prasarak Samaj Nashik and Hon. Principal Dr.P.V.Rasal of our college for their constant moral support with the encouragement. I also express my sincere thank to Savitribai Phule Pune University for sponsored this seminar. It is heartening to note the great response that we received to our call for papers. As a result, a large number of delegates from many far off states are coming to participant in this seminar therefore I express my gratitude to all of them.

Thank you!

Dr. Ashok K. Yeole
Executive Editor

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Bacteriological analysis of Tap Water Samples from Deolali Camp, Bhagur & Vihitgaon, Nasik (MS), India.

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Department of Microbiology,
S.V.K.T. College, Deolali Camp, Nashik

Abstract:

The present study was undertaken to check bacteriological quality of tap water from three areas Deolali Camp, Bhagur & Vihitgaon of Nasik city (MS), India. Tap water samples were epidemiologically studied to assess their bacteriological characteristics and suitability for potable purposes. A total of 30 tap water samples were collected aseptically in sterilized container. A study was conducted to isolate and identify the micro-organism responsible for contamination of drinking water. The bacteriological examination of water samples included the most probable number of presumptive coliforms. The MPN number was very high (>1600) of positive water samples. The most common group of indicator organism used in water quality monitoring are coliforms. Analysis was performed using culture and biochemical methods. The organisms isolated were identified as E.coli (75%), Pseudomonas (15%) and Klebsiella (10%). To conclude, E.coli was major source of contamination. A regular monitoring of tap water sources for drinking should be carried out at regular basis.

Keywords: MPN count, Tap water, Coliforms, Nasik city.

Introduction:

Water plays an essential role in human life. Although statistics, the WHO reports that approximately 36% of urban and 65% of rural Indian were without access to safe drinking water The most common and widespread danger associated with drinking water is contamination, either directly or indirectly, by sewage, other wastes or human and animal excrement. About 25 years ago, authoritative estimates indicated that each year some 500 million people are affected by water-borne or water associated disease. In a recent estimate based on WHO reports suggests that 80% of all human illnesses in the developing world are caused by biological contamination. Faecal pollution of drinking water may introduce a variety of intestinal pathogens. Their presence being related to microbial diseases and carriers present in the community, which may cause diseases from mild gastroentritis to severe and sometimes fatal dysentry, cholera or typhoid. Other organisms, naturally present in the environment and not regarded as pathogens, may also cause opportunist disease. Ideally, drinking water should not contain any microorganisms known to be pathogenic. It should be free from bacteria indicative of pollution with excreta

Material And Methods

Sample: collection:

30 water samples were aseptically collected in sterilized bottles from various tap water sources at Deolali gaon, vihitgaon and bhagur. All samples were immediately transported to the laboratory and processed within two hours.

SampleProcessing:

A. pH of water: pH of all the water samples was recorded by means of a pH meter.

B. BacteriologicalAnalysis:

i)Presumptive test for coliforms:

a**. Untreated water samples**: Briefly, five tubes of double strength lactose broth (containing durham tube) were inoculated with 10 ml water sample (in each tube) and two tubes of single strength with 1.0 ml and 0.1 ml respectively. After incubation at 35°C for 48 hours production of acid and the presence of gas in any of the durham tubes was considered positive. Number of the positive tubes was recorded and most probable number (MPN) was calculated according to MPN tables.

ii) Confirmatory test for faecal coli-forms:

One ml from each positive tube of presumptive coliforms was inoculated in Brilliant Green Lactose bile Broth (BGLB) tube. After incubation at 44.5°C in a water bath for 24 hours; tubes with gas and turbidity were considered positive. Positive tubes were further cultured on Eosine Methylene Blue agar (EMB) for isolation of faecal coliforms. Isolated colonies were confirmed by using biochemical tests.

IV) Standard Plate Count (SPC):

The standard plate count was done by pour plate technique using 10 fold dilutions (upto 10-6) in ringers solution. One ml of each dilution was poured (duplicates) in empty, sterilized petridishes. About 12 to 15 ml of plate count agar (kept at 45°C in a waterbath) was added to each plate. Plates after solidification were incubated at 37°C for 24 to 48 hours.

Results:

All the samples showed positive results for MPN with maximum of 1800.The organisms isolated from above samples were *E.coli* (75%) , *Pseudomonas* (15%) & *Klebsiella (*15%) which were identified by standard biochemical methods.

Biochemical Test: For species identification the biochemical (IMViC) test as per WHO guideline was performed.

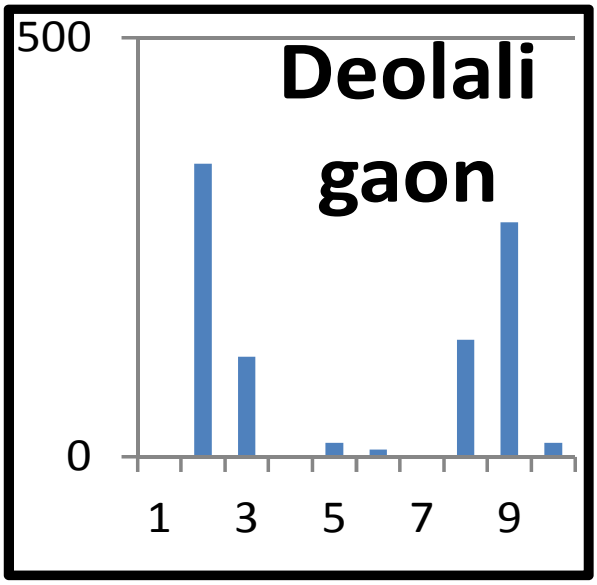
Table: 1 - Biochemical characterization.

Organism	MR	VP	Indole	Urease	Citrate
Escherichia coli	+	–	+	–	–
Klebsiella	+	–	–	+	+
Pseudomonas sp.	–	–	–	–	+

VP: Voges-Proskauer**, MR:** Methyl Red.

Graphical representation of MPN results:

Fig 1: MPN Results for Bhagur, Deolali gaon and VihitgaonTap Water Samples.


Deolali gaon
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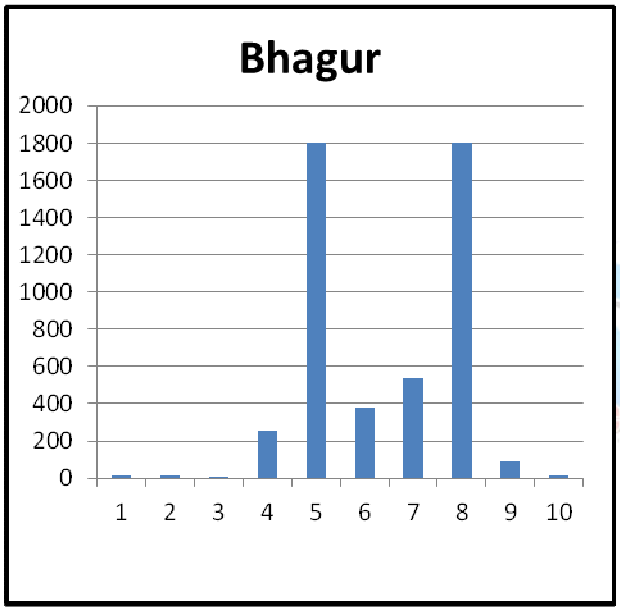
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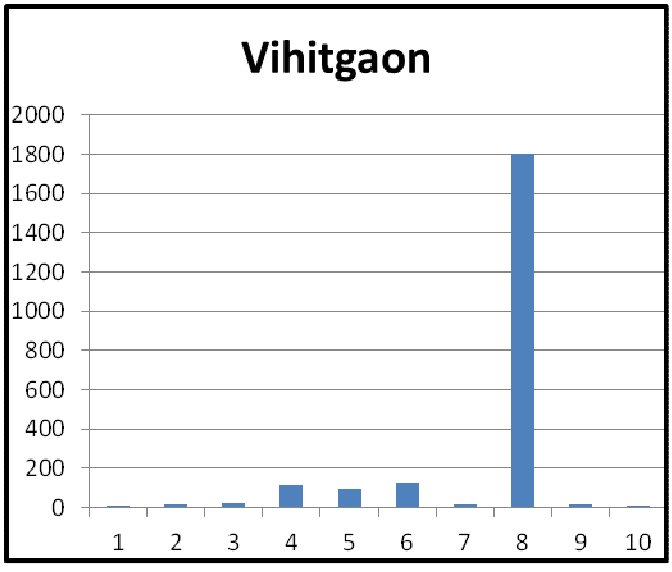
Vihitgaon
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Discussion:

Much of the ill health which affects humanity, especially in developing countries can be traced to lack of safe and whole water supply. There can be no state of positive health and well being without safe water. Since water is vital for our life we expect it to be clean and safe. Even water that appears clear may not necessarily be safe or acceptable. The water intended for human consumption must be free of pathogenic and chemical agents, pleasant to taste and usable for domestic purposes since water is the most important potential source of infectious diseases So water purification is the most important potential available for ensuring public health. In this study, all water samples were faecally contaminated and 1800 MPN level was obtain. Biochemical properties of bacteria clearly revealed the presence of *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella Sp.*in the water samples collected from Bhagur, Deolali gaon and Vihitgaon.

Conclusion:

All the Contaminated water samples tested showed faecal contamination and maximum samples showed high MPN count.

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Diversity of Freshwater Fungi from Ahmednagar District (M.S., India): Ingoldian fungi

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Abstract :

The present paper deals with 11 species of freshwater Mitosporic fungi of the ecological group Ingoldian Fungi. They were isolated from submerged leaf litter and conidia in foam samples from various study sites in Ahmednagar district (Maharashtra, India). These fungi include: Anguillospora crassa Ingold, A. gigantea Ranzoni, A. longissima (Sacc. & P. Syd.) Ingold, Angulospora aquatica Sv. Nilsson, Articulospora tetracladia Ingold, Brachiosphaera tropicalis Nawawi, Campylospora chaetocladia Ranzoni, C. filicladia Nawawi, C. leptosoma Marvanova & Laichmanova, Clavariana aquatica Nawawi, and Clavatospora tentacula Sv, Nilsson. All these fungi are being recorded for the first time from Ahmednagar district. The data provides information on the distribution of these fungi in India, apart from description and illustrations.

Key words: Freshwater, Foam samples, Ingoldian fungi, Submerged leaves

Introduction

Aquatic Hyphomycetes (also called Freshwater Fungi or Ingoldian Fungi) commonly occur on submerged decaying leaves in fast flowing streams and sporulating underwater (Ingold, 1975). These were first highlighted by late Prof. C.T. Ingold in his monographic article (Ingold, 1942). Later, in literature they are also known as "Water-borne conidial fungi" delimited from other fungi by their well developed branched, septate, mycelia with usually thin-walled hyaline (non pigmented) asexual (mitotic) spores (conidia) having characteristic shapes – stauroform (tri- or tetraradiate), scolecoform (needle shaped or sigmoid) and helicoform.

Materials and Methods

The submerged leaves and foam samples were collected from each study site and analysis was done by the following methods:

Leaf litter analysis:

Submerged leaves of different kinds were collected randomly from sampling sites and brought to the laboratory in moist polythene bags. They were washed several times in tap water and finally in distilled water. They were cut into small bits and incubated separated in Petri dishes containing distill water at laboratory temperature (25 - 30^0c). The water was replaced in Petri dishes once in two days to minimize the growth of bacteria and other organisms. The leaf bits were screened under an inverted microscope at 24 hours intervals for 60 days to detect the water borne fungi appearing on them.

Foam analysis:

Foam samples were placed in cleaned wide mouthed plastic bottles and kept for 24 hours to enable the foam to dissolve. It was prepared by adding FAA to yield 5% foam solution. Then

samples were brought to laboratory and scanned under high power of a microscope using 15x eyepieces for the presence of conidia of Ingoldian Hyphomycetes.

Systematic account:

1) *Anguillospo crassa* Ingold, *Trans. Br. Mycol. Soc.,* 41: 367 (1958).

Conidia: hyaline, sigmoid, S- or L-shaped, 5-10-septate, 120-200 µm long, 15-20 µm wide in the middle region tapering to 8-10 µm at the ends.

Habitat: Conidia in foam samples, Pravara river (at Sangamner), 05 October 2014, leg. D.S. Borade.

Distribution in India: Karnataka, Uttarakhand, Maharashtra, Kerala, Andhra Pradesh, Gujarat, and Madhya Pradesh (see Borse et al. 2016, 2017).

2) *Anguillospora gigantea* Ranzoni, *Farlowia*, 4: 363 (1953).

Conidia: hyaline, sigmoid or falcate, scolecosporus, 150-750 µm long, 5-6 µm broad in the middle and tapering gradually to 2.5-3 µm broad at the tips, 6-10 celled.

Habitat: Conidia in foam samples, Mula river (at Newasa, Devgad), 08 September 2013, leg. D.S. Borade.

Distribution in India: Karnataka and Maharashtra (see Borse et al. 2016, 2017).

3) *Anguillospora longissima* (Sacc. & P. Syd.) Ingold, *Trans. Br. Mycol. Soc.,* 25: 401 (1942).

Conidia: aleuriospores, terminal, eel-like, 200-350 µm long, 5-6 µm broad in the middle region, tapering to 3-4 µm broad at the ends, 6-10-septate, curved or sigmoid, hyaline, separating when mature by the breakdown of a small 'separating cell' at the end of the conidiophore.

Habitat: On submerged leaves, Godavari river (at Kopergaon), 08 September 2013, leg. D.S. Borade.

Distribution in India: Maharashtra, Tamil Nadu, Uttarakhand, Karnataka, Kerala, Madhya Pradesh, and Andhra Pradesh (see Borse et al. 2016, 2017).

4) *Angulospora aquatica* Sv. Nilsson, *Sv. Bot. Tidskr.*, 56: 354 (1962).

Conidia: hyaline, unicellular, 75-100 µm long, 1.5-2 µm broad, tapering to 1 µm broad at the apex, curved or sigmoid, mostly with right and sharp angles and usually in more than one plane.

Habitat: Conidia in foam samples, Pravra river (at Shrirampur), 20 November 2014, leg. D.S. Borade.

Distribution in India: Karnataka, Maharashtra and Gujarat (see Borse et al. 2016, 2017).

5) *Articulospora tetracladia* Ingold, *Trans. Br. Mycol. Soc.,* 25: 372 (1942).

Conidia: hyaline, with four long divergent arms; the first formed arm 20-35 µm long, 3 µm broad, 1-2 septate; the other three arms 50-75 µm long, 3 µm broad, 1-3 septate, each with a narrow constriction or isthmus where it joins the short arm.

Habitat: Conidia in foam samples, Pravara river (at Bhandardara), 18 August 2013, leg. D.S. Borade.

Distribution in India: Maharashtra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and Uttarakhand (see Borse et al. 2016, 2017) .

6) *Brachiosphaera tropicalis* Nawawi, In: Descals et al., *Trans. Br. Mycol. Soc.*, 67: 213 (1976).

Conidia: The mature conidia consist of a spherical body, 46-58 µm diam, and filled with numerous small spherical globules up to 6 µm diam. The spherical body is yellowish brown and furnished with 4-7 radiating arms, 95-180 µm long, 9-11 µm wide at the widest point, tapering to 4-5 µm wide at the rounded apex, constricted to 3-5 µm at the point of origin and becoming 3-5 septate. The spherical body is multinucleate and each cell of the arms contain up to 8 nuclei.

Habitat: Conidia in foam samples, Mula river (at Mual dam at Rahuri), 9 December 2011, leg. D.S. Borade.

Distribution in India: Maharashtra and Karnataka (see Borse et al. 2016, 2017).

7) *Campylospora chaetocladia* Ranzoni, *Farlowia*, 4: 353-398 (1953).

Conidia: aleurispores, hyaline, terminal, multicellular, each consisting of a basal cell 8-12 µm wide, 10-14 µm long, with two divergent appendages of approximately the same length, 35-50 µm long, 3-6 µm wide at the point of attachment to the basal cell and tapering to about 1.5 µm at the tips, and a lateral branch, 10-25 µm long attached perpendicularly to the transverse axis of the conidium and bearing at each end an appendage similar in appearance to those on the basal cell.

Habitat: On submerged leaves and conidia in foam samples, Mula river (at Mula dam Rahuri), 09 December 2011, leg. D.S. Borade.

Distribution in India: Uttarakhand, Karnataka, Kerala, Andhra Pradesh, Maharashtra, Gujarat, and Madhya Pradesh (see Borse et al. 2016, 2017).

8) *Campylospora filicladia* Nawawi, *Trans. Br. Mycol. Soc.,* 63: 603 (1974).

Conidia: consists of two distinct halves: The proximal half is triangular, 4-celled, 6-7 µm high and 10-12 µm wide. The distal half is allantoid, 4-celled, 9-13 µm long and 3-4.5 µm wide. Viewed either from the top or bottom, the conidium is more or less rectangular, 4-4.5 µm thick with a round or conical projections at each corner. The appendages arising from the end cells are lie along the long axis. The projection opposite the origin of each appendage is bigger and rounder. The two appendages at the top of the conidium are usually longer (15-35 µm) than the lateral appendages (7-17 µm). They are always directed opposite each other and are more or less perpendicular to the lateral appendages. Surface view of the conidium always shows these two appendages to be in a crossed position.

Habitat: Conidia in foam samples, Bhima river (at Karjat), 26 August 2012, leg. D.S. Borade.

Distribution in India: Karnataka, Kerala, Tamil Nadu, and Maharashtra (see Borse et al. 2016, 2017).

9) *Campylospora leptosoma* Marvanova & Laichmanova, *Mycosphere,* 5: 250 (2014).

