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ECOLOGICAL AND COMPARATIVE STUDIES OF MICROCYSTIS BLOOMS OF TWO PONDS LOCATED AT DIFFERENT GEOGRAPHIC LOCATIONS IN PUNE AREA.

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Abstract :

Microcystis aeruginosa Kutz is one of the most cosmopolitian species among the planktonic cynobacteria.Intracellular gas vacuoles cause this species to float in stagnant water, leading to accumulation of bulk population at water surface. This phenomenon is called as bloom.

In the present study two ponds of Pune region, which are located at different geographical conditions and altitude levels were investigated for survey of algal blooms of Microcystis aeruginosa Kutz. Studies were conducted to determine the occurrence and abundance of cyanobacteria in relation to physico-chemical parameters of Dehu Road pond and Sinhgad Fort pond, which is 1440m above from sea level. The chemical parameters selected for analysis were dissolved oxygen, free CO_2, pH, total hardness, total suspended solids, sulphates orthophosphates and chlorides. The results showed that pH of water in both ponds were alkaline (were similar) in both ponds. In case of bicarbonates, total hardness, total suspended solids and sulphates showed very high concentration in Dehu road pond while chlorides were totally absent. Whereas orthophosphates were absent in Sinhgad pond. It was also observed that density of Microcystis was maximum in sinhgad pond.

Keywords: Algal blooms, *Microcystis* , Pune region, Physico-chemical parameters.

Introduction

The occurrence of Cyanobacterial blooms is a global problem affecting freshwater, saline &

marine water bodies . The ecological studies of water bodies have gained immense importance in recent year. The use of algae as an indicator of water quality & pollution has been used studied by many researchers.

Microcystis aeruginosa kutz is one of the most cosmopolitan species among planktonic Cyanobacteria. A dense growth of planktonic algae often involving just one or few species usually imparting a distinct colour to the water body is referred as 'Algal blooms'. Micro cysts blooms typically thrive in warm, turbid & slow moving water . *M. aeruginosa* Kutz occur in fresh to moderately brackish water producing bad smelling & unsightly scum , preventing use of water bodies. The production & release of range of cyanotoxins is often associated with algal blooms under such condition the productivity of zooplankton and thereby fish is reduced.

Materials and methods:

Dehu Road Pond B:

This pond is located along new Pune-Mumbai highway about 17 km North of pune .Pond B is wedged shaped slightly bigger pond . This pond is also with permanent blooms of *Microcystsis aeruginosa* (Kutz). Length of the pond is about 300ft. Width of the pond towards its widest region is 200ft while towards its narrow region it is 5ft only. Depth of the pond is about 25ft. This pond receives water from rain, ground sewage water through the canal. The pond water is used for brick construction. Excess water along with the raw material used for brick construction finds its way back in to the pond. Close to the brick work there is a small unit that deals with stone crushing, from this unit the waste water along with fine gravels flows in to the pond.

Sinhgad Entry Gate Pond:

Sinhgad is one of the historic fort of Maharashtra and had strategic importance in the history of Maratha's .The fort lies on a hill having an altitude of above 1440 meters from sea level. The fort is about 1000 meters in length and 647 meters in width. There are number of ponds located on the fort. Large number of tourist visits the fort almost every day. Most of the ponds are in a bad shape and highly polluted.

Entry Gate Pond:

This pond lies in the close vicinity of the main gate (Pune gate) of the fort. This pond is well constructed and rectangular in shape. The pond measures above 150 in length 75ft in breadth and 25ft in depth. The pond is provided with steps. The pond water is used for washing off cloths and

cleaning of utensils by residents of the fort.

Water samples from concerned localities were collected and analysed for various Physico-chemical Parameters such as pH, Temperature , Colour , Dissolved oxygen(Do), Biochemical Oxygen Demand(BOD) , Free CO_2, Total alkalinity(carbonate and bicarbonate), Hardness, Total suspended solids(TSS), Sulphates and Ortho-phosphates . The methods recommended by APHA (1980) have been followed in most cases.