Conidia: septate, slightly constricted at septa; the triangular part is 3-4-septate, 6-10 x 11-23 µm, the heel-like pedicel is typically cylindric, widened only just below the foot of the lateral arm, 1-1.7 x 2-5 µm; the allantoid part is 3-septate, 9-19 x 3-5 µm; conidial end cells are apically rounded or rarely conoid, the two juxtaposed distal ones often semi-dome shaped with adjacent sides flattened and parallel; each end cell bears a single appendage; appendages are parallel-walled or slightly tapering distally, 15-35 x 1-1.5 µm, typically distinctly constricted or rarely cylindrical at insertion, straight or gently curved, mostly terminal, but on the distal conidial ends

sometimes subterminal, crossed or diverging, rarely parallel or abruptly recurved. Top or bottom view of the conidial body is fusoid. Conidial hilum is flat or somewhat bulged, slightly thickened.

Habitat: Conidia in foam samples, Godavari river (at Kopergaon), 24 December 2011, leg. D.S. Borade.

Distribution in India: Maharashtra (see Borse et al. 2016, 2017).

10) *Clavariana aquatica* Nawawi, In: Descals et al., *Trans. Br. Mycol. Soc*., 67: 217 (1976).

Conidia: obpyriform to broadly clavate, 5-8 µm wide at the base, broadening to 24-33 µm above; three arms are more or less of the same length develop from its crown, 53-160 µm long, 3-5 µm at its widest point and tapering to 2-2.5 µm at the apex, 0-2-septate; forth arm arises through the detachment scar with same length as the rest of the arms, with age the central body becomes highly vacuolated.

Habitat: Conidia in foam samples, Ghod river (at Shrigona), 5 December 2011, leg. D.S. Borade.

Distribution in India: Uttarakhand, Maharashtra and Karnataka (see Borse et al. 2016, 2017).

11) *Clavatospora tentacula* Sv. Nilsson, *Symb. Bot. Upsal*., 18: 89 (1964).

Conidia: hyaline, tetraradiate; main axis clavate, elongate, 0-6 septate, 30-75 µm long, 1.5-2.5 µm wide at base, 4-7 µm wide at apex; with 3 equidistant, divergent, 30-55 x 1-2.5 µm, appendages arising from apex and unconstricted at base.

Habitat: Conidia in foam samples, Pravara river (at Akola), 16 December 2012, BAFAD-32, leg. D.S. Borade.

Distribution in India: Maharashtra, Uttarakhand, Karnataka, Kerala, and Andhra Pradesh (see Borse et al. 2016, 2017).

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We are much obliged to the Hon' ble authorities of M. V. P. Samaj (Nashik), Hon' ble Prin. Dr. A.P. Patil, M.V.P. Samaj's Arts, Sci. and Com. College, Ozar, Dist.- Nashik (M.S.), and Hon' ble Prin. Dr. S. T. Sonawane, K. A. M. Patil Arts, Comm. and Science college, Pimpalner, Dist. - Dhule (M.S.).

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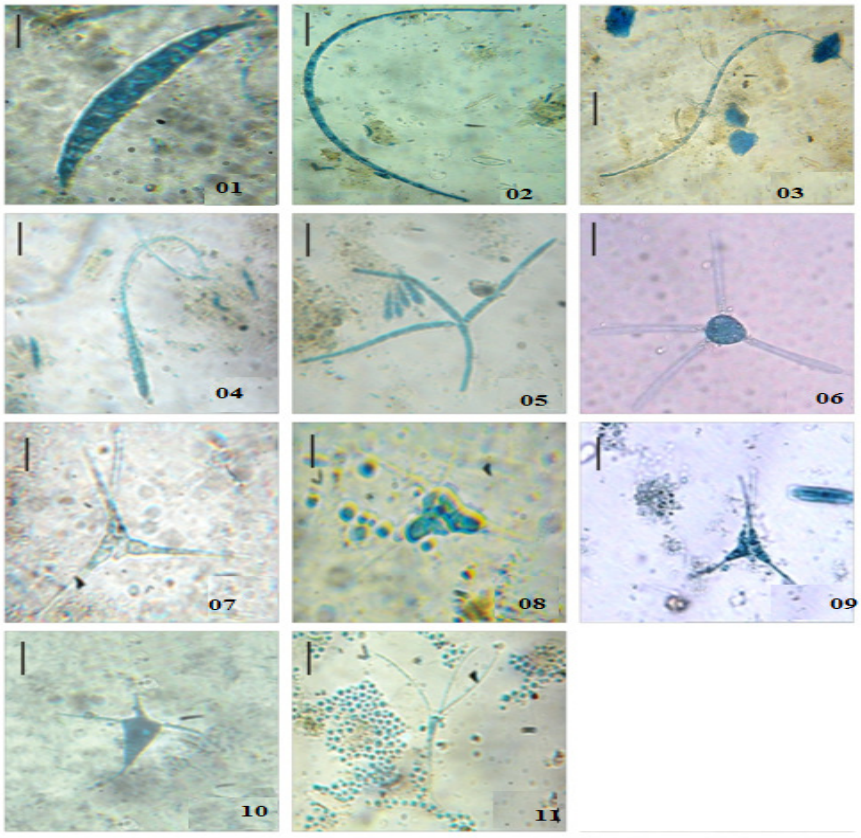
Fig. Plate:

1) *Anguillospora crassa* Ingold,
2) *A. gigantea* Ranzoni,
3) *A. longissima* (Sacc. & P. Syd.) Ingold,
4) *Angulospora aquatica* Sv. Nilsson,
5) *Articulospora tetracladia* Ingold,
6) *Brachiosphaera tropicalis* Nawawi,
7) *Campylospora chaetocladia* Ranzoni,
8) *C. filicladia* Nawawi,
9) *C. leptosoma* Marvanova & Laichmanova,
10) *Clavariana aquatica* Nawawi, and
11) *Clavatospora tentacula* Sv. Nilsson.

PHOTO PLATE



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Heavy Metal Contamination in Vegetables Collected from Different Market Sites In and Around Nashik City (Maharashtra)

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Abstract:

The study was conducted to find out heavy metal contamination of vegetables collected from different market sites in and around Nashik City, (Maharashtra state, India.) Vegetable samples from four different sites were collected and analyzed by using atomic absorption spectrophotometer. Results showed that there was wide variation in the concentration of heavy metal from different sites. Vegetables samples collected in the vicinity of an industrial area were most contaminated (Site 1 and 2) while vegetables samples grown away from the city were least contaminated (Site 4 and 5). Analytical results indicated that the lead concentration in 80% vegetable samples was more than maximum permitted limit. The high concentration of cadmium was found in Onion and Coriander, while Cr and Cu content was recorded high in Cauliflower. The results show that consumers are at greater risk of purchasing fresh vegetables with high levels of heavy metals beyond permissible limits as defined by the Indian Prevention of Food Adulteration Act, 1954.

Keywords: Atomic Absorption Spectrophotometer, Vegetables, Contamination, Heavy metal.

Introduction

Vegetables constitute an important part of the human diet since they contain carbohydrates, proteins, vitamins, minerals and trace elements [1,2] However, they contain both essential and toxic elements over a wide range of concentrations. Excessive accumulation of heavy metals in agricultural soils may not only result in environmental contamination, but lead to elevated heavy metal uptake by crops, which may affect food quality and safety. The increasing trends in food contamination in urban areas are largely attributed to the polluted environment in urban agriculture, contaminated food transport and poor market sanitary conditions. The other source includes, use of contaminated or waste water for irrigation purpose, industrial activities such as metal finishing, paint pigment and battery manufacturing, mining activities, traffic emissions and other human activities like municipal waste water sludge depositions and use of pesticides and phosphate fertilizers [**2, 3**].

Heavy metals such as lead, mercury, cadmium and copper are cumulative poisons. These metals cause environmental hazards and reported to be exceptionally toxic [3-4]. Heavy metals may enter the human body through inhalation of dust and consumption of food plants grown in metal contaminated soil [5-7]. Use of polluted water in the immediate surroundings of big cities for growing of vegetables is a common practice. Although this water is considered to be a rich source of organic matter and plant nutrients, it also contains sufficient amounts of soluble salts and heavy metals like Fe, Mn, Cu, Zn, Pb, Ni, Sn, Hg, Cr, As, Al. When such water is used for

cultivation of crops for a long period, these heavy metals may accumulate in soil and may be toxic to the plants and also cause deterioration of soil [10].

Materials and Methods

Four different sites were selected from the Nashik, Maharashtra. (India)

Site-1 Market Site Satpur and Ambad, Nashik.

Site-2 Market Site , Sinnar.

Site-3 Market Site Panchvati, Nashik

Site-4 Market Site Dindori Tahsil, Nashik

Site-5 Market Site Kalwan Tahsil , Nashik(away from city and industrial area)

Sample Collection, Preparation and Treatment

The vegetable samples were collected in triplicates from different site and washed with double distilled water. 100 gram of edible portion of all three samples was homogenized, and immediately oven dried at 170^0C and then ground to fine powder in a manual grinder. Dried powder of each sample was digested in 100 ml Pyrex glass beaker by adding 1 gram in 10 ml Concentrate Nitric acid .Cold digestion was done for 24 hours and then heated at 50^oC for 4 hours. The solution was finally boiled with 1:5 mixtures of Concentrate HCl & HNO_3 in order to digest all organic matter. Finally solution was filtered and volume of the extract was made up to 25 ml using double distilled water [9].

Standards and Analysis

All the analytical grade chemicals, reagents and solvents were obtained from Sigma Aldrich, Spectrochem, Mumbai (India) and E.Merck (India). Standard solutions of heavy metals viz. Copper (Cu), Chromium (Cr), Lead (Pb) and Cadmium (Cd) were prepared using Copper sulphate ($CuSO_4$, $5H_2O$), Potassium dichromate ($K_2Cr_2O_7$), Lead chloride ($PbCl_2$) and Cadmium chloride ($CdCl_2$) were prepared using distilled water having 1000 ppm concentration. Heavy Metals analyses were carried out using Atomic Absorption Spectrophotometer at NHRDF Nashik, Maharashtra Industrial & Research Institute Nashik and K.T.H.M.College, Nashik.

Concentration of Heavy Metals in (mg/kg) from different vegetable sample.

Sr. No.	Heavy Metal	Site	Coriander	Onion	Cauli-flower	Brinjal	Cabbage	Tomato	Palak
1	Pb	S1	11.52	16.31	12.45	13.25	19.20	11.58	7.48
		S2	10.15	12.40	12.56	9.12	7.96	12.08	7.19
		S3	6.13	7.15	4.92	9.31	6.02	5.62	4.29
		S4	4.69	5.98	2.34	6.94	3.61	6.56	4.23
		S5	1.25	0.98	0.25	N.D.	0.69	1.09	1.13
2	Cd	S1	4.92	5.13	1.31	1.53	1.25	1.63	1.43
		S2	4.10	3.52	1.43	2.64	0.94	1.44	1.04
		S3	2.23	2.62	1.33	1.24	1.44	1.40	0.56
		S4	1.62	2.43	1.09.	1.69	1.20	0.89	0.58
		S5	0.38	0.65	N.D.	0.39	N.D.	N.D.	0.45
3	Cr	S1	15.32	20.12	32.20	10.60	14.20	15.50	13.10
		S2	12.30	16.20	20.12	13.10	10.60	8.30	5.60

		S3	13.43	15.34	19.23	11.83	9.10	6.12	5.75
		S4	12.56	12.45	18.25	10.21	8.69	5.45	5.69
		S5	1.58	2.02	9.23	N.D.	2.64	4.31	5.03
4	Cu	S1	21.35	19.75	23.50	11.26	10.28	15.98	17.90
		S2	16.35	13.65	19.45	9.65	11.34	10.96	6.92
		S3	6.12	13.98	16.21	10.34	9.25	6.39	8.27
		S4	4.69	9.58	11.36	7.56	8.10	4.88	8.73
		S5	2.13	2.69	5.36	2.62	5.12	1.96	1.46

N.D. = Not Detected
S1= Market Site Satpur and Ambad, Nashik
S2= Market Site Sinnar
S3 =Market Site Panchvati , Nashik
S4= Market Site Dindori Tahsil , Dist-Nashik.
S5 = Market Site Kalwan Tahsil, Dist Nashik

Conclusion

1. The metal concentration in the different vegetable sample was higher than the permissible limits of Indian Prevention of Food Adulteration Act (PFA), 1954.
2. Nearly 80 % of samples were showing higher levels of Pb than the permissible limit of 2.5 mg/kg as per PFA, 1954.
3. Nearly 50 % of Onion and Coriander samples were showing higher levels of Cd than the permissible limit of 1.5 mg/kg as per PFA 1954. Rest of the samples including palak, coriander and cabbage had Cd within the safe limits.
4. The high concentration of Cr and Cu was recorded in Cauliflower.
5. Vegetables grown in the vicinity of an industrial area (Satpur and Ambad, Sinnar) were most contaminated.
6. Vegetables grown away from the city (Market Site Kalwan) were least contaminated.

The results show that consumers are at greater risk of purchasing fresh vegetables with high levels of heavy metals beyond permissible limits as defined by the Indian Prevention of Food Adulteration Act, 1954.

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Zooplanktons Diversity of Bori Dam Naldurg, Dist. Osmanabad (M. S.) India

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Abstract :

The present investigation deals with the study of zooplanktons of diversity of Bori Dam Naldurg Osmanabd Dist. (M.S) India. The work was carried out during the year 2016 (January to December). The result of this communication shows total 15 Species belonging to four different groups. It includes Rotifer (05) Cladocera (04) Copepods (04), and Ostracopoda (02). The growth of Zooplanktons was found throughout the years.

Keywords: - Zooplanktons diversity, Bori dam Dist. Osmanabad.

Introduction

Zooplanktons are the microscopic free swimming component of an aquatic ecosystem. They are primary consumers in the lake that feed on phytoplanktons. The seasonal variations of these organisms was dependents on physico-chemical and biological parameters. It's is a food of fishes.

Many works on zooplanktons like Battish S.K (1992), Rao K. S. and Chubey Usha (1993), Sakhare V.B and Joshi P.K (2002) etc.

There is no compressive report on the zooplankton of Bori am Naldurg Dist Osmanabad. Hence the works was undertaken.

Material and Methods

Zooplankton samples were collected with the help of plankton net. The samples were preserved in 4% formalin for further. Identification was done with the help of standard literature of Battish S.K (1992), Danpathi M.V.S.S.S (2000) Dussan et al (1984) Murugan N.P et al (1948), Pennak R. W. (1987) etc.

Results and Discussion

During the period of investigation following 15 zooplanktons species belonging to Rotifers (05) Cladocerans (04), Copepoda (04) Ostracopoda (02) were recorded.

Table No – I

Zooplanktons Diversity of Bori dam Naldurg. Dist Osmanbad.

Sr. No.	Group	Species
1	**Rotifera**	Filinia longiset Branchionus auadridentatus Karettela auadrata (muller) Branchionus forticula Kerattela cochloearis

2.	**Cladocera**	Daphinosome sarsi Bosmina sp. Chydorus sphaericus Daphnia carinata
3.	**Copepoda**	Cyclops bicolor Cyclops virides Mesocyclops leuckarti Argulus foliceous
4.	**Ostracopoda**	Cypris sp. Cyclocypris globoso.

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Crocodile of Warana basin, Maharashtra, India: Threats to Population and Strategies for Protection and Conservation

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Abstract :

The occurrence of Crocodile in Warana basin was noted and a threat to the population was studied in two successive years 2013-14 and 2014-15. Sand mining from the habitat of crocodile, use of crocodile eggs as a food source by some tribal people and a possibility of the accidental killing of crocodiles are the measure threats recorded to the crocodile population from Warana basin. Hence, conflict management strategies should be applied, mitigation of Crocodile-Animal conflict should be employed and threats to this endangered species should be reduced. For this purpose awareness in the society about protection and conservation of crocodile must be developed. To build an inclusive constituency for the conservation of this species, it is essential to communicate a clear and, perhaps even more important, sincere conservation ethic.

Key Words: - Warana basin, Crocodile Population, Threats, Strategies for Protection and Conservation

Introduction :

A crocodile belongs to family Crocodylidae, order Crocodilia of class Reptilia. Crocodiles as known to human being are the largest reptiles present on the earth. They are known since remote paste. The Indian mythology represents crocodiles as a ride of Maa Ganga (the Ganga river goddess). Also, it is said that the god of rain – Varuna rides on a monster of Makara. There are only 22 species of Crocodiles all over the world, out of which only 3 are found in India. These are – the Gharial- *Gavialis gangeticus*, the mugger- *Crocodylus palustris* and the salt-water crocodile- *Crocodylus porosus*.

In recent eight to ten years, crocodile *Crocodylus palustris* (Lesson, 1831) was reported from Warana basin by peoples from various fields like farmers, news paper reporters and others. Warana basin is one of the major agricultural areas from western Maharashtra, India. Hence the population of the Crocodile from this study region has some threats which are identified in present study. Similarly, some strategies for protection and conservation are also suggested.

Review of Literature:

Many crocodile species are threatened worldwide, usually by human activities, and information on the operation of predation on vulnerable age classes can contribute to management (Magnusson 1982; Kushlan 1988; Mazzotti 1989; Thorbjarnarson and Hernandez

1993). All crocodiles are primarily aquatic but nest terrestrially. That situation can create a significant mismatch between the availability of suitable nesting habitat and the abundance of adult crocodilians (e.g. Leslie and Spotila 2001; Thorbjarnarson et al. 2001; Villamarı´n et al. 2011), and hence the numbers of nesting females. Population densities of adult crocodiles depend upon attributes (food supply, shelter, etc.) of the aquatic system, whereas nest-site availability is driven by features of the surrounding terrestrial environment. That conflict raises the possibility of a flourishing crocodile population having access to very limited nesting areas. The concentration of nesting can increase the degree of threat posed by terrestrial nest-predators (Webb et al. 1983a). This type of system is studied, to document predator abundance as well as the rates and determinants of nest raiding (sudden attack).

Study Area:

The River Warana is a major tributary of river Krishna. It begins its course close to the western crest of Sahyadri at a height of about 987 m. above MSL at Patherpunj in Patan Taluka of Satara District. River Warana runs north to South direction on the hilltop (Sada) in the Sahyadri ranges. Further it takes eastward turn and runs about 148 km between 16^{o} 33' and 17^{0} 16' North latitudes and 73^{0} 33' and 74^{0} 41' East longitudes on the famous Deccan plateau in Maharashtra, just east of the Western Ghats till it joins the river Krishna at Haripur near Sangli city of Maharashtra (Fig. 1). The major tributaries of the river Warana on the left bank are Zolambi and Morana and on its right bank are Tanali, Kansa & Kadavi. Rivers Zolambi & Tanali merges in river Warana behind the Chandoli dam (17^{0} 8' N and 73^{0} 51' E) in the Vasant Sagar water reservoir.

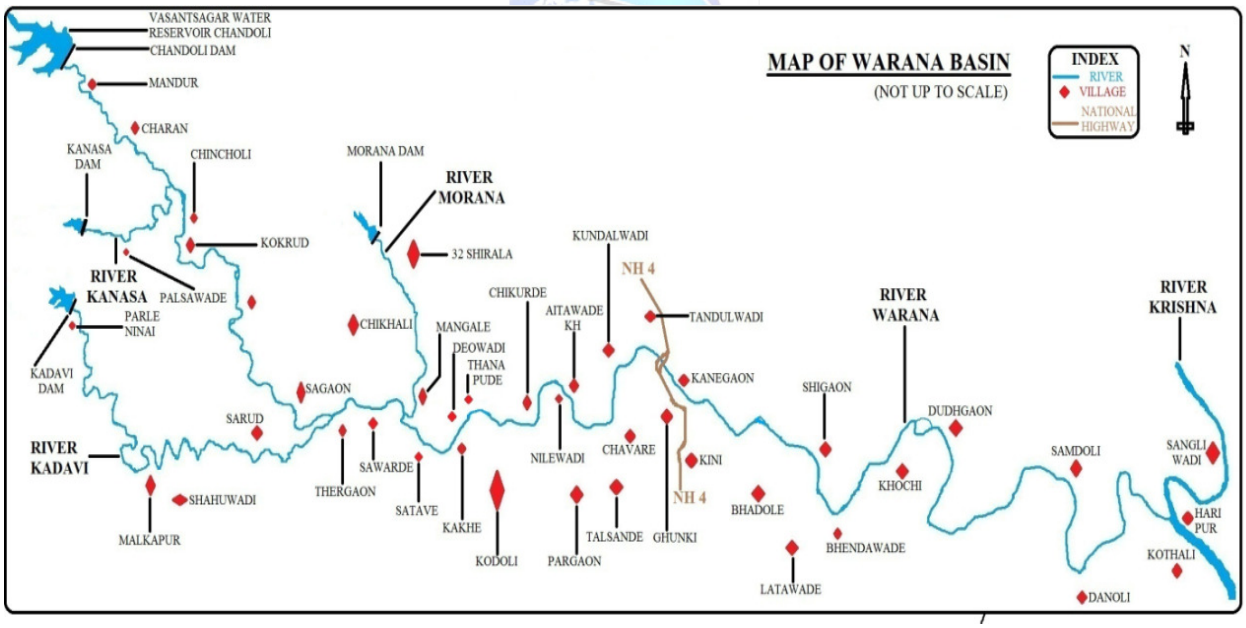

Fig. 1 Map of Study Area

The Study area has a typical wet-monsoon climate. The rainfall varies in the Warana basin from place to place. In the Western part (Upper part of Basin) the annual average rainfall has been recorded above 3000 mm, mostly during the month of June to September. While in the Eastern part (lower part of the basin) the average annual rainfall is less than 500 mm. The average maximum temperature recorded in the valley is 40^{0} C in summer months, while, an average minimum temperature is about 18^{0} C in winter months. Either banks of the river have agricultural vegetation consisting of maximum sugarcane plantation.

Methodology

Frequents visits in the study area were carried out for identifying the threats to crocodile population. Multiple surveys were conducted and observations were noted in the field note. Interviews of farmers in the study area were conducted. Farmer's views regarding threats to crocodile population as well as Strategies for Protection and Conservation were noted.

Observations and Results

The threat observed in study region B is the construction of water canal on the river Kadavi (Fig. No. 2). Right canal of Warana River is being constructed, which crosses river Kadavi at Sarud. This construction work has affected the nesting behaviour of a crocodile. Secondly, it was known that some tribal communities are eating eggs of crocodile by collecting them from the nests (Fig. No. 3). They may also capture the youngones from the nesting sites. This is a major threat to the species as it directly affects the population of this endangered species. The sand mining from the Warana River is one another major threat as it causes the damage to the habitat and nesting sites of the crocodile. At present, there is increase in the industrial areas in the Warana basin, which can also cause the chemical pollution of the habitat of the crocodile. It will also affect food source of the crocodile. Thus the species may search for other food sources and there may be an increase in crocodile–human conflicts and crocodile-animal conflicts.

Fig. 2 Construction of Water canal

Fig. 3 Tribal community at crocodile nest

Discussion :

Individuals are known to have large over lapping activity areas (Kushlan and Mazzotti 1989a). Development of river banks for various purposes and other anthropogenic effects may limit a crocodile's ability to find proper nesting and feeding areas. The largest potential threat to *C. palustris* in Warana basin is habitat destruction and fragmentation by sand mining. The impact of anthropogenic land use has been shown to adversely affect biodiversity in the tropics (Daily et al. 2001; Dale et al. 1994). Similarly, in Warana basin, the impact of sand mining has adversely affected the diversity of crocodile.

The hunting and poaching of crocodiles from Warana basin for leather is not reported in present investigation but eating of eggs of crocodile by some tribal people and possibility of killing youngones by the same or may by the farmers from either river banks of Warana basin can have a much adverse effect on the population of this endangered species in the Warana

basin. Hunting and habitat alteration pressure have confined *C. acutus* populations to distinct population centers throughout its range (Kushlan 1988). Laurie A. Mauger (2012) reported that increased land use in Costa Rica has created some problems with crocodile population. Land use has intensified within the Central Valley and has expanded into more rural areas with deforestation being a key disturbance to the natural ecosystems (Veldkamp and Fresco 1997). Crocodiles are dependent on aquatic and terrestrial ecosystem for all of their life stages.

Sand mining along river Warana could have the negative impacts on *C. palustris* populations in the form of nest-site destruction and the increase in environmental contamination. These have been listed as potential limiting factors for the Florida population of *C. acutus* (Kushlan 1988).

Summary and Conclusion :

The largest potential threat to C. palustris in Warana basin is habitat destruction and fragmentation by sand mining and it may adversely affect the diversity of crocodile. The hunting and poaching of crocodiles from Warana basin for leather is not reported in present investigation but eating of eggs of crocodile by some tribal people and possibility of killing youngones by the same or may by the farmers from either river banks of Warana basin can have a much adverse effect on the population of this endangered species in the Warana basin.

Conservation strategies of Crocodile *Crocodylus palustris*:

The successful maintenance of crocodile *Crocodylus palustris* in Warana basin will require stronger management efforts and increased knowledge of their biology in this portion of their range. For the protection and conservation of crocodile *Crocodylus palustris* from Warana basin, awareness in the society is a must. To build an inclusive constituency for the conservation of this species, it is essential to communicate a clear and, perhaps even more important, sincere conservation ethic. Conservationists, scientists and policy makers mainly rely on utilitarian logic to justify in situ crocodile conservation. The danger of focusing solely on economic values and environmental services is twofold. First, by promising tangible benefits to rural communities conservationists often create unrealistic expectations. This undermines the credibility of conservation organizations and can ultimately alienate local people from nature conservation. It is one thing to deceive ourselves; it is another to misinform poor rural communities, and second, by framing conservation as an economic issue, conservationists risk obscuring other valid motivations to conserve crocodiles in the wild.

Moreover, a crocodile farm similar to the Madras crocodile bank trust, Mamallapuram, Tamilnadu, India or Samutprakarn Crocodile farm, Thailand can be developed in Western Maharashtra for the crocodile *Crocodylus palustris* from Warana basin and river Krishna. In this farm, in-house research on 'the rear and release' technique can be conducted to standardize.

The Crocodile Project will also contribute in various ways to the entire approach of wildlife conservation, research and training. These include-

i. Local people can be intimately involved in the management of crocodiles.
ii. Full-time research personnel will be inducted into the wildlife wing to carry out research on crocodiles and other associated wildlife.
iii. Some important wetland sanctuaries will be created with crocodiles as the flagship-species.

iv. Along with the crocodile project, there will be intimate overseas collaboration in the field of wildlife conservation, education and training.

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A Geographical Factors Affecting the Types of Rural Settlements in Nashik District (Maharashtra)

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Abstract

The study of rural settlements has been one of the most significant themes of the human geography. Rural settlement as a pioneer habitat of human being. It is a living and functional space occupied by rural community with their economic, social and cultural environment. This environment influences the entire rural way of life and their dynamic structure. Rural settlements show an impact of natural environment on them more clearly and directly. In the present study, an attempt has been made to examine and ascertain the types and factors affecting the rural settlements in Nashik District. Rural settlements are small agglomeration of people at favourable sites and are influenced by physical and economic factors. This study has attempted to analyze the dispersion of rural settlements. Dispersion index has been calculated using averages population size and average spacing of settlements to identify the types of rural settlements. Simple statistical techniques such as quartile first, median and quartile 3rd are used for classifying the settlements into different types such as fragmented, dispersed, composite and compact. This study shows that compact type settlements are observed in irrigated & fertile tract of Niphad, Nashik, Deola tahsil on the other hand fragmented & dispersed settlements are noticed in hilly and forested area which occupied western and northern tahsils. The composite types of settlements are generally found in the upper and lower plateau areas of the Nashik district.

Key Words: Dispersion Index, Compact, Dispersed, Composite, Fragmented settlements.

Introduction:

The study of rural settlements has been one of the most significant themes in Human Geography. The geographical study of rural settlements begins with Ritter's work in the early nineteenth century. *There are many reasons for changes in settlement types. Rural and urban settlements have always changed over period of time and will continue to do so. They are dynamic, with populations that swell and shrink like the ebb and flow of the tide and are dependent on the economic and social status of their surroundings. In order to investigate the changes in rural settlements, an appropriate area must be chosen. Rural settlements shape and arrangements are often in strict accord with the kind of work, the agricultural technique and the way the soil is used (Perpillou, 1966). According to Aurousseau (1920) the arrangements of rural settlements as geographical entities express the groupings of dwellings and their inter relationship makes the different types of rural settlements.*

Rural settlements hardly considered to be of any logical classification because consideration of their site and form are inter-woven in a very complex fashion. Sometimes site is taken as an important criteria for the classification of rural settlement types. The pattern has been guided by physical factors such as relief, source of water supply, drainage, soil conditions etc. on the other hand it is closely related to the socio-economic conditions such as land use, land tenure, crop association, means of transportation and density of population (Kumbhar, 1986).

Rural settlements indicate the complex relationship between the human occupance of land and the environment. Many people have studied settlement types but they have not given their clear explanation. Rural settlement types and patterns are used sometimes as synonymous. But they are sometimes interchangeable and one being element or part of other. According to Damanageon (1962) on plains settlements tended to the concentration where as in rugged or broken area disperse settlements are more common.

Study Area:

For the present study, Nashik district has been selected as a study area. It is peculiar region with distinct physical setting and socio-economic conditions. It is situated in the north – western part of Maharashtra State and covers some upper part of Godavari basin and Girana basin. It lies between 19˚33' to 20˚53' north latitude and 73˚15' to 75˚16' east longitude (Nashik Gazetteer 1983). It covers parts of Survey of India degree sheets 46H, 46L 47E, and 47I. It occupies the small portion of leeward side of Western Ghats region. This is a better developed and more populous part of Maharashtra state excluding its tribal belt. Nashik district has an area of 15530 Sq. km with 1922 rural settlements. Nashik district includes 15 tahsils namely Surgana, Kalwan, Deola, Trimbkeshwar, Baglan, Malegaon, Peth, Dindori, Igatpuri, Yevla, Sinnar, Niphad, Chandwad, Nandgaon and Nashik (Fig.1). According to 2011 census record, about 57.47% (i.e.3509814) population resides in rural areas.

Objectives:

The main objective of the present study is to identify the rural settlement types and factors affecting on them in the study area.

Database:

Required data have been collected from the secondary sources. Tahsil wise data concerned with rural of population, area and number of rural settlements have been obtained from Nashik District Census handbook, 2011.

Methodology:

The data collected for the present investigation are tabulated and analysed. The index of Dispersion of rural settlements has been calculated by the formula used by Mandal, R. B. (1972). The measurement of dispersion i.e. Q1, median and Q3 is used to classify rural settlements types on the basis of dispersion index values. Lastly, these settlement types are represented with the help of choropleth method in respect of the study region. Index of dispersion of rural settlements has been calculated by the following formula:

$$\textbf{Dispersal Index} = \frac{Average\ Population\ Size\ of\ Settlement\ (a)}{Average\ Spacing\ of\ Settlement\ (b)}$$

$$a = \frac{Total\ Rural\ Population}{No.\ of\ Rural\ Settlements}$$

$$b = \sqrt{\frac{Total\ Rural\ Area}{No.\ of\ Rural\ Settlements}}$$

Location map

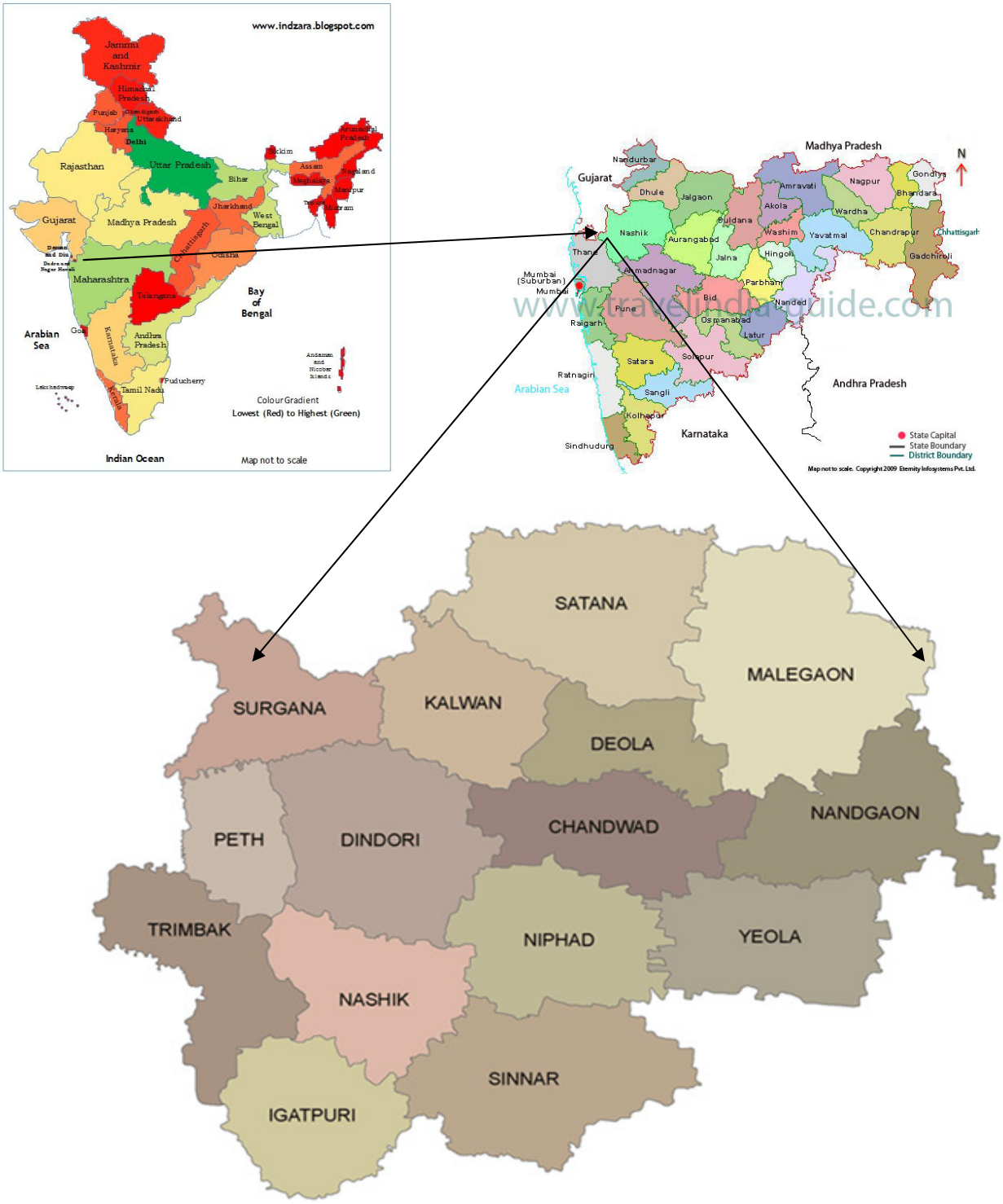


Fig. No. 01

Table I:

Tahsil wise rural area, rural population, No. of rural settlements and dispersal index

Sr. No	Tehsil	Area in sq. km (Rural)	Rural Population	No of Rural Settlements	Dispersal Index
1	Peth	572.98	119838	145	417.66
2	Surgana	843.75	169553	190	423.99
3	Trimbakeshwar	886.67	156367	125	470.27

4	Nandgaon	1082.04	185186	100	564.59
5	Kalwan	874.81	208362	152	573.55
6	Yeola	1051.68	221320	124	613.34
7	Igatpuri	817.49	197686	117	640.00
8	Chandwad	925.30	210508	111	658.49
9	Sinnar	1360.89	281091	130	669.42
10	Dindori	1400.25	315709	158	672.77
11	Baglan	1479.28	336734	170	673.73
12	Malegaon	1794.07	368137	143	727.22
13	Deola	569.50	144522	50	857.69
14	Nashik	559.67	175948	73	873.27
15	Niphad	1041.89	418853	134	1124.37
	Total	15260.27	3509814	1922	9960.36