For the purpose of analysis H_2O samples from the ponds were collected between 8.00am to 1.00 pm. The selected parameters were analysed using standard methods. Separate samples were collected for the estimation of dissolved O_2 and free CO_2 using 300ml Borosil bottles. DO was immediately fixed on the site before further analysis to reduce error. For estimation of other chemical parameters samples were collected in 5 liter plastic cans and analysed within 4 hours of sample collection. (Table no.1)

Methods used for analysis of Water Parameter:

Sr.No	Parameters	Methods
1.	Dissolved Oxygen	Modified Winkler method
2.	pH	pH Paper
3.	Chloride	Titrimetric method
4.	Total Hardness	Titrimetric method
5.	Ortho-phosphate	Ammonium molybdate stannous chloride method
6.	Sulphate	Colorimetric method

Discussion:

The factors that promote blue green algal blooms are shallowness, warm temperature, high nitrogenous and phosphorus contents and good supply of half bound CO_2 [Deshikachary, (1959)].Analysis of the water samples collected from Dehu road pond and Sinhgad entry gate pond showed the following results. Temperature records by Indian worker indicate prevailing temperature range from 5^0c-35^0c during the bloom of *Microcystis*.Temperature recorded during our study was 22^0c -23^0c

Bloom forming blue green algae usually occur in the hard water than the soft water (Reynolds 1975). Cherunoussva et.al (1968) demonstrated dependence of *Microcystis* on bi-carbonates for their photosynthesis. Hydrobiological data by Indian workers on the water bodies

with *Microcystis* blooms indicate presence of bi-carbonates ranging from 34.39 mg/l to 328.25mg/l. The estimated amount of bi-carbonates in Dehu road pond was 405mg/l & in Singhad pond was 165 mg/l. The pH in this water ranged from 7.3 to 7.5. The hardness values were also much higher in studied pond water bodies from 66 to 156 mg/lit.

Nitrates and phosphates have been considered as key elements in the growth of phytoplankton. Based on experimental study Gerloff & Skogg (1954-57) concluded that exccessive nutrient densities are not essentials for the production of *Microcystis* . The phosphate values determined by Indian worker during the bloom ranged from 0.1 to 115 µg/lit . Among the water bodies studied for *Microcystis* bloom, Sinhgad pond exhibited lack of phosphates. In Dehu road pond phosphates was 0.68mg/lit. Sulphates in Dehu road pond was 1.53 mg/lit and in sinhgad pond it was 61mg/lit. It should be mentioned here that, nutrient concentration in the water is not a true measure of availability since it ignores fluxes and contents of the algal cells. Many algae in fact absorb and store far many more than their immediate needs when nutrients are freely available (Reynolds, 1975)

Pearseal (1932) was of the opinion that the growth of the blue green algae is favoured by dissolved organic compounds. During our study the estimated values of biochemical oxygen demand in Dehu road pond was 121 mg/lit & Sinhgad pond was 132 mg/lit. This very high value of biochemical oxygen demand indicates heavy load of organic matter. However, precise role played by organic matter in promoting blue green algae is still a mystery (Reynolds , 1975)

In Pune waters the *Microcystis* blooms are not confirmed to any narrow range of physico-chemical conditions . Shallow water condition, alkaline pH, high bi-carbonates and organic matters appeared to be most favourable for *Microcystis* blooms to occur.

Chaeko (1954) reported several instances of O_2 depletion and large scale mortality of fishes and other fauna causing considerable damage and loss during his study. However such mortality of fish as well as direct toxic effect of *Microcystis* did not encounter during the study.

Thus shallow water conditions, alkaline pH, high bi-carbonates and high organic matter are the features appeared to be most favourable for *Microcystis* to grow in to a bloom.