Source: Census Handbook 2011

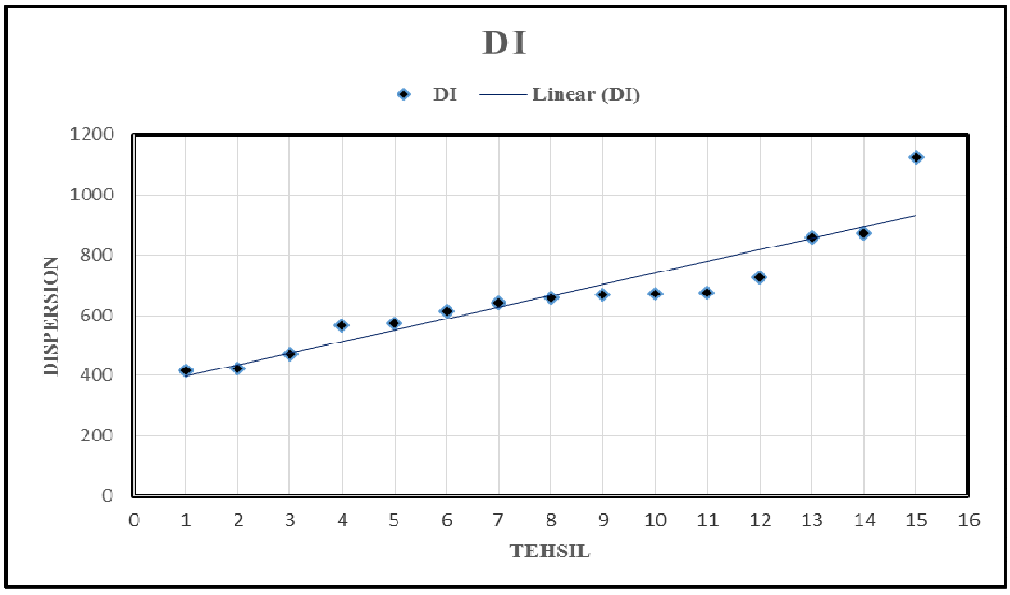
Table II: Nashik District

Settlement Types, Area covered, Number of Settlements and Mean population size-2011

Sr. No.	Dispersal Index Values	Types of Settlement	Area in Sq. km.	% of Area	No. of Settlement	% to total	Mean pop. size
1	Less than 564.59	Fragmented	2303.40	15.09	460	23.93	969
2	564.59-658.49	Dispersed	4751.32	31.14	604	31.43	1694
3	658.50-727.22	Composite	6034.49	39.54	601	31.27	2166
4	Above 727.22	Compact	2171.06	14.23	257	13.37	2877
			15260.27	100.00	1922	100.00	

Source: Computed by Authors

Fig No. 02



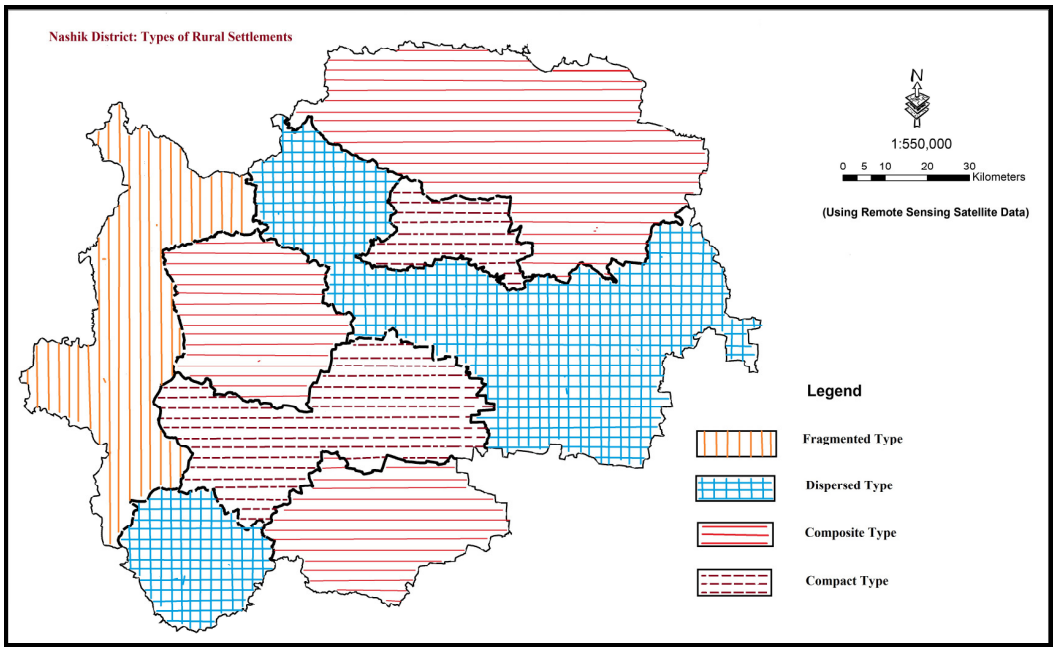


Fig No. 03

Result & Discussion:

For the analysis of classification of rural settlement types a statistical method of Mandal (1979) has been applied and the results have been presented through a table, linear diagram and map considering the types of rural settlement. On the basis of Q first, median and Q three values the dispersal index have been categorized. The dispersal values ranges from 417.66 to 1124.37. The table II gives the details of area and number of settlements in the different classes of settlement types.

Fragmented Settlements:

The fragmented types of rural settlement are located on the border line areas of the Nashik District. They are dominantly found in the western part of the study area which is occupied by the hilly and forested area. The hills are higher than those at the edge of the neighbouring sahyadris. Surgana, Peth, Trimbkeshwar tahsils having these type of settlements. The dispersal values of this group is less than 564.59. In this area very shallow water levels within 2m observed. Soil of this region is also less productive. The mean population size of rural settlements is small and most of the wadi or pada form of rural settlement are dominant.

Dispersed Settlements:

The dispersed type of rural settlements are found in Nandgaon, Kalwan, Yevla, Igatpuri and Chandwad tahsils of the study region. In these area availability of water, development of canal irrigation and fertile soil and some of the contributory factors are responsible for disperse type of rural settlements. These settlements are small in size and they are located near the cultivable lands. 31.43 percent area is covered by these settlemets. The rivers provide only seasonal opportunities for agricultural activities. Hence, dispersed settlements grown in this area.

Composite Settlements:

The composite form of rural settlements which is dominantly found in the Sinnar, Dindori, Baglan and Malegaon tahsil of Nashik District. These tahsil covers 31.27 percent area

of the total. This type of rural settlements are due to result of interactions of both centrifugal and centripetal forces. These tahsils having good irrigation facilities and transportation routes. The growth of these settlements is based on the transfer of surplus population from the main nucleus which exerts pressure on the people to seek place outside from main nucleus with in the village territory, so that they may continue to be the part of social linkage.

Compact Settlements:

The compact form of rural settlements is observed in Deola, Nashik and Niphad tahsils of Nashik district. This area is fertile zone of study region. It covers 13.37 percent area of the district. The average size of rural settlements in the study area is large. The transport network is developing in this area. Most of settlements are located in the area having dense population with close spacing between the houses. Niphad and Nashik have black soil with good irrigation facility. Hence, the compact type of rural settlements are located in the agriculturally prosporous area, where the size of rural settlements are increased.

Factors affecting the rural Settlement Types:

The types of rural settlement found in study area are not the result of single geographical factor but assemblage of several geographical factors- physical and cultural.

Physical Factors:

The physical factors have a greater controll over the types of rural settlements. Relief plays very significant role in determining the settlement. There is a great variation in the topography of the Nashik District. The district forms the part of Western Ghats and Deccan plateau. Physiographically, the Nashik district comprises varied topography. The offshoots of Sahyadri viz. Satmala, Selbari and Dolbari hill ranges along with eastern and southern plains and Godavari valley are distinct geographic units. The study area ranging in altitude from 300-1600 mts. above mean sea level. The general slope of the study region constantly decreases towards the eastern side. The extreme western portion is rugged with flat topped mesas abutted by escarpment, rising several hundred feets above the valley bottoms. Because of that the fragmented settlements are found. The normal annual rainfall in the district varies from about 500mm to 3400mm. It is minimum in the north eastern part while it increases towards west and reaches a maximum around Igatpuri in Western Ghats.

A soil is also most important factor in the distribution of rural settlements. The soils of the district are the weathering products of basalt and have various shades from gray to black, red and pink colour. In the study region fertile river terraces, relatively level and patches of fertile soil are responsible for growth of composite and compact type of settlements. The red soil is less common and is suitable for cultivation under a heavy and consistent rainfall. These areas are dominated by fragmented rural settlements. The forest is mainly located in western, northern and south-western regions of the district. Availability of water is also responsible for compact and composite types of settlements. Sharp variation in the local climate effects the distribution of rural settlement in the study area.

Cultural Factors:

People of different castes living in one village, such villages are compact settlements. Caste prejudices are also responsible for fragmented, composite, dispersed settlements. Such charactaristcs of inhabitants are more responsible for fragmented and dispersed type of rural

settlements. The condition of insecurity need of defence acted as an attracting force for compact and agglomereted type of settlements in the district. The economy of people is mainly based on agriculture. Those people have their own lands and for the better operation of agricultural activities prefer to settlel near fields. In the district, rural settlements having good transportation linkages are generally copact. Hence, cultural factors are also responsible for the rural settlement types.

Conclusion:

The rural settlements of the study region categorised into four different types; Fragmented, Dispersed, Composite and Compact. The compact rural settlement in study area is the product of permanent agriculture, productive land and favourable climatic conditions whereas fragmented and dispersed settlemtens are found in areas of rugged topography. Hence, here the rural settlements affected by physical factors such as topography, slope, soils, water and climatic conditions and cultural factors such as caste system, security, economy, transport network facilites.

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Isolation of Cartap hydrochloride Degrading Microorganisms from soil

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Abstract :

Insecticides are substances used to kill insects. They include ovicides and larvicides used against insect eggs and larvae, respectively. Insecticides are used in agriculture, medicine, industry and by consumers. Insecticides are claimed to be a major factor behind the increase in the 20th-century's agricultural productivity. Nearly all insecticides have the potential to significantly alter ecosystems; many are toxic to humans and animals; some become concentrated as they spread along the food chain.

In present study Caldan 50 S.P was used for isolation of stains capable of degrading caldan. Cartap hydrochloride (Caldan) is an insecticide of Nereistoxin analogue group, which gives effective control of insects through its contact, systemic and stomach action.

Two isolates were isolated and were preliminary identified as Bacillus spp and Pseudomonas spp.

Key words: Insecticide, Caldan, Cartap hydrochloride

Introduction

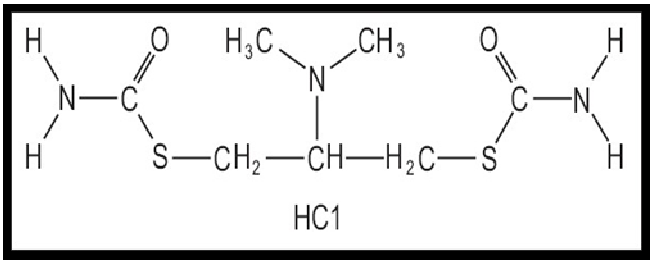
The application of pesticides for pest control in cropping systems is general practice in India. Insecticides are the dominant group of pesticides used in most rice growing countries like India. Since pesticides are very toxic by design, they have the potential to adversely impact on ecosystem health. Pesticides a quit significant among these chemicals, which are defined as any substance or mixture of substances which are used to control destructive pests such as insects, plant disease organisms and weeds, including many other living organisms such as nematodes, arthropods other than insects, and vertebrates that endanger our food supply, health, or comfort. In particular, the term pesticide refers to chemical substances that alter biological processes of living organisms deemed to be pests, whether these are insects, mould or fungi, weeds or noxious plants. Pesticides are widely used in most areas of crop production to minimize infestations by pests and thus protect crops from potential yield losses and reduction of product quality . These pests potentially cause damage or interfere in any other way in the production, elaboration, storage, transport, or commercialization of food, agricultural products and wood products or animal food. Certainly, pesticides have improved longevity and quality of life, chiefly in the area of public health. However, the application of pesticides may cause adverse effects among the different forms of life and among the ecosystems.

The use of microbes in the bioremediation and detoxification of many toxic xenobiotics, especially toxic pesticide is an efficient tool for the remediation of contaminated sites in the environment.

Cartap is a pesticide that was first introduced into the market in Japan in 1967. Its commercial names include Padan, Kritap, AG-Tap, Thiobel, and Vegetox. Its basic chemical structure is S, S-[2-(dimethylamino)-1, 3-propanediyl] dicarbamothioate. It is commonly used as

a hydrochloride ($C_7H_{15}N_3O_2S_3HCl$). Cartap is essentially a contact and stomach poison. It is used for the control of chewing and sucking pests and results in insect paralysis. It has been categorized as a high-effectiveness, low-toxicity, and low-residue pesticide used in rice and sugarcane fields.

Figure 1: Chemical structure of Cartap hydrochloride



Materials and Method:

Collection of soil samples:

Soil samples were collected from agriculture farm **of Belatgavhan,Nasik District, Maharashtra**, with history of continued farming activities . Surface soil from 0-15 cm was collected, placed in sterile plastic bags and were brought to laboratory for analysis. Soil sample was sieved through mesh prior to bacterial screening.

Insecticide:

For present study insecticide Cartap hydrochloride (Caldan 50) was used.

Medium and chemicals:

Enrichment and isolation of Pesticide degrading bacteria:

One grams of soil sample were added to 100 ml minimal broth supplemented with different concentrations of insecticide (5ppm, 10ppm ,20 ppm…….100ppm)

Samples were incubated on rotary shaker (150 rpm) at 30°C for 5 days. After sufficient incubation 0.1 ml culture broth was pipetted and spreaded on minimal agar plate supplemented with pesticide. Plates were incubated for 24-48 hrs at 30°C. Well isolated small colonies were obtained after incubation.

Identification of bacterial isolates:

Selected bacterial isolates were identified as per standard biochemical tests.

Table 1: Biochemical tests for identification of *Bacillus sp*

S.No	Biochemical tests	Inference
1	Catalase Test	+ve
2	Methyl red Test	+ve
3	Indole production Test	-ve
4	Voges-Proskauer Test	-ve
5	Glucose-lactose utilization Test	-ve
6	Citrate utilization Test	+ve
7	Urease	+ve

Table 2: Biochemical tests for identification of *Pseudomonas sp*

S.No	Biochemical tests	Inference
1	Catalase Test	+ve
2	Methyl red Test	-ve
3	Indole production Test	-ve
4	Voges-Proskauer Test	-ve
5	Oxidase	+ve
6	Citrate utilization Test	+ve
7	Gelatinase	+ve

Result and Discussion:

During this study two bacterial isolates were found to show significant ability to carry out the degradation of selected pesticides, these cultures was identified as *Bacillus spp and Pseudomonas spp.*

Among the two isolates *Bacillus* was found to tolerate a concentration of about 80ppm and *Pseudomonas* was able to tolerate a concentration of about 50ppm.

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Physico-Chemical Parameters of Bennetura Reservior Murum, Dist–Osmanabad. (Maharashtra)

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Abstract :

During the year 2016 the analysis of water quality from Bennetura reservoir was conducted. Present investigation deals with physico-chemical parameters of reservoir. The temp of water raged between 16 to 33 oC. pH was found to be 7.5 to 8.2 Total dissolved solids ranged from 62 to 168 mg/lit. Transparency was found to be 77 to 152. The Dissolved oxygen was found to be 5.1 to 9.2 mg/lit Chloride and total hardness varies from 32 to 52, and 52 to 102 mg/lit

Key words- Physico-Chemical limnology-Bennetura Reservoir Dist. Osmanabad.

Introduction

Some Indian workers carried out the Limnological investigation on reservoirs in India such as Kulshrestha et al 1992, Thomas and Aziz 2000 in the state of Maharashtra studies has been conducted on Limnology by Shashtri and Pendse1991, Sakhare and Joshi 2002,

There is no such work was carried out on Bennetura reservoir Murum in Osmanabad District of Maharashtra. Hence the present investigation was undertaken to study the physico-chemical Limnology of Bennetura reservoir.

Material And Methods

For the systematic analysis of water quality , monthly samples were collected from the four sampling stations for a period of one year (Jan-2016-Dec. 2016) The water samples is used for the collection of sample . The sample was collected for a depth of one meter in the morning period. The sampler is of one liter capacity of plastic can. With this sampler the samples were brought to laboratory for analysis some parameters like temp, transparency , pH , dissolved oxygen, free carbon dioxide and alkalinity , were analyzed at the reservoir (study site) and some parameters like the Total Hardness, Total Dissolved Solids, and Chlorinity were analyzed in the laboratory

The methods used for the analysis of physico-chemical parameters are given as in methodology for water analysis .(Trivedi and Goal 1984, APHA 1980, & M.S. Kodarkar (1998) The pH values were recorded the sides with the help of pH pen-meter.

Result and Disscusions

Water Temperature: - The temperature is very important factor which influence the aquatic life. The temp. of air and water affects the conc. of dissolved gasses and chemical solutes. During the present investigation. The temp. varied between 16 to 33 oC. The lowest (16 oC) temp. was recorded in the month of January and highest temp (33 oC was recorded in the month of may.

pH (Ion Concentration) :- The pH in the reservoir ranged between 7.5 to 8.2 .The minimum pH was recorded in the month of December, while the maximum was in February. It shows that the nature of water during the period of investigation is alkaline.

Transparency: -

The most important physical parameter is transparency which is important for production. With the help of sacchi disc, the transparency of 77 was the recorded in October and 152 cm was recorded during March. Transparency is inversely proportional to turbidity which created by inorganic and organic matter.

TDS (Total Dissolved Solids):- The investigation of total dissolved solids shows that the TDS values peak in summer less in Monsoon. It is observed that TDS value varied from 62 -168 mg/lit. The TDS value 62 mg/lit. in monsoon whereas 168 mg/lit. in summer.

DO (Dissolved oxygen):- It is clearly shows the dissolved oxygen ranged between 5.1 to 9.2 mg/Lit. It found that, the high dissolved oxygen was reported in the monsoon (August) and lower values where recorded in summer (April).

Alkalinity:-

The alkalinity in the water mainly due to the salts of carbonates, bicarbonates , phosphates, nitrates, borates, silicates etc. Total alkalinity is the major of the capacity of water to neutralize a strong acid. The minimum value was observed in the month of August (21) where as maximum value in the month of January. (106).

Free CO2:- During the period of investigation the free carbon dioxide was not recorded.

Chlorides:- Chlorides was recorded during the investigation such as the minimum and maximum values of chlorides were 2mg/lit. and 52 mg/lit.in the month February and April respectively According to subbamma and Rama Sarma.(1992) , the fluctuation in the chloride values of various water bodies is minimum in the monsoon period.

Total Hardness:- Calcium and Magnesium is the important factor which gives the hardness to the water, maximum values recorded during summer and lowest during winter. During present work it is observed that the maximum hardness (102) was found in the May and minimum (52) in the month of January.

In the present study period, the higher values were recorded in Winter and lower values in Monsoon.

Table No. –I
Physico-chemical parameters of Bennetura Reservoir Murum Dist. OSmanabad.
(From Jan-2016 to Dec 2016).

Sr. No.	Parameters	Range
1	Water temperature (oC)	16 to 33
2	pH	7.5 to 8.2
3	Transparency (cm)	77 to 1562
4	Total Dissolved Solids (mg/lit)	62 to 168
5	Dissolved Oxygen (mg/lit)	5.1 to 9.2
6	Total alkalinity (mt/lit)	21 to 106

7	Free carbon dioxide (mg/lit)	Nil
8	Chlorides (mg/lit)	32 to 52
9	Total Hardness (mg/lit)	52 to 102

Acknowledgements:

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Histopathological and Histochemical Changes in Fresh Water Snail Mellania Tuberculata and Mellania Scabra Trematode Parasite From Giranandam, Godavari River and Surrounding Water Resources District – Nashik (Maharashtra) India.

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Abstract :

The fresh water snail mellaniascabra and tuberculata is infected with cercariaviviparia it causes macroscopical and microscopical changes in the host. The macroscopical changes are change in the length of shell showing thinning and ballooning and also the chance in color and texture of hepatopancresas. The histopathological changes include numerous vacuoles, cell shape changes from columnar to cuboidal. In addition to these changes cells are destroyed and accumulations of fatty bodies are observed. A histochemical effect is noted that the amount of carbohydrate and proteinis decreased with magnitude of infection. The lipid content of hepatopancreas gets increased as a result of infection and role of lipid in cercariae depends on the type of swimming movement

Key words-mellaniascabra and tuberculata, shell, hepatopancreas,trematode,infections.

Introduction :

There is multidimensional approach in order to understand the nature of parasitism and the pathological effects on the hosts. In the present work host -parasite relationship is studied and full attention is paid to the study the effects of larval stages of trematodes on the first intermediate host (gastropod). Effect of larval trematodeds on the mollusan intermediate host depends upon four important factors as summarized by smyth (1966).

1. The degree of infection,
2. Size and age of host,
3. Developmental pattern of larvae and
4. Nature of organ invadedSmyth (1966) distinguished three main types of effects namely-

1. Those affecting hepatopancreas
2. Those affecting gonads and
3. Those affecting general physiology of host

The work on host parasite relationship dates back to twentieth century. Pelseneer was first to report the reduction in the size of peins of *Littrinalittorea* infected with progenitor stages of *Cercariaemasculans* as compared with that of non-infected snails.

Agersborg (1924) studied the effect of larval trematodes on physagyrina and Helisamatrivolvis and reported the four infected stages-

1. Whenmiracidaincaded snails the host tissue shrunk and refractory when prepared and examined microscopically,
2. Hosts tissue along path of penetration by trematodes secreted a granular substance, which was discharged into intercellular spaces and from hence was distributed throughout the host body but was not taken ito the parasites body,

3. Degeneration of host tissue especially at the primary site of infection occurred with the epithelium taking on squamous rather than normal columnar form,
4. There was a gradual return of tissue to the normal condition as parasites gradually decreased in numbers. Hurst (1927) reported decrease in the quantity of glycogen and increase in the fat content within the hepatopancreas of physaaccidentalis infected with larval stages of Echinostomarevolutum.

It is not unknown to see the excessive growth of shell of mollusk infected with trematode larvae. This phemomenon was firstly reported by Wesenberglund (1934) as gigantism. Gignatism was also reported by Rothschild (1936, 1941) in *PeringiaUlvaeAndLittrioPeritoides*. Cort et al (1941, reported the complete destruction of digestive gland of *PhysaParkeri*infected with Van Barnd and Files (1947) in *Austrlorbisglabratus*infected with *Schistosomamansoni*. Lal and premvati (1955) reported the destruction of digestive gland of *Melanidestuberculates* when infected with larval monostome. Cheng and james (1960) reported the active ingestion of cells of hepatopacreas of fresh water bivalve *sphaerium striatum* by the radiae of *crepidostomimcornutum*. Cheng (1962) noted reduction in the quatity of glycogen and lipid in the *Helisomatrivolvis* infected with Echinoparphiium larvae. Porter (1967) observed the histopathological effect of trematodeon hepatopancreas of *Oxytmasillicula*. Zdua and Yavorskii (1972) studied the histopathological change caused by larval trematode on live of *Galba trancatula*. The effect of distomecercaria, *Cercariapigmenteta* on the digestive gland of *lymneaauricularia* was studied by Karyakarteet. al. (1977). They observed that the amount of lipid decreased considerably in the infected hepatopancreas ascompared to the non-infected snail. Yadavet. al. (1978) Observed that content of hepatopancreas, protein and DNA of *Lymneaauricularia* were lower in snails infected with *Cercariaeindicae*XXll than the non-infected snails.

ln the present research work mellaniascabra and tuberculatainfected with *Cercaria*viviparia is selected for histopatropathological studies.

Material and Method

Hepatopancreas of non-infected and infected snails (parasitized) used for histopathological studies. They were washed in normal saline and fixed in the following solutions.

Carbohydrates

Carnoy's fluid-Ethyl alcohol-60ml,
Chloroform 30 ml,
Acetic acid glacial- 10ml

Fixed for 12 hours, dehydrated in alcohol and embeded in paraffin wax (M.P.56-60c) through xylene.Sections were cut at 5-7u, spread and mounted on albuminatized slides using water.

Bouin's fluid- Saturated aqueous picric acid-75ml,
Formalin-25ml,
Acetic acid glacial -5ml

Fixed for 24 hours, washed in water, dehydrated up 70% alcohol. Material was washed 70% alcohol saturated with lithium carbonate to remove picric acid. Then dehybrated in alcohol

and embeded in paraffin wax (M.F 56-58C). Through xylene sections were cut at 5-7u, spread and mounted on albumenized slides using little water.

A-Carmine stain for glycogen (Best,1906)-

Stock carmine solution was prepared by gently boiling 2gm carmine, 1gm of postassium carbonate and 5gm potassium chloride in 60ml distilled water for 5min. Solution was colled and filtered. 20ml of ammonia (Sp. G.09) was added to filtrate and stored.

15ml of stock solution was diluted with 12.5 ml of ammonia and 12.5 of methyl alcohol.
Best differentiator – Absolute alcohol – 16ml,
Methyl alcohol-8 ml,
Distilled water – 20 ml.

Procedure-

1. Paraffinnn sections were deparaffininzed inzylene and transferred to the change of abosolte alcohol.
2. Sections were placed 1% celloidin in absolute alcohol/ether (equal parts) for two minutes.
3. Dried in alcohol.
4. Passed through alcohol to water.
5. Stained in Ehrlich's hematoxylin for 2 minutes.
6. Rinsed in tap water.
7. Stained in carmine staining solution for 30 min.
8. Differentiated in Best's differentiator for 30-40 seconds.
9. Washed in 80 5 alcohol.
10. Dehydrated in absolute alcohol.
11. Cleraed in xylene mounted D.P.X.

Result- Glycogen – Red

B- Alcian Blue Method for mucoplysaccharide (Steedman 1950)

1. Section were deparaffinized in zylene and hydrated from alcohol to water.
2. Sections stained in 1% alcianbblue, prepared in 3% acetic acid for 30 minutes.
3. Rinsed in distilled water, Counter stained with Ehrlich's haematoxylin for two minutes,
4. counter stained with Ehrlich's haematoxylin for two mintes,
5. Washed in running water for five minutes,
6. Dehyrated in alcohols, cleared in xylene and mounted in D.P.X.

Result-Acid Mucopolysaccharide-Blue Green Protein

Trematodes were washed with normal saline and were fixed in slightly flattened position. After fixation period they were washed with distilled water, dehydrated in alcohol and cleared section were cut at 5-7 u, spread and mounted on albuminatized slides using little water.

Mercury Bromophenol Blue Method (Bennag 1955)
Fixative-cornoy
Staining agent-HgCl2 -1gm,
Bromphenol Blue – 1.05gm,
Acetic acid – 100ml

Procedure-

1. Sections were deparaffinixed in xylene and hydrated through alcohol to water,
2. They were stained for 25 minutes in staining agent,
3. Rinsed in 0.5% acetic acid for two minutes,
4. Sections were transffered into tertiary butyl alcohol,
5. Cleared in xylene and mounted in D.P.X.

Result proteins – Deep Blue

Lipid

Sudan Black B method for lipid (Macmanus1946)
Fixiative-formal calcium
40% formaldehyde_100ml,
Distilled water – 500 ml,
10% Calciun Chloride (unhydrous)- 100 ml,
(a piece of chalk was added)

Preparation of Block-

Hepatopancreas of healthy and parasitized snails were washed thoroughly in normal saline and then fixed in formal calcium for 12 hours. After fixation they were transferred to dichromate calcium (potassium dichromate 5 gm, calcium chloride 1 gm and distilled water 100 ml) for 18 hours at room temp. They were transferred to dichromate calcium for 24 hours at 60^0C. Specimens were washed thoroughly in running water and finlly in paraffin wax (M.P. 58-60^0C) Section were cut at 5-7 u and were pread on slides.

Preparation of Glycerine jelly-

15 gm of white gelatin was dissolved in 100 ml of distilled water by gentle heating. 100 gm of glycerine was added to it and warmed for 5 minutes. Two drops of phenol was added to it. This mountant was kept at 37^0C in an incubator.

Procedure-

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Procedure-

1. Sections were deparaffinized in xylene and broughupto 70% alcohol.
2. They was stained in saturated sudan Black B in 70% alcohol fo r 3 minutes.
3. Excess pf stain was removed by rinsing quickly in 70% alcohol,

4. Washed in running tap water,
5. Mounted in Glycerine jelly

Result – Lipid-black and brownish black.

Obserbations And Results

The snail *mellaniatuburcullata*was found parasitized with *Cercariaviviparia*. Only six snails werefound to be infected out of 2895 snails dissected and observed. The percentage of infection was 0.20%

1. Macrosopical observations-

Macroscopicalobservaitons of infected and non-infected –*Mellaniatuburculata& M-scabra*parasitized with *Cercaraiaviviparia*

Shell				**Hepatopancreas**			
Length		**Thinning and Ballooning**		**Colour**		Texture	
Non-infected	Infected	Non-infected	Infected Thinning	Non-infected	Infected	Non-infected	Infected
28mm (26-30 mm)	41mm (37-45 mm)	Thick	And Ballooning	Rownish	Whitish	Compact	Fibrous

The shell of non- infected snails was quite thick and measures 28 mm (26-30mm) in length. Compared to this the infected snails shoed elongation of shell and measures 41m, (37-45) in length. It was observed that the elongated shell was thinner than the shell in the non-infected snails and ballooning was also common as a result of larval infection.

As a result of this infection the colour of hepatopancreas changed from brownish to whitish and it's compact nature was lost. It assumed a fibrous structure. Hepatopancreas changedit's shape and become enlarged.

2. Pathological observation-

Pathological changes in digestive gland of *mellaniascabram-tuberculata* parasitized with infected *mellaniaScabra* and *m-tuberculata*

Sr. No.	Characters	Mellaniascabra&m-tuberculata	
		Non-infected	Infected
1	Vacuoles	Not observed	Numerous, rounded and cuboidal vacuoles observed. Vacuolated cuboidal.
2.	Alteration in cell	Columnar	Cells are destroyed.
3.	Autophagy	-	Larval forms compactly.
4.	Sloughing of tissue.	Compact	Cells are destroyed and only larval forms observed.
5.	Histolysis	-	Occluded. Cells Shown accumulation of fatty bodies.
6.	Tubule Lumen	Not occluded	
7.	Accumulation of fatty bodies in cells.	Not observed	

The infection of *Cercariaviviparia* caused numerous pathologicl changes in the microscopicalstrctures of digestive gland of *Mellaniascabra& m-tuberculata*Numerous vacuoles of various shape such and rounded and cuboidal appeared in the hepatopancreatic cells. Columnar cells became cuboidal. The cells were destroyed in vicinity of larval forms and many times the gland was destroyed. The hepatic tubule that was intact in non-infected hepatopancreas was observed compressed because of infection and tubules were occlunded. The cells showed accumulation of fatty substances'.

3-Histochemical observations-

The relative intensities of carbohydrate, proteins and lipid in digestive gland of non-infected and infected *mellaniascabra& m-tuberculata*parasitized by *Cercariaviviparia.*

+++ = Lntensily Stained
++ =Moderatekt Stained
+ = Slightly stained
0 = No Stain

Carbohydrates

The best's Carmine test was positive and the Alcian blue was also in the hepatopancreas of non-infected snails. The intensity of staining reaction showed the presence of large quantities of glycogen and mucopolysaccharide.

Best carmine and Alcian Blue gave totally negative results in infected heptopancreas showing absence of glycogen and acid mucopolysaccharde.

Proteins

The non-infected hepatopancreas was positive with Mercury bromophenol Blue and slight reaction was observed in heavly infected hepatopncres. The results shows the presence of large quantities of proteins in non-infected hepatopancreas and few traces were in infected hepatopncreas of Mellaniascabra& m-tuberculata.

Lipids

Sudan Black B gave the slightly positive raction in non-infected hepatopancreas and strong reaction in infected hepatopancreas. The results showed the presence of Sudonophilic lipid in small quantities in non- infected and large quantities in infected *Mellaniascabra& m-tuberculata*

Conclusion

As indicated already the fresh water snail *mellaniascabra& m-tuberculata*was selectd for histopathological studies. The snail was infected with *mellaniascabra& m-tuberculata*

The fresh water snail *mellaniascabra& m-tuberculata* showed the macroscopical, microscopical, histological and histopathological changes as a result of the infection of species of cercariae.

In *mellaniascabra& m-tuberculata*the shell increased in length and became thin. Ballooning was observed. The brown and compact hepatopancreas became whitish and fibrous after the infection.

The increase in the size, thinking and ballooning of shell is the direct consiquece of the excessive consumption of food by the snail to meet the demands of larval stages of Cercariaviviparia.

The vacuoles, histolysis, destruction of the tubules and occlusion of tubules lumen in the hepatopancreaticcells are direct conseqences of physical destruction by the larval stages. Accumulation of fatty substances in because of their release of fatty substances the gland changes from brownish to whitish is due to the action of *Cercariavivciparia*. The infection also cause the change in the texture of hepatopancreas. Becomes fibrous. The change is due to destruction of hepatic cells. Many times the cercariae were passed out of the gland, leaving the spaces and hence giving fibrous texture to the gland.

Pathological effects like numerous vacuoles of different shapes such as rounded vacuoles of different shapes such as rounded or cuboidal appears in hepatopncreartic cells. Accumulation of fatty substances is because of the release of fatty substances as end product of metabolism of the larvae.

In hepatopancreas of non-infected snails carbohydrates are present in large quantities. While in the hepatopancreasof infected snails only the traces of carbohydrate are observed. Proteins also show this type of downward trend. But lipids show the result quite contrary to carbohydrates and protein content. Sudonophilic lipi8ds showed their presence in traces in non-infected snails. The amount increased in hepatopancreas of infected snails. Cercariavivparia damage to hepatopancreas of *mellaniascabra& m-tuberculata* In addition to this physical damage, host glycogen and proteins are utillzed by the developing stages to maximum extent and hence the amout progressively decreases in infected snails. Fully developed cercariae were also seen associated with bodywall of sporocysts. Stored glycogen in body wall of sporocyst has been re3eported by Gintsinskay (1960), Cheng (1963) and Bowers (1976). Accoridng to kishna (1979) following possibilities can be offered the factors leding to the protein catabolism.

1. The larval trematode first take carbohydrates needed from the host organism. This causes a starvation for the snail, which then catavoli9ses tissue protein to meet it's energy requirement.
2. There may be reduced rate of absorption of food caused by displacement of hepatopancreatic tissue by the spreading larval stages of parasites. This also could necessitate a protein catabolism.
3. Metabolic pathway leading to degradation of host protein could be activated through substances shed by the parasites.

The amount of lipid increases in the hepatopancreatic cells of the snail. The cercariae are directly responsible for the change in lipid content of hepatopancreas of host shell. The parasites may not take lipids as their food, but accumulation of fatty substances is a direct consequence of car ohydrate metabolism.

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Physico- Chemical Status of Kunsawali Water Tank No-2, In Osmanabad District (M.S.) India.