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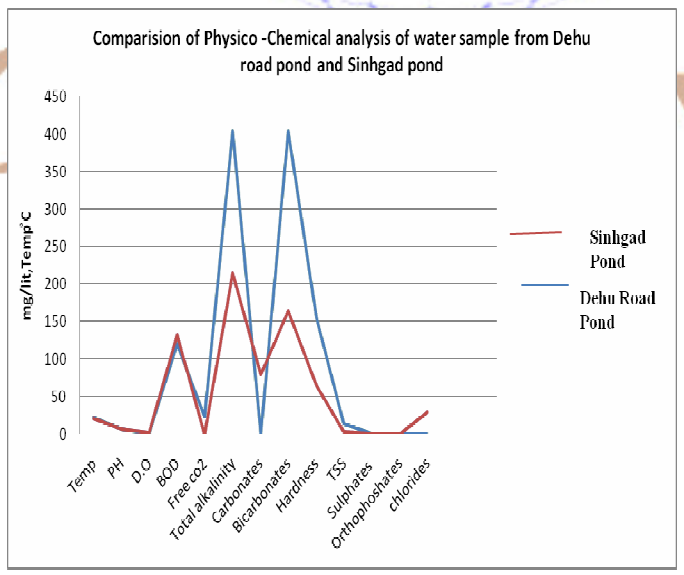
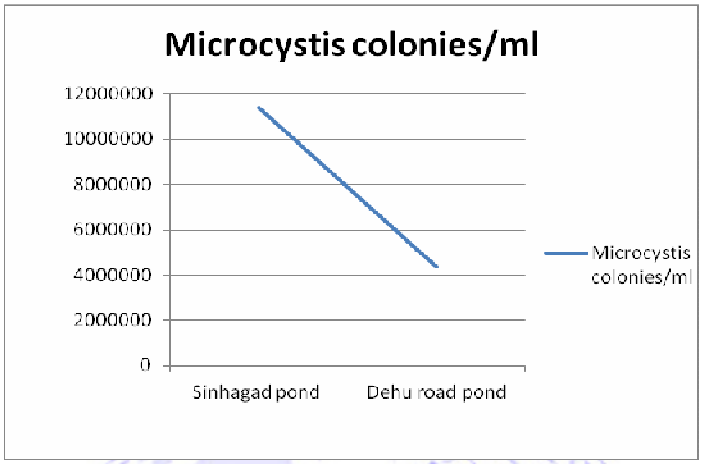
Physico-Chemical Observations on Microcystis Bloom (Comparitive):

Parameters	Dehu road pond	Sinhgad road
Colour	Blue green	Green
Temp	23	22
PH	7.3	7.5
D.O	1.21	2.62
BOD	121	132
Free CO_2	24.2	Ab
Total alkalinity	405	215
Carbonates	00	80
Bicarbonates	405	165
Hardness	156	66
TSS	14	3.15
Sulphates	1.53	0.61
Ortho phosphates	0.68	00
Chlorides	-	29.48
Microcystis colonies/ml	438 X 10^4	114 X 10^5





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EFFECT OF DIFFERENT BROTH MEDIA ON DRY MYCELIAL WEIGHT OF SCLEROTIUM ROLFSII CAUSING ROT DISEASE OF CHILLI.

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Abstract

Chilli is a vital crop and species in vegetable, it has been observed to suffer due to various fungal diseases, but disease caused by Sclerotium rolfsii, in that chilli rot had received significance loss-made. The effect of dry mycelial weights in broth (liquid) broth media were tested with different broth media Asthana & Hawker's broth media, Carrot juice broth media, Cooked vegetable broth media (natural broth media), Conn's broth media, Czapek-dox broth media, Garlic broth media, Glucose-dox broth media, Glucose peptone broth media, Leonian broth media, Oat meal broth media, Malt extract peptone-dextrose broth media, Potato dextrose broth media, Potato sucrose broth media, Richard's broth media and Yeast dextrose broth media. The effect of different broth media were done by poisoning food technique. Among all the broth media Malt extract peptone-dextrose broth media & Potato sucrose broth media were recorded excellent dry mycelial weight 4282mg and 3020mg after twenty-fourth days of incubation period. The Sclerotium rolfsii dry mycelial weight in broth media of Carrot broth media, Cooked vegetables broth media, Garlic broth media and Oat meal broth media evident 10mg, 20mg, 30mg, and 40mg respectively were gave minimum dry mycelial weight.