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Abstract :

The present paper deals with the study of physico-chemical status of Kunsawali water Tank No- 2, in Osmanabad district (M.S.) India. The work was carried out during the Year 2017. The physico-chemical parameters like temperature, pH, transparency D.O., free CO_2, total alkalinity, total hardness, Chlorides, nitrates, phosphates and T.D.S. were studied during the course of study one year i.e January to December 2017. The results of this study shows, the water quality of Kunsawali Tank No-2, in osmanabad district is suitable for drinking, domestic as well as agriculture use.

Key-words –Physico- chemical aspects – Kunsawali water Tank No- 2, in Osmanabad.

Introduction :

Material and Water quality is an ever – changing entity and no water body has a persistently constant water quality in progression of time. Today, with the rapid increases in population and over exploitation for different purposes, the quality of water has been deteriorating at an alarming rate which results in depletion of Aquatic life. Several workers from India and abroad have contributed their efforts in studies of limnology in freshwater i.e. Brett (1950), Kamat (1956), Goel (1988), Goel and Chauhan (1991), Bhosale et.al. (1994), Chavan and Mohekar (1999), Hujare and Muley (2005).Human history can in fact be written in terms of interactions and inter relations between human and water. The quality of water in an ecosystem provides significant information about the available resources for supporting life in that ecosystem. There is no authentic record is available about the limnological aspects of DHOM Reservoir, hence this investigation was undertaken.

Methodology

The water samples were collected from the Kunsawali water Tank No-2, in Osmanabad district for a period of one year. The temperature of water and pH was recorded on the spot and remaining parameters were analyzed in the laboratory. The water temperature was recorded by using thermometer. The transparency was measured by using sacchi disc.The chemical parameters of water were analyzed by using standard literature by using standard literature i.e. APHA (1980) and Kodarkar et.al. (1998).

Results and Discussion

Table No. I

Physico- chemical profile of Kunsawali Water Tank No-2, in Osmanabad district.

Sr. No.	Parameter	Range
1	Water temperature (°C)	25 to 38
2	pH	7.0 to 8.3
3	Transparency	43 to 64

4	D.O. (mg/lit)	4.2 to 7.0
5	Free CO_2	1.2 to 3.1
6	Total alkalinity (mg/lit)	122 to 161
8	Chlorides (mg/lit)	27 to 31
9	Nitrates (mg/lit)	0.54 to 0.71
10	Phosphates (mg/lit)	0.70 to 1.0
11	Total Dissolved Solid (mg/lit)	181 to 276

1. **Water Temperature:**Generally the water quality depends on the atmospheric as well as water temperature of water body.There is rise in water temperature leads to spared up the chemical reactions accelerates in the water body.In present investigation it ranged from 25 to 38°C. It is important for its effect on the chemistry and biochemical functions in the organism. The water temperature is maximum in summer and minimum during winter.
2. **pH :**The pH is most important abiotic factor that serves as an index of water pollution of the water body. The pH was recorded with the help of pocket digital pH meter. Majority of the water body are slightly alkaline or basic in nature because of the presence of carbonates as well as bicarbonates present in the water.In present investigation it varies between 7 to 8.3it is highest in summer, lowest in monsoon. If affects plant metabolism within the cell by affecting the uptake of nutrients and CO_2.
3. **Transparency:**The transparency indicating that high tropic status of any water body. Transparency values also indicated eutrophication. It ranged from 43 to 64. Its highest values recorded in winter and lowest in rainy season. It is useful for assessing primary productivity of water body.
4. **D.O.**:The dissolved oxygen in the water body is very important parameter for aquatic animals because all the aquatic animals it used for respiration. In the water body the quality of D.O. depend on the photosynthetic activity of aquatic plants.It has a great limnological significance. It regulates many metabolic processes of aquatic organisms. The variation of D.O. varies from 4.2 to 7.0. The minimum D.O. was in summer and maximum in winter.
5. **Free CO_2 :**The amount of Free CO_2 is due to the respiration of aquatic animals.In present study, CO_2 was high (3.1) in rainy season, low (1.2) in winter months. It is generally low and the concentration is maintained by diffusion from the atmosphere, respiration of animals and plants.
6. **Alkalinity:**The alkalinity of water was usually interpreted as quantity of compounds as bicarbonate, carbonates present in the water. The alkalinity was minimum during rainy season because of dilution of tank water by rain water due to increase in the water level the alkalinity decreases. It is due to the minerals which dissolve in water from soil. It varies from 122 to 161 high values are indicative of eutrophic Nature of water bodies and lowest in monsoon.
7. **Chlorides:**Chloride is an ion that is released in to surface water through the breakdown of salt compounds. Although salts are naturally occurring mineral, elevated levels in surface waters may be attributed to various human activities.The range of chloride was

between 27 to 31. It appears in freshwater as a result of salt deposited in the ground dissolving into fresh water or as a salt left after evaporation.

8. **Nitrates :**The minimum nitrate values were recorded 0.54 mg/lit in the winter and maximum 0.71 during summer season. The most common form of combined organic and inorganic Nitrogen in lakes and streams.
9. **Phosphates –** The imp. Source of phosphates are discharge of domestic sewage, detergents and agricultural runoff. It varies from 0.70 to 1.0 mg/lit. Its maximum values recorded in winter and maximum during summer.
10. **Total Dissolved Solids** – The total dissolved solids are nothing but the residue left in the vessel found after the evaporation of a sample in an oven at a particular define temperature. It varies from 181 to 276. The highest values recorded during summer and lowest in winter. It can be attributed to high rate of evaporation and consequently decreased water level leading to accumulation of dissolved solids.

From above observations, the water of Kunsawali water Tank No-2 is safe for drinking and agricultural use.

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Removal of Heavy Metals From Industrial Effluent by Chemical Precipitation Method

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Abstract:

This study deals with the sources of heavy metals and the removable of heavy metals from electroplating effluent before discharging the water on ground. The various metals present in the wastewater are found to be chromium, zinc, copper, Nickel etc., there are various methods available to remove the heavy metals i.e. adsorption, chemical precipitation, sedimentationfiltration etc. The Precipitation method is using in laboratory to removal some heavy metals from the waste water. The present study deals with the determination of physicochemicalparameters of electroplating effluents collected from a local industry. Treatment of plating effluent water was carried out using the ferrous sulphate and polyelectrolytewere selected as coagulant and settling agent respectively at appropriate pH conditions. Theeffective performance of Ferrous sulphate and polyelectrolyte was carried out at the pH 10 in Laboratory

Key Words: Lime, NaOH, Ferrous sulphate , Polyelectrolyte, Electroplating sample.

Introduction:

Development of new activities and progress of human beings have brought about degradation of natural environment –physical, chemical, biological and social environment. Environmental pollution by industries is one of the most important factorsfor degradation of environment. Due to industrial development the heavy waste water is generated daily which is very hazardous to our environment and whole ecosystem. Chemical precipitation is simple and easy process for removal of heavy metals from industrial wastewater. Chemical treatment of industrial wastewater is preferable because industrial wastewater are frequently complex, high in pollutant load and often containing materials toxic or resistance to the organisms on the biological processes.Water is essential to all forms of life. Water playsan important role in life process and in manyindustries. Due to increase in population, natural resources, rapid industrializationand urbanization has resulted into generation ofhuge amount of waste water. Among the various impuritiesthe heavy metal contamination has become avery serious problem in recent years. The metalcontaminants have to be considered as one of the important pollutant due to their toxic effects.Solid waste whichcontains metal salts and some agriculturalpractices introduce toxic metals in natural environment. They destroy the life cycle of Microorganism also cause chromosomal and hereditary changesin humans and animals. It has been noted that the metals are considered to be indestructible poisons and their dispersion into ground over long periods me may be highly dangerous. The application of chemical extraction as a part of the treatment is a feasible option, especially when it is applied as a pre-treatment aiming at heavy metals removal. Once they are soluble, heavy metals can be precipitated again and further be removed by a physical separation, e.g. flotation .One of the most influential parameters

controlling the solubility of metals ispH.In conventional treatment, precipitation is the easy technique for the removal of dissolved heavy metals. Precipitation of heavy metals lowers the concentrations of all metals. The solubility of precipitated metal compounds is the key to this method's success; if a metal can form an insoluble compound, then the compound can be removed via clarification and filtration.As metals enter the treatment process, they are in a stable, dissolved aqueous form and are unable to form solids. The goal of metals treatment by hydroxide precipitation is then to adjust the pH (hydroxide ion concentration) of the water so that the metals will form insoluble precipitates.

Material & Method:

The raw water sample is collected from thelocal electroplating industry for Laboratory test. Spot test is conducted of temperature is 22°C and the pH is found to be2, using the pH meter. In the present study thechemicals used are lime, NaOH, ferrous sulphateand Anionic polyelectrolyte .

A precipitation reaction is a reaction in which soluble ions in separate solutions are mixed together to form an insoluble compound that settles out of solution as a solid. That insoluble compound is called a precipitate.Separation is the main technique used in this method.

Following is the Physico - Chemical characteristics of electroplating effluents:

Sr. No	Parameters	Concentration mg/lit
1	pH	2.0
2	Chemical Oxygen Demand (COD)	101890
3	Biochemical Oxygen Demand (BOD)	8110
4	Suspended Solids	180
5	Total Dissolved Solids	70400
6	Oil And Grease	30
7	Odour	No particular
8	Chlorides	4610
9	Chromium	8.16
10	Copper	6.28
11	Nickel	6.22
12	Zinc	4.60
13	Hexavalent Chromium	1.08

Sodium hydroxide pellets wereuse to prepare 5% sodium hydroxide solution,which is used to adjust the pH of the raweffluent sample. At pH 10 the process is effective.5 % hydrated lime solution prepared by adding 5 gm lime in 100 ml distilled water.5 % of ferrous sulphate solution is prepared. In the present study 0.1% of solution ofpolyelectrolyteis used toimprove effluentclarity. The raw water sample is taken in a beaker and 5%solution of sodium hydroxide is added toadjust the pH of the raw effluent water sample.5%solution of lime was added to the effluent. 5% solution of ferrous Sulphate is added to theeffluent and 0.1% of polyelectrolyte solutionis also added after the addition of lime and Ferrous sulphate. After additionof polyelectrolyte, immediately flocks formation takes place and settles fast.Thesludge formation takes place and settles at the bottom and thesupernatant water is formed at upper layer. Then theeffluent water is filtered by ordinary filter paper.The heavy metals gets removes in the form of sludge and we get clear Supernantwater.

Theanalytical results are obtained as follows:

Initial pH	Add NaoH 5%	After pH	Add ferrous sulphate 5%	Add Lime 5%	Add poly eletrolyte 0.1%	Final pH value
2.0	10 ml	8.0	10 ml	2 ml	1.0 ml	8.5
2.0	10 ml	8.0	10 ml	4 ml	1.5 ml	9.0
2.0	10 ml	8.0	10 ml	6 ml	2.0 ml	9.5
2.0	10 ml	8.0	10 ml	8 ml	2.5 ml	10.0

Result And Discussion

Effect of pH : The effect of pH on the removal of heavymetals was examined. The wastewaterfrom electroplating industry is studies at different pH values.Effluent from plating industry was analyzedand found to be acidic. Effluent sample wereadjusted to pH values ranging from 8.5 -10. Fromthe experimental table it is observed, that pH 10.0 isoptimum for coagulation process.

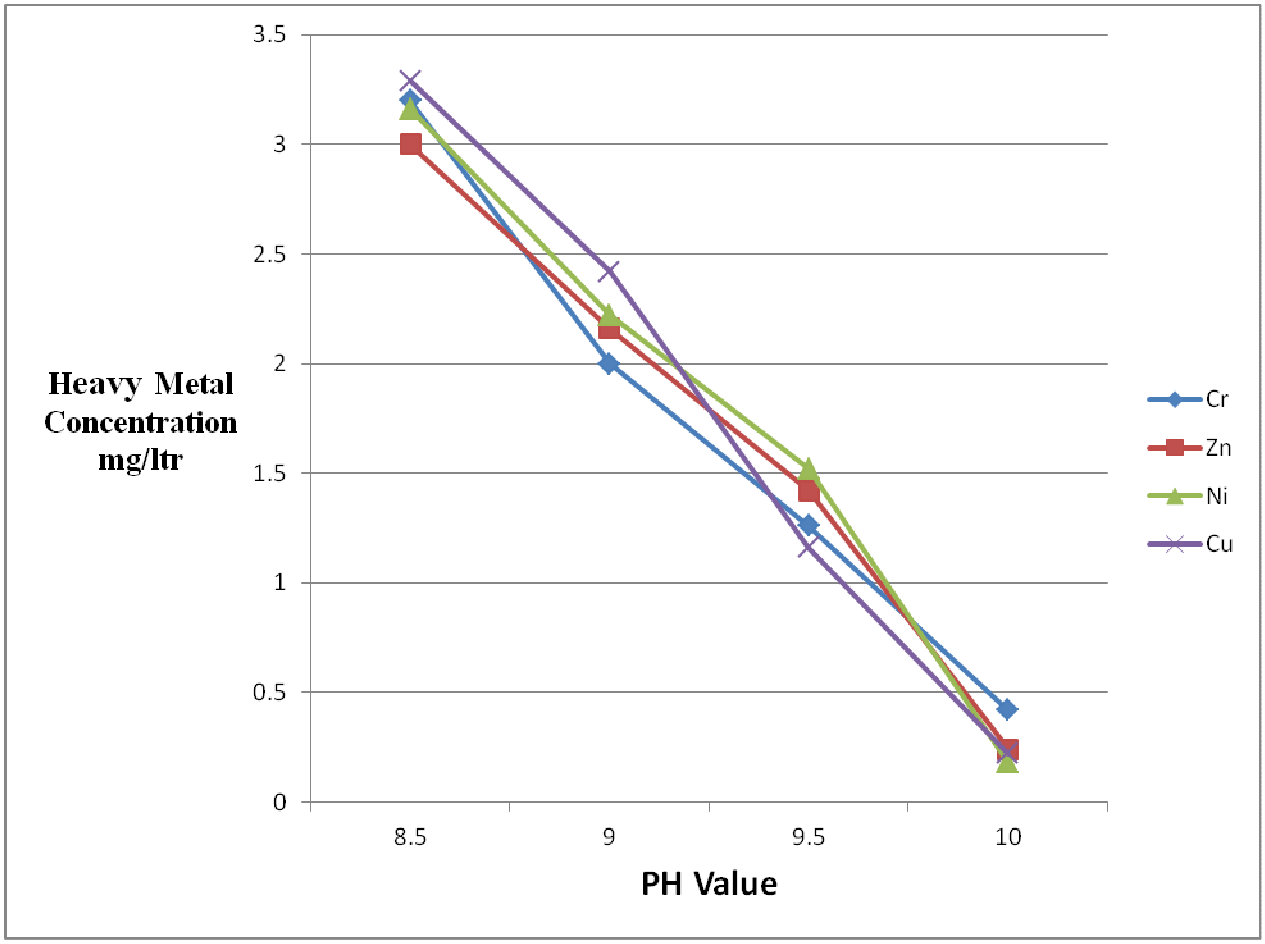

Fig.1: Effect of pH

Conclusion:

A simple and cost effective treatment procedurewas proposed for the removal of heavy metals from electroplating industry effluent namelyusing coagulants Ferrous sulphate. The coagulating process is influenced by the addition of polyelectrolyte, lime and NaoH. This process is quitecompact low cost process, which needs, lesstime and small area. Thereport shows that during this process the metal like chromium, Zinc, Nickel, Cupper is totally removed below

the detectable limit. Themost important thing is that sludge which contains precipitated metal hydroxidesolids ofheavy metals should be treat according to the government pollution norms. In this process pH and then precipitation in alkaline condition is very important.

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Recent Trends in Animal Dissection with Its E-Alternative Resources

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Introduction

The Concept of animal dissection was first introduced in the educational mainstream during the days of 1920s.During that time it was supposed that the use of animals would help students learn the basics of anatomy, physiology, biology as well as theories of evolution. In present days,Upto 5.7 million animals are killed every year for the dissection in educational experiments. The sale of animals for the dissection has came big business inthe market. The procurement of these animals can cause painful and cruel deaths in the laboratories. The lessons learned from dissection will have long effects and not all of them square measure smart or more significance. This natural science takes on a replacement which means as killing and dismembering become the lesson learned: Students learn that animals square measure expendable - a goods to be used and discarded.The desensitizing of children, often starts in the early elementary grades, can lead a child to the belief that an animal's life is not important.The student who opposes such practice respecting for animal life might be made to feel different or even foolish for caring.Will the student wishes to be journalist, photographer, lawyer, engineer or accountant for one day to benefit from performing a dissection? It doesn't have to be this way and students are making that clear. With the development in advanced technology, more easy methods of teaching dissection are now available to students of all ages group. Alternatives to dissection include excellent anatomical models on DVD, slides, charts, posters, interactive computer programs and apps, non-animal projects, books, pamphlets, laboratory manuals and even coloring books etc.

A very simple search for alternatives to dissection on your favorite web search engine yields more number of results.The best way to object the dissection is to be ready: Don't wait until lab day to express your concerns; ask your teacher early in the semester weather dissection will be part of the curriculum. At the beginning of the semester, calmly address your teacher and explain your honest feelings. Be firm in your beliefs and clearly state your reasons for objecting. Be prepared to offer an alternative project that teaches the same concepts. If appropriate, have a note from your parents stating their support of your beliefs.In each and every comparative study published till now,The students taught using non-animal methods such as interactive computer simulations tested as well as or better than their peers who were taught using animals for dissection and other animal-based exercises.Teaching Methods such as narrated software programs with physiology animations or well-labeled anatomical models allow students to learn more efficiently without being distracted by the gore of cutting up dead animals and trying to differentiate the discolored body parts. Using alternatives, each and every body part can be studied and actual body parts are dissected repeatedly until students are confident with the material, unlike actual dissection in which each system is ablated and displaced and the specimen is discarded at the end of the lesson.This Studies shows the students to prefer these alternatives and find them to be a more enjoyable learning tool.Non-animal methods benefit the educators by substantially lowering the cost and time associated with anatomy laboratories: Materials need

only to be purchased once and can be used whenever they need, and they omit the set-up and clean-up time associated with using animal specimens.The National Science Teachers Association (NSTA) and the Human Anatomy and Physiology Society (HAPS) now approved the use of alternatives as complete replacements for animal dissection. The NSTA, HAPS, and the National Association of Biology Teachers also encourage teachers who do offer dissection to be responsive to students' objections to animal dissection and to be prepared to provide alternatives. Internationally, in 2011 the government of India issued guidelines banning dissection and experimentation on animals for teaching students and now requires the use of modern non-animal methods instead.

An overall review of the scientific research on the educational, ethical, and economic benefits of non-animal science teaching methods is also available in this informational brief.Many teachers and schools have replaced animal dissection altogether, in favor of modern alternatives.At least 15 states and scores of individual districts and schools at all levels have laws or policies to ensure that students in classes that don't replace dissection are given the option to learn biology by instead using one of the many humane alternatives available. If your state or school is not among those that guarantee students' right to choose, request an educator aout the dissection pack. This pack will provide you with information on alternatives to dissection and advice about changing school policy.

Educational Grantsresources:

PETA can provide software donations to help your school replace dissection with humane alternatives. Learn more. To learn about PETA's free Web-based training sessions in dissection alternatives, e-mail SamanthaS@peta.org.

Online Dissection Programs and Additional Resources:

1. The Physicians Committee for Responsible Medicine (PCRM) (202-686-2210)
2. Anatomy in Clay® Learning System.
3. Glencoe Interactive Dissections.
4. Froguts.
5. Kidwings.
6. ScienceWorks.
7. Virtual Frog Dissection Kit.
8. Virtual Pig Dissection (VPD).

Organizationsresources:

Ethical Science Education Coalition, 167 Milk Street #234, Boston, MA 02109-4315 [Phone: (617) 367-9143]

Johns Hopkins University Center for Alternatives to Animal Testing, 111 Market Place, Suite 840, Baltimore, MA 21202-6709 [Phone: (410) 223-1693]

National Association of Biology Teachers, 11250 Roger Bacon Drive, No. 19, Reston, VA 22090-5202 [Phone: (703) 435-5582]

National Science Teachers Association, 1840 Wilson Boulevard, Arlington, VA 22201-3000 [Phone: (703) 243-7100]

The Humane Society of the United States, Youth Education Division, P.O. Box 362, East Haddam, CT 06423-0362 [Phone: (203) 434-8666]

Alternatives Resources:

A simple search for alternatives to dissection on your favorite web search engine yields hundreds of results. The best way to object to dissection is to be ready: Don't wait until lab day to express your concerns; ask your teacher early in the semester if dissection will be part of the curriculum. At the beginning of the semester, calmly address your teacher and explain your honest feelings. Be firm in your beliefs and clearly state your reasons for objecting. Be prepared to offer an alternative project that teaches the same concepts. If appropriate, have a note from your parents stating their support of your beliefs.

Many have proposed substituting the use of computer simulations, realistic models, multimedia presentations, anatomical overlays, and butcher shop "parts" in place of conventional dissection. More creative alternatives include the use of marine "specimens" from the supermarket (Colby, et. al, 1995), use of PlayDoh(TM) to study brain anatomy (Wilson & Marcus, 1992), and use of interactive videodisc simulations (Strauss & Kinzie, 1991). The rapidly expanding resources of the World Wide Web also include many new resources on the Internet Anzovin (1993) made the point that many alternatives to dissection are cleaner and cheaper than dissection, allow students to learn at their own pace, and reduce safety considerations.

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Impact of Deforestation on Environment

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Abstract

The World Resources Institute considers deforestation one of the world's most pressing land-use problems. Deforestation leads to several community and environmental problems. Looming consequences such as loss of various forms of life that inhabit the planet, destruction of forest-based-societies and climatic disruption are eminent dangers all of us need to acknowledge.

The two largest surviving regions of rain forest are in Brazil and Indonesia. They are being stripped at an alarming rate by logging, fires and land-clearing for agricultural use and cattle-grazing.

Keywords : Deforestation logging, climatic environment Resources.

Introduction

According to the World Resources Institute, more than 80 percent of the Earth's natural forests have already been destroyed and since 1900 up to 90% of West Africa's coastal rain forests have disappeared.

- **Soil Erosion**

Currently soil erosion is one of the most prevalent environmental problems. Accelerated soil erosion by water or wind may affect agricultural areas as well as natural environments. Soil is lost due to the deficiency of the protective cover of vegetation. This is a direct result of our negligent actions. Logging, overgrazing or improper farming practices are leaving the land unprotected and vulnerable. Trees help prevent erosion and landslides which in turn helps to enrich and nourish the soil.

Deforestation has been described as the cutting down of trees without planting others in their place.It is hard to think that there was a time when 90% of the earth was covered by trees, but this was once the case. If so, one asks, naturally, what happened to all these trees? Why do people cut down trees? The following are probable reasons:

- **Demand for land for cultivation.**

This has been seen both in Kenya and other parts of the world especially countries that have Agriculture as the backbone of their economy. Trees have been cut down to obtain land for cultivation of both subsistence and cash crops, both by governments and individuals.

- **Need for firewood**

People, especially those who live in rural areas where electricity and gas are unavailable, resort to use of firewood as a source of heat. Here, wood is cut down and burnt.

- **Need for land to build industries**

Industries require a lot of land and while industrialization is important for every country, it is the bane of large tracts of forest. People need jobs in order to provide for their daily needs.

- **Need for land to build houses**

With the worldwide increase in population, land to build houses for people to live in is very much required.

- **Need for wood for furniture, pencils, paper etc**

Whereas the above needs are important and have to be satisfied, cutting down trees is not the most probable solution to these problems. Why? This is because, most people who cut down trees do not plant others in their place. Also, if all the above needs are to be met by cutting down of trees, even planting two for every tree cut will not prevent desertification. This is because trees take so long to grow and mature, especially so for hard wood trees. Deforestation has the following dangers:

1. Destruction of Carbon Sinks:

Carbon sinks are huge stores of carbon, e.g. Swamps and forests

2. Soil Erosion:

Deforestation makes soil prone to erosion by agents such as wind and water. The roots of trees hold the particles of soil together thus, preventing the fertile top soil from being carried away. Soil erosion leads to loss of productivity of the land due to loss of mineral nutrients and soil microorganisms.

3. Destruction of Animal Habitats:

Apart from domesticated animals and marine and fresh water animals, all other animals need forests as their habitats. These forests do not only provide a place for the animals to roam day but also provide their food and act as a source of protection from predators through camouflage. Destruction of the animals' habitats literally kills the animals.

4. Medicinal Plants:

Some trees are used as herbs. Trees such as the Cinchona have been used as treatment against Malaria since time immemorial. Destruction of these forests leads to destruction of medicinal plants that could be used as treatment for various ailments.

5. Trees Act as Windbreakers:

Absence of these trees enables strong winds and or storms e.g. Hurricanes and Tornados. I write this in the wake of a Tsunami at the Indonesian coast where about 150 people have just lost their lives. Hurricanes like Katrina are still fresh in our memories. I cannot over emphasize this point.

6. Greenhouse Effect and Global Warming:

Nature balances the flow of energy and nutrients. Forests plan a very vital role in these cycles e.g. the carbon cycle where deforestation causes carbon dioxide to remain in the atmosphere. Accumulation of carbon dioxide in the atmosphere acts as a blanket that traps long wave radiation of heat and prevents it from escaping the surface of the earth back into the atmosphere. This phenomenon is known as the greenhouse effect. The trapped radiation is converted into heat. This heat causes global warming.

Destruction of forests also causes modification of climate of an area mostly leading to desertification and aridity.

Recommended as solutions to these problems:

- For every tree that is cut, three, not two should be planted in its case. We have reached such a critical point that to prevent the desertification of the world that many more trees need to be planted.

- Unless it is necessary, water catchments areas should strictly be left alone
- Quick growing varieties of soft wood trees should be grown for commercial uses e.g. making of furniture, pencils and paper.
- We should carry out consistent mass education on a worldwide scale, on the importance of reforestation and the dangers of deforestation
- We need to enact and enforce strict laws against deforestation, worldwide.
- It is high time that we reduced our dependence on charcoal as a source of fuel and make use of wind and solar energy.

Nature works as a whole cycle. This is seen not only in animals where predator and prey work together but also in the different energy and nutrient cycles. As already explained earlier, forests play a crucial role in this equation. The knowledge of how to conserve our environment could be our greatest guarantee for survival on this earth and the perpetuation or our species

The term deforestation is often misused to describe any activity where all trees in an area are removed. However in temperate climates, the removal of all trees in an areain conformance with sustainable forestry practicesis correctly described as regeneration harvest. In temperate mesic climates, natural regeneration of forest stands often will not occur in the absence of disturbance, whether natural or anthropogenic.Furthermore, biodiversity after regeneration harvest often mimics that found after natural disturbance, including biodiversity loss after naturally occurring rainforest destruction.

Deforestation occurs for many reasons: trees are cut down to be used or sold as fuel (sometimes in the form of charcoal) or timber, while cleared land is used as pasture for livestock, plantations of commodities and settlements. The removal of trees without sufficient reforestation has resulted in damage to habitat, biodiversity loss and aridity. It has adverse impacts on biosequestration of atmospheric carbon dioxide. Deforestation has also been used in war to deprive an enemy of cover for its forces and also vital resources. A modern example of this was the use of Agent Orange by the United States military in Vietnam during the Vietnam War. Deforested regions typically incur significant adverse soil erosion and frequently degrade into wasteland.

Disregard or ignorance of intrinsic value, lack of ascribed value, lax forest management and deficient environmental laws are some of the factors that allow deforestation to occur on a large scale. In many countries, deforestation, both naturally occurring and human induced, is an ongoing issue. Deforestation causes extinction, changes to climatic conditions, desertification, and displacement of populations as observed by current conditions and in the past through the fossil record.Among countries with a per capita GDP of at least US$4,600, net deforestation rates have ceased to increase.

Atmospheric:

Illegal slash and burn practice inMadagascar, 2010

Deforestation is ongoing and is shaping climate and geography.Deforestation is a contributor to global warming, and is often cited as one of the major causes of the enhanced greenhouse effect. Tropical deforestation is responsible for approximately 20% of world greenhouse gas emissions. According to theIntergovernmental Panel on Climate Change deforestation, mainly in tropical areas, could account for up to one-third of total anthropogenic carbon dioxide emissions. But recent calculations suggest that carbon dioxide emissions from deforestation and forest degradation (excluding peatland emissions) contribute about 12% of total anthropogenic carbon dioxide emissions with a range from 6 to 17%.Deforestation causes carbon dioxide to linger in the atmosphere. As carbon dioxide accrues, it produces a layer in the atmosphere that traps radiation from the sun. The radiation converts to heat which causes global warming, which is better known as the greenhouse effect. Other plants removecarbon (in the form of carbon dioxide) from the atmosphere during the process of photosynthesis and release oxygen back into the atmosphere during normal respiration. Only when actively growing can a tree or forest remove carbon over an annual or longer timeframe. Both the decay and burning of wood releases much of this stored carbon back to the atmosphere. In order for forests to take up carbon, the wood must be harvested and turned into long-lived products and trees must be re-planted. Deforestation may cause carbon stores held in soil to be released. Forests are stores of carbon and can be either sinks or sources depending upon environmental circumstances. Mature forests alternate between being net sinks and net sources of carbon dioxide (see carbon dioxide sink and carbon cycle). In deforested areas, the land heats up faster and reaches a higher temperature, leading to localized upward motions that enhance the formation of clouds and ultimately produce more rainfall. However, according to the Geophysical Fluid Dynamics Laboratory, the models used to investigate remote responses to tropical deforestation showed a broad but mild temperature increase all through the tropical atmosphere. The model predicted <0.2°C warming for upper air at 700 mb and 500 mb. However, the model shows no significant changes in other areas besides the Tropics. Though the model showed no significant changes to the climate in areas other than the Tropics, this may not be the case since the model has possible errors and the results are never absolutely definite.

Fires on Borneo and Sumatra, 2006.

People use slash-and-burn deforestation to clear land for agriculture.Reducing emissions from deforestation and forest degradation (REDD) in developing countries has emerged as a new potential to complement ongoing climate policies. The idea consists in providing financial compensations for the reduction of greenhouse gas (GHG) emissions from deforestation and forest degradation".

Rainforests are widely believed by laymen to contribute a significant amount of the world's oxygen, although it is now accepted by scientists that rainforests contribute little

netoxygen to the atmosphere and deforestation has only a minor effect on atmospheric oxygen levels. However, the incineration and burning of forest plants to clear land releases large amounts of CO_2, which contributes to global warming. Scientists also state that tropical deforestation releases 1.5 billion tons of carbon each year into the atmosphere.

Forests are also able to extract carbon dioxide and pollutants from the air, thus contributing to biosphere stability.

Hydrological :

The water cycle is also affected by deforestation. Trees extract groundwater through their roots and release it into the atmosphere. When part of a forest is removed, the trees no longer transpire this water, resulting in a much drier climate. Deforestation reduces the content of water in the soil and groundwater as well as atmospheric moisture. The dry soil leads to lower water intake for the trees to extract.Deforestation reduces soil cohesion, so that erosion, flooding and landslides ensue.

Shrinking forest cover lessens the landscape's capacity to intercept, retain and transpire precipitation. Instead of trapping precipitation, which then percolates to groundwater systems, deforested areas become sources of surface water runoff, which moves much faster than subsurface flows. That quicker transport of surface water can translate into flash flooding and more localized floods than would occur with the forest cover.

Deforestation also contributes to decreased evapotranspiration, which lessens atmospheric moisture which in some cases affects precipitation levels downwind from the deforested area, as water is not recycled to downwind forests, but is lost in runoff and returns directly to the oceans. According to one study, in deforested north and northwest China, the average annual precipitation decreased by one third between the 1950s and the 1980s.Trees, and plants in general, affect the water cycle significantly:

- their canopies intercept a proportion of precipitation, which is then evaporated back to the atmosphere (canopy interception);
- their litter, stems and trunks slow down surface runoff;
- their roots create macropores – large conduits – in the soil that increase infiltration of water;
- they contribute to terrestrial evaporation and reduce soil moisture via transpiration;
- their litter and other organic residue change soil properties that affect the capacity of soil to store water.
- their leaves control the humidity of the atmosphere by transpiring. 99% of the water absorbed by the roots moves up to the leaves and is transpired.

As a result, the presence or absence of trees can change the quantity of water on the surface, in the soil or groundwater, or in the atmosphere. This in turn changes erosion rates and the availability of water for either ecosystem functions or human services.

The forest may have little impact on flooding in the case of large rainfall events, which overwhelm the storage capacity of forest soil if the soils are at or close to saturation.Tropical rainforests produce about 30% of our planet's fresh water.

Soil :

Deforestation for the use of clay in the Brazilian city of Rio de Janeiro.

The hill depicted is Morro daCovanca, in JacarepaguáUndisturbed forests have a very low rate of soil loss, approximately 2 metric tons per square kilometer (6 short tons per square mile).Deforestation generally increases rates of soilerosion, by increasing the amount of runoff and reducing the protection of the soil from tree litter. This can be an advantage in excessively leached tropical rain forest soils. Forestry operations themselves also increase erosion through the development of roads and the use of mechanized equipment.

China's Loess Plateau was cleared of forest millennia ago. Since then it has been eroding, creating dramatic incised valleys, and providing the sediment that gives the Yellow River its yellow color and that causes the flooding of the river in the lower reaches (hence the river's nickname 'China's sorrow').

Removal of trees does not always increase erosion rates. In certain regions of southwest US, shrubs and trees have been encroaching on grassland. The trees themselves enhance the loss of grass between tree canopies. The bare intercanopy areas become highly erodible. The US Forest Service, in Bandelier National Monument for example, is studying how to restore the former ecosystem, and reduce erosion, by removing the trees.

Tree roots bind soil together, and if the soil is sufficiently shallow they act to keep the soil in place by also binding with underlyingbedrock. Tree removal on steep slopes with shallow soil thus increases the risk of landslides, which can threaten people living nearby.

Biodiversity

Deforestation on a human scale results in decline in biodiversity, and on a natural global scale is known to cause the extinction of many species.The removal or destruction of areas of forest cover has resulted in a degraded environment with reducedbiodiversity. Forests support biodiversity, providing habitat for wildlife; moreover, forests foster medicinal conservation.With forest biotopes being irreplaceable source of new drugs (such as taxol), deforestation can destroy genetic variations (such as crop resistance) irretrievably.

Illegal logging in Madagascar.

In 2009, the vast majority of the illegally obtained rosewood was exported to China.Since the tropical rainforests are the most diverse ecosystems on Earth and about 80% of the world's known biodiversity could be found in tropical rainforests,removal or destruction of significant areas of forest cover has resulted in a degraded environment with reduced biodiversity. A study in Rondônia, Brazil, has shown that deforestation also removes the microbial community which is involved in the recycling of nutrients, the production of clean water and the removal of pollutants.

It has been estimated that we are losing 137 plant, animal and insect species every single day due to rainforest deforestation, which equates to 50,000 species a year. Others state that tropical rainforest deforestation is contributing to the ongoing Holocene mass extinction. The known extinction rates from deforestation rates are very low, approximately 1 species per year from mammals and birds which extrapolates to approximately 23,000 species per year for all species. Predictions have been made that more than 40% of the animal and plant species in Southeast Asia could be wiped out in the 21st century.Such predictions were called into question by 1995 data that show that within regions of Southeast Asia much of the original forest has been converted to monospecific plantations, but that potentially endangered species are few and tree flora remains widespread and stable.