Key words : Broth media effects, Culture broth media, Fungal pathogen, *Sclerotium rolfsii.*

Introduction:

Chilli (*Capsicum spp.*) is a significant commercial and export-oriented crop in India. Chilli is an important commercial spice and vegetable crop for all small and marginal farmers in Asia, Africa and South America. In India, the states of Andhra Pradesh, Karnataka, Maharashtra, Orissa and Tamil Nadu Account for more than 75 % of the area and total production of chilli.

Culture media has been used by microbiologists since the nineteenth century. All microorganisms need sources energy, nitrogen, Carbone, Phosphorus, Sulphur and various minerals'. All the culture media tested here supported the growth of fungi to various degrees. Microbiological media is the most wide and arguably most important tool for the research and also pharmaceutical microbiologist. The research laboratory uses a range of culture media depending upon the application required (Sutton, S.V.W. 2005). Given this primacy in mycological & pathological research it is important that the fungal culture media manufactured in laboratory is of high quality and suitable for the intended research mode and methods.

Materials and Methods:

Isolation of *Sclerotium rolfsii* was carried out from diseases chilli plant collected from field of Aurangabad District. The effect of different broth media on the growth of *Sclerotium rolfsii* was studied using poisoning food technique, (Dhingra and Sinclair, 1985).

Culture broth media:

In-vitro growth of *Sclerotium rolfsii* was tested with different fifteen culture broth media given as Asthana & Hawker's broth media, Carrot juice broth, Cooked vegetable broth (natural broth media), Conn's broth media, Czapek-dox broth, Garlic broth, Glucose-dox broth, Glucose peptone broth, Leonian broth, Oat meal broth, Malt extract peptone-dextrose broth, Potato dextrose broth, Potato sucrose broth, Richard's broth and Yeast dextrose broth.

Measurement of Mycelial Weight:
(Liquid broth medium)

The dry mycelial weight measures in (liquid) broth media were studied. The *S. rolfsii* growth of pathogen was measured in terms of dry mycelial weight. The advanced zone of mycelial mat 4mm diameter agar disc containing the mycelial, were cut with sterilized cork borer and transferred to Erlenmeyer flasks. The *Scleroium rolfsii* was allowed to grow in 100ml Erlenmeyer flask containing 20ml sterilized broth medium (excluding agar). Each set of experiment runs in triplicate. Each flask was incubated by transferred an agar disc of 4mm diameter containing hype inoculums. Inoculated flask was incubation for 0, 4, 8,12,16,20 and 24 days. After given incubation period, the mycelial mat of the pathogen was removed and collected in pre-weighted what man's filter No-1.Now the filter papers with mycelial mat were dried at 60^0C in electric oven. After drying, the filter papers with mycelial were re-weighed. The dry mycelial weight per culture determined by subtracting the weight of filter paper from the weight of filter paper with mycelial mat.

Result :

The results of dry mycelial weight in fifteen broth media are recorded in Table. After incubation period with regular intervals of 4, 8, 12, 16, 20 and 24 all fifteen broth media were carefully observed and obtained dry mycelial weight of *Sclerotium rolfsii*.

These results evident that Carrot broth medium, Cooked vegetable broth medium, Garlic broth medium and Oat meal broth medium gave minimum dry mycelial weight.

In the further investigation in our studied that about moderate degree of dry mycelial weight, were found in Glucose agar broth medium, Asthane and Hawker's broth medium and Conn's broth medium.

Moving towards broth medium those observed satisfactory significant dry mycelial weight were Czapek dox broth medium, Yeast dextrose broth medium and Potato dextrose broth medium were in prominent ranked.

Entering abundant growth of mycelial mat in media was Glucose peptone broth medium and Richard's broth medium has been proved as heavy dry mycelium weight broth medium.

In our present studies, Potato sucrose broth medium was revealed to be more favorable for production of *Sclerotium rolfsii* mat resulted as second ranked as compared to Malt extract peptone dextrose agar broth medium was recorded as excellent dry mycelial weight after twenty fourth days of incubation period among all fifteen broth media.

Discussion:

The pathogenic fungus *Slcerotium rolfsii* growth was determined in terms of dry mycelial weight in fifteen different broth media. In these present studies, an attempt has been made to understand the dry mycelial growth of *Sclerotium rolfsii* form results. From results Table Malt extract peptone dextrose broth medium revealed excellent dry mycelial weight. If in present studied in fifteen different broth media, we eradicate Potato dextrose broth medium, Richard broth medium and Glucose peptone broth medium, we got Potato dextrose broth medium, we search out Potato dextrose broth medium proved the best broth medium for supporter of growth this is match with the work of Zape, et.al. (2013). The Carrot broth medium, cooked broth medium, Garlic broth medium and Oat meal broth medium least amount of dry mycelial weight reported. This may be due to as compared to Carbone, Organic and Inorganic broth media fresh antifungal sources used in broth media. In this broth media ability of *Sclerotium rolfsii* growth are restricted by ability of most important nutrient essential to utilize.

Conclusion:

Although earlier works proved that potato dextrose broth medium found to best, but in our result analysis showed among all the broth media (in Table) Malt extract peptone-dextrose broth medium & Potato sucrose broth media were recorded excellent dry mycelial weight 4282mg and 3020mg after twenty-fourth days of incubation period. *Sclerotium rolfsii* dry mycelial weight in broth media of Carrot broth media, Cooked vegetables broth media, Garlic broth media and Oat meal broth media evident 10mg, 20mg, 30mg, and 40mg respectively were gave minimum dry mycelial weight. Malt extract dextrose broth media are most suitable for better growth of *Sclerotium rolfsii* as compared to potato dextrose broth medium. This may be due to Malt extract peptone dextrose broth medium containing peptone like complex organic sources, with one Carbone sources dextrose consume for nutrition. On the other hand Potato dextrose broth media carried only one Carbone sources, As compared to Malt extract peptone dextrose broth medium.

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Table : Morphogenic effect of different broth media on growth in milligrams (mg) of *Sclerotium rolfsii*.

Serial Number	Broth media	Dry mycelial Weight In mg					
		4 Days	8 Days	12 Days	16 Days	20 days	24 days
1	Asthane & Hawker's broth medium	30	30	10	60	40	100
2	Carrot broth medium	110	20	20	10	40	10
3	Conn's broth medium	10	20	40	180	70	100
4	Cook vegetable broth medium	60	50	630	40	30	20
5	Czapek dox broth medium	80	110	90	90	120	210
6	Garlic broth medium	20	40	0	30	20	30
7	Glucose dox Broth medium	60	40	30	110	50	60
8	Glucose peptone dextrose broth medium	110	200	200	290	450	630

9	Leonian broth medium	06	17	20	40	40	50
10	Malt extract peptone dextrose broth medium	340	500	4260	320	7190	4282
11	Oat meal broth medium	0	244	60	60	20	40
12	Potato sucrose broth medium	220	264	310	140	120	3020
13	Potato dextrose broth medium	160	2440	100	210	110	540
14	Richard's broth medium	170	140	214	280	1120	670
15	Yeast dextrose broth medium	90	330	120	140	190	520

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EFFECT OF INDUSTRIALIZATION ON WATER QUALITY PARAMETER FROM SINNAR TAHSIL, DIST. NASHIK.

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Abstract :

The present study deals with the physic-chemical parameters of water from water sources in Sinnar Tahsil such as weal water, ground water and other water sources. Sinnar Tahsil is located at Nashik-Pune highway surrounded by Industrial area mainly Malegaon and Musalgaon MIDC. In Sinnar Tahsil many types of industries are present out of which chemical industries are mainly responsible for the pollution. The effluent from chemical industries pollutes the water sources and the quality of water varies from their standard value. The west water directly or indirectly comes in contact with water sources and the quality of drinking water must be change, it adversely affect on aquatic life.

Keywords : Sinnar Tahsil, Water pollution, Industrialization, Physico-chemical parameter.

INTRODUCTION

Sinnar is located in Nashik district on Nashik-Pune highway. Sinnar Tahsil has got importance in last few years due to industrialization. In Sinnar Malegaon and Musalgaon area is covered by industries and they are well known as Malegaon and Musalgaon MIDC. The industrialization in Sinnar Tahsil gives many more jobs for peoples in Sinnar and in other areas also, but due to industrialization other problems also created and among them water pollution is most important one. In present study we are going to analyze the variation in the physico-chemical properties of water inn Sinnar Tahsil and study the effect of industrialization on the quality of water.