Scientific understanding of the process of extinction is insufficient to accurately make predictions about the impact of deforestation on biodiversity.Most predictions of forestry related biodiversity loss are based on species-area models, with an underlying assumption that as the forest declines species diversity will decline similarly.However, many such models have been proven to be wrong and loss of habitat does not necessarily lead to large scale loss of species.Species-area models are known to overpredict the number of species known to be threatened in areas where actual deforestation is ongoing, and greatly overpredict the number of threatened species that are widespread. A recent study of the Brazilian Amazon predicts that despite a lack of extinctions thus far, up to 90 percent of predicted extinctions will finally occur in the next 40 years.

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Effect of lindane-a pesticide found in soft drinks, on selected members of normal flora of human intestine

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Abstract :

To get nutrition we get food, which has some amount of pesticide in it. Soft drinks are non-essential, non-nutritive foods. Therefore if any pesticide residues are allowed in a soft drink, the drink will have to be 'fitted in' into the calculations of how much residue we can safely ingest daily on the whole. The intestinal tract harbors a huge diversity of metabolically active bacteria that interact, forming a complex ecosystem. This microbiota has an important role in human metabolism, nutrition, immunity, and protection against colonization by pathogenic microorganisms. Several factors can influence the intestinal microbiota; one of it is antimicrobial agent. We investigated the influence of lindane, the pesticide found in soft drinks on selected members of normal flora of human intestine. This tiny toxin in tiny doses found to be inhibitory for beneficial selected members of normal flora. Lindane showed inhibitory effects by disk diffusion method on Klebsiella aerogenus, Lactobacilli bulgaricus, Staphylococci aureus, and Pseudomonas aeruginosa at different concentrations with varying degree but below the average concentration that found in soft drinks. Parallel inhibitory results were obtained by well diffusion method with little wider zones. Broth dillution method was used to determine the minimal concentration of antimicrobial to inhibit the microorganisms. MIC obtained in broth dilution method was tested in batch culture using minimal media providing lindane as sole carbon source against similar concentrations of glucose as control.

From these results it may be concluded that there is erosive potential of soft drinks that public should be aware of. Although many of the soft drinks components have already been evaluated individually for their toxicity, further research studies should be make in order to cover the effect of the whole soft drink on the body.

Introduction

Excessive consumption of carbonated soft drinks has been putatively linked to health effects including dental caries, obesity, and osteoporosis but study by CSE, a private research group in New Delhi, now reiterated another concern first raised few years ago: pesticide contamination. Indians consume over 6,500 million bottles of cold drinks yearly. Its growing popularity means that children and teenagers, who glug these bottles, are drinking a toxic potion The average amount of pesticide residue found in all the samples was 11.85 parts per billion (ppb) or 24 times higher than the BIS standards for total pesticides in soft drinks (0.5 ppb). Pepsi Cola contained 30 times higher residue on an average, while Coca-Cola contained 27 times higher than average. *Lindane* (g-HCH.) organochlorine pesticides — a confirmed carcinogen — was found at an average concentration of 5.5 ppb, which is 54 times higher than the BIS standard (finalized but not notified) for individual pesticides in soft drinks (0.1 ppb) In one sample of Coca-Cola bought in Kolkata, lindane was as high as 14 ppb, which is 140 times higher than the BIS standard. It was found in 100 per cent of cold drink samples. Its concentration ranged from 0.0008 milligram per liter (mg/l) to 0.0042 mg/l in the samples tested.

Lindane is absorbed through respiratory, digestive or cutaneous routes and accumulates in fat tissues. It damages human liver, kidney, neural and immune systems and induces birth

defects cancer and death. Chronic administration results in endocrine disruption in birds as well as in mammals.(Pages N, Sauvet MP, Bouvet S, Goudey-Perriere F (2002) Reproductive toxicity of Lindane *Soc Biol* .196(4): 325-38.) . Tiny and continuous exposure of these pesticides via soft drinks may damage our intestinal normal flora, which is the base of human health.

Normal flora contributes to our existence in several ways Good health depends on the number and strains of bacteria living in digestive tracts. When useful strains are reduced to less than 85 percent, an imbalance or ***dysbiosis*** occurs. This study aims on effects of lindane on test organisms of human intestinal normal flora using various methods similar to that of antimicrobial susceptibility testing and finally MIC were checked by batch culture method.

Materials and Methods

Chemicals and media

Commercially available pesticide lindane (lindane 6.5% D.P., trade name GAMEX) was used. Muller- Hinton agar used for susceptibility testing by disk and well method. M-H broth was used for MIC. Mineral medium employed for batch culture study of normal flora with pesticides.

Organisms

Pure stock cultures of test organisms were obtained from NCL. Organisms selected are representative of human intestinal normal flora. The organisms are:

- ***Escherichia coli*** **- NCIM –2065 (ATCC- 8739)**
- ***Klebsiella aerogenus*** **- NCIM - 2239**
- ***Proteus mirabilis,*** **- NCIM - 2241**
- ***Pseudomonas aeruginosa,*** **- NCIM – 5029 (ATCC- 27853)**
- ***Lactobacilli bulgaricus*** **- NCIM – 2056 (ATCC- 8001)**
- ***Staphylococci aureus*** **- NCIM – 2079**

Disk diffusion test

The Kirby-Bauer method was used for antimicrobial susceptibility testing. The accuracy and reproducibility of this test are dependent on maintaining a standard set for procedures **D**ifferent concentration ranges were selected for lindane according to its concentration found in maximum brands of soft drinks. Average concentration found in all soft drinks is 5.5ppb. Lindane stock solution is diluted with sterile distilled water to get concentrations as 3ppb, 4ppb, 5ppb, 6ppb, 7ppb & 0.1ppb, where 0.1ppb is a standard set for safe levels of pesticide residues in soft drinks. Sterile filter paper disks of desired concentrations for lindane was prepared. The predetermined battery of pesticide disks was dispensed onto the surface of the inoculated M-H agar plates and incubated

Well diffusion method

On seeded agar, wells of 5mm in diameter made with cork- borer aseptically. Equal volume of different concentrations of lindane placed in the different wells of a plate for each organism. After 24 hr. incubation zone of inhibition were observed

Minimum inhibitory concentration (MIC)

Broth dillution method is used to determine the minimal concentration of antimicrobial to inhibit the microorganism. This can be achieved by dilution of lindane in M-H broth and is tested in $\log_2$ serial dilutions (two fold).

Batch culture in presence of lindane

To test survival efficiency of organisms in presence of lindane, this pesticide was added to get MIC for particular organism as only carbon source, to the minimal medium. Batches of 25 ml medium in 100 ml flasks were set for each organism. Similar concentrations of glucose were prepared in minimal medium of same quantity for respective test organisms as control. All flasks were inoculated with respective organisms over-night incubated suspension and incubated for three successive days at 37ºc. The growth was measured as optical density (O.D.) at 615 nm using photoelectric colorimeter

Observations

Disk diffusion method

Table no. 2.1 Zone of inhibitions (mm) of test organisms for lindane by disk diffusion method**.**

ORGANISMS	ZONE OF INHIBITION (**mm**)					
	CONCENTRATIONS OF PESTICIDE WELL (ppb)					
	0.1	3	4	5	6	7
E. coli	___	___	___	___	___	___
Klebsiella aerogenus	___	09	09	10	11	14
Lactobacilli bulgaricus	___	___	06	08	08	09
Proteus mirabilis	___	___	___	___	___	___
Staphylococci aureus	___	___	___	___	11	11
Pseudomonas aeruginosa	___	___	11	13	14	15

Well diffusion method

Table no.2.2 Inhibition zone of test organisms of lindane in well diffusion method

ORGANISMS	ZONE OF INHIBITION (**mm**)					
	CONCENTRATIONS OF LINDANE IN WELL (ppb)					
	0.1	3	4	5	6	7
E. coli	___	___	___	___	___	___
Klebsiella aerogenus	___	12	14	15	16	16

Lactobacilli bulgaricus	___	07	08	09	10	10
Proteus mirabilis	___	___	___	___	___	04
Staphylococci aureus	___	___	___	10	11	12
Pseudomonas aeruginosa	___	___	12	14	14	16

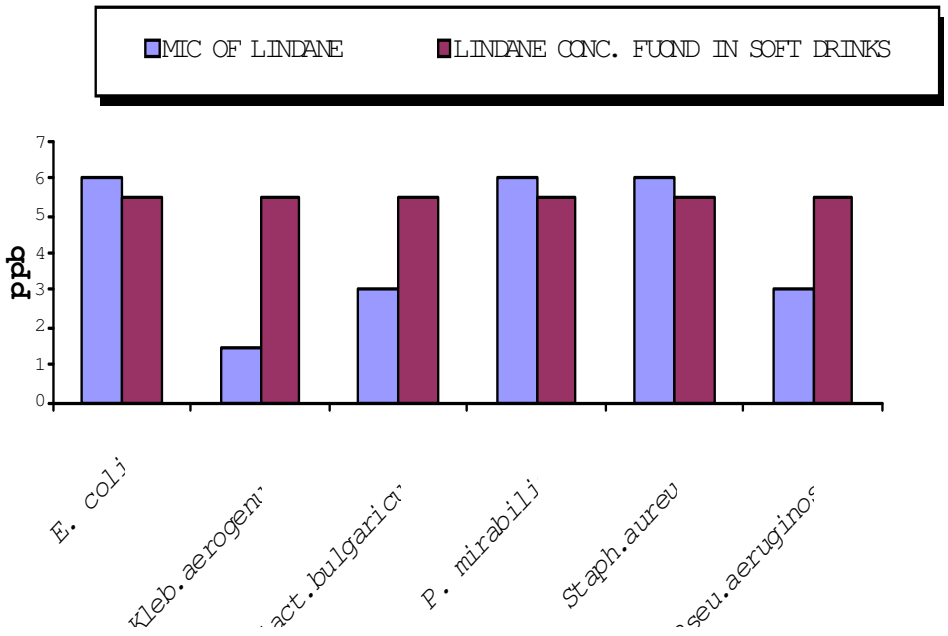
MIC by broth dilution method

Table no.2.3 MIC of lindane by broth dilution method.

ORGANISMS	CONCENTRATIONS OF LINDANE (ppb)							
	0.1	0.5	01	02	04	08	16	32
E. coli	+	+	+	+	+	---	---	---
Klebsiella aerogenus	+	+	+	---	---	---	---	---
Lactobacilli bulgaricus	+	+	+	+	---	---	---	---
Proteus mirabilis	+	+	+	+	+	---	---	---
Staphylococci aureus	+	+	+	+	+	---	---	---
Pseudomonas aeruginosa	+	+	+	+	---	---	---	---

[+ Turbidity, --- no turbidity]

Graph 2.1 MIC of lindane for test organisms



Batch culture

Table no.2.4 Effect of lindane on test organisms at their MIC in batch culture

ORGANISMS	TEST O.D.				CONTROL O.D.			
	O hr	24hr.s	48hrs	72hrs	O hr	24hr.s	48hrs	72hrs
Klebsiella aerogenus MIC - 3ppb	0.025	0.024	0.025	0.025	0.024	0.04	0.10	0.18
Lactobacilli bulgaricus MIC - 3ppb	0.010	0.011	0.012	0.010	0.012	0.035	0.09	0.22
Staphylococci aureus MIC – 6ppb	0.025	0.024	0.025	0.025	0.025	0.040	0.23	0.48
Pseudomonas aeruginosa MIC – 3ppb	0.020	0.02	0.021	0.02	0.021	0.045	0.21	0.45

Results

Lindane showed inhibitory effects on ***Klebsiella aerogenus, Lactobacilli bulgaricus, Staphylococci aureus, Pseudomonas aeruginosa*** at concentrations; 7ppb, 5ppb &4ppb respectively by disk and well diffusion method. In well diffusion method size of inhibition zone were larger than that of in disk diffusion method.

MIC of lindane for test organisms were as follows :(ppb)

E.coli $4 \leq 8$ *Proteus mirabilis* $4 \leq 8$

Staphylococci aureus $4 \leq 8$ *Klebsiella aerogenus* $1 \leq 2$

Lactobacilli bulgaricus $2 \leq 4$ *Pseudomonas aeruginosa* $2 \leq 4$

Organisms were not got inhibited at the BIS standard for individual pesticides in soft drinks (0.1 ppb)

Lindane is showed inhibitory effect on respective organisms at their MIC in batch culture. There was no significant increase in O.D as compare to control.

Conclusion

Lindane, a pesticide found in soft drinks could be responsible for disturbing normal flora of gut as it is showing inhibition of some important representative members of them in this work.

The concentrations of lindane inhibitory to test organisms were below that of for single pesticide found in soft drinks. This indicates that though the concentration of pesticides in soft drinks was tiny they are still toxic to humans.

Discussion

The cocktail of pesticides was detected by various laboratories in most popular brands of soft drink in India. The concentrations of these pesticides though variable but all are above the set standards. Lindane is one of them, which was found in almost all samples tested.

The serious ill effects of lindane on humans, animals and pests are well studied.

Its effect on normal flora of human intestine was determined by various methods, used to determine effect of antimicrobial.

Its effect on normal flora of human intestine was determined by various methods, used to determine effect of antimicrobial.

Set of concentrations of lindane were prepared which covers concentrations more, less and equal to the average concentration found in soft drinks.

These concentrations were used to perform disk diffusion, well diffusion and broth dilution method for MIC

Susceptibility of test organisms was determined by disk and well method by measuring zone of inhibition for each concentration of lindane.

Inhibitory effect of lindane was tested by broth dilution method taking double dilutions according to results of disk and well diffusion method.

Klebsiella aerogenus, Lactobacilli bulgaricus, Staphylococci aureus, Pseudomonas aeruginosa showed susceptibility to lindane in varying degree and at various concentrations. Susceptibility of test organisms for lindane by disk method is either at lower concentrations or with lesser extent than well diffusion method.

MIC obtained in broth dilution method was tested in batch culture using minimal media providing lindane as sole carbon source against similar concentrations of glucose as control. This had confirmed inhibitory quality of lindane at concentrations below set standards of pesticides in soft drinks.

Today, most of us have lost our ability to digest nutrients. This is largely due to the fact that the "anti-probiotics" things like pesticides we are exposed to have killed off the friendly bacteria necessary to produce the enzymes that digest the nutrients. Enzymes are responsible for all building and repairs in the body.

Without the correct balance of 85% probiotic bacteria to 15% pathogenic bacteria, some form of physical disease is likely to manifest itself.

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Piscivorous Birds of Niradeoghar Reservoir Tal. Bhor, Dist, Pune (M.S.) India

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Abstract :-

NIRA river is a main tributory of Bhima in Krisha river basin. The Nira Deoghar reservoir is a Earthen dam situated 18^0 06' 18" North/73^0 43' 36'' East. The important' objective of this reservoir is irrigation along with hydroelectricity, drinking purpose and pisciculture. The detailed study of Ichthyodiversity of this reservior has been studied by the above investigators and found 57 species of fish belonging to nine orders.

In the present investigations researchers found piscivorous birds in this reservoir. The survey was done in the month of October, November, December 2013 and January; February, March and April 2014.

Key words – Piscivorous birds – Nira Deoghar reservoir, Dist, Pune INDIA.

Introduction :-

In the food chain Birds occupy the top position just below Man. Birds are major predators, scavengers and pollinators. They are also economicaly useful as food, art ornamentation and asthetic value. Birds are harmful to mankind because they destroy crops, fruits, stored grains and also spread diseases and are pests of honey bees. Thus birds are of great economic importance to man. (Singh, 1929, salim Ali 1932, Kannan, 1980, Devidar 1985). The piscivorous birds have been studied Singh, T.C.N.1929. A note of the pollination of Erythring indica by birds, J.Bom. Nat, Hisl, Soc, 33 : 460 – 62 earlier by Ghazi (1962), Kulkarni A.V. (2006), Babare M.G and Sawant P.L. (2012), Kulkarni V.L. and Babare M.G.. (2013)

Materials and Methods :-

For survey and Identification of birds frequent visits were done in morning and evening hours. Birds were identified at the spot as per the guidelines given by Ali and Ripley (1996) by using binocular 7X and 8X magnifications.

Results and Discussion :-

In this present investigation total forteen species of piscivorous birds were identified out of which ten are residents four are resident migratory. Pisciculture is one of the main objective of this Nira Deoghar reservoir hence the presence of piscivorous birds is notably important as these birds feed on fishes. Birds are the carriers of pathogens hence it is necessary to curtail their number. Reducing the number is obtained by irradicating the habitats of these birds. The aquatic weeds are removed in time and also the peripheral margins of the reservoir are cleared.

Table I. Occurence of Piscivorous Birds of Nira Deoghar Reservoir, Tal Bhor Dist. Pune

Sr.No	Common Name	Scientific Name	Count	Abundance	Migrating Behavior
1	Small Blue King fisher	Alcedo a this	04	r	R
2	White brested Kingfisher	Halcyon Symmensis	03	r	R
3	Lesser Pied Kingfisher	Ceryle rudis	04	r	R
4	Common Coot	Fulica atra	90	O	RM
5	Spotted billed duck	Anas preciiorthyncha	45	U	RM
6	Grey Heron	Ardea cinerea	19	r	RM
7	Little Egret	Egretta garzetta	07	r	RM
8	Little Cormorant	phalacrocorare niger	09	r	R
9	Indian shag	phalacrocorare fuscicollis	17	U	R
10	Black necked	Grebe podiceps nigricollis.	14	U	R
11	Asian open bill	Anastomus oscitans	09	r	R
12	Painted stork	Mycteria leucocephala	03	r	R
13	Brown fish owl	Ketupa zeylonensis	04	r	R
14	Stork billed kingfisher	Halcyon capensis	07	r	R

Abbreviations :

I) For movement –

R – Residential
M – Migrant
RM – Residential Migrant

II) For Abundance –

C – Common – (Above 100)
O – Occasional (Above 50)
U - Above 20
r – Above and five

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