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MATERIAL AND METHODS

The present study was carried out for the analysis of physico-chemical parameters of water from different water resources (Table-1) in Malegaon and Musalgaon areas in Sinnar Tahsil.

Table – 1: Location of the water resources

Sr. No	Sample No.	Water resources	Place/ Location
1	A	Weal water	Malegaon MIDC area
2	B	Weal water	Malegaon MIDC area
3	C	Weal water	Malegaon MIDC area
4	D	Weal water	Malegaon MIDC area
5	E	Weal water	Musalgaon MIDC area
6	F	Weal water	Musalgaon MIDC area
7	G	Weal water	Musalgaon MIDC area
8	H	Weal water	Musalgaon MIDC area

In present study, sampling was done during morning hour in winter season. The water samples were collected in polyethylene bottles. The samples were collected from three different areas around Malegaon and Musalgaon MIDC respectively. To minimize the variation in physico-chemical changes that can affect water quality, temperature, pH, Turbidity, DO, salinity, EC of water sample was analyzed immediately on the spot by water analysis kit. The remaining parameter were such as alkalinity, chloride, TDS, calcium, magnesium, BOD, total hardness, nitrate and phosphate were determined in the laboratory by reported methods. Sodium can estimate by flame photometric method. The mean value data was calculated as season wise and standard error was also calculated.

Table – 2: Physico-chemical parameter of water samples.

Sr. No.	Physico-chemical Parameters	Water Samples							
		A	B	C	D	E	F	G	H
1	Temperature	15 ± 1.2	14 ± 0.2	15 ± 0.3	15 ± 1.4	16 ± 2.1	17 ± 2	15 ± 0.1	14 ± 1.2
2	pH	7.1 ±0.1	7.4 ±0.1	7.1 ±0.3	8.1 ±0.1	8.1 ±0.3	7.7 ± 0.2	8.2 ±0.1	7.2 ± 0.2
3	EC(mho/cm)	2.1 ± 0.2	2.5 ± 0.3	3.0 ± 0.4	2.3 ± 0.1	3.5 ± 0.2	3.7 ± 0.1	3.5 ± 0.3	4.0 ±0.1
4	Turbidity (NTU)	9.2 ± 0.3	10 ± 0.2	9.1± 0.1	9.2 ± 0.4	10 ± 2	11 ± 1.3	11 ± 1.2	10 ± 1.3
5	TDS (ppm)	300 ± 2	290 ±2	300 ± 1	280 ± 2	350 ±0.3	310± 0.2	340 ±0.1	340 ±0.6
6	Alkalinity (ppm)	160 ± 3	167 ± 4	170 ± 3	200 ± 3	250 ±4	255±4	260±3	270±4
7	Total Hardness (ppm)	105±4	110±4.5	115±4	220±4.5	100±5	120±5.5	150±6	170±5
8	Calcium (ppm)	25±2	20±2.5	50±3	55±2.5	60±3	70±3	80±3	85±3
9	Magnesium (ppm)	3.1±0.2	4.1±0.3	5.1±0.4	6.1±0.4	7.1±0.3	8.1±0.4	9.1±0.4	10.1±0.4
10	DO (ppm)	11±0.3	13±0.2	15±0.3	20±0.2	12±0.4	14±0.6	16±0.7	18±0.6
11	BOD (ppm)	4±1.5	5±2.5	6±2	5.5±3	6±0.2	8±0.5	10±0.8	12±1
12	Chloride (ppm)	102±1.2	105±1.5	110±2	112±2.1	110±0.6	115±0.8	120±1	125±1.2
13	Nitrate (ppm)	5±0.12	8±0.4	9±0.6	10±0.8	12±0.3	14±0.4	16±0.6	16±0.8
14	Phosphate (ppm)	1.2±0.2	1±0.4	2±0.3	3±0.4	2±0.1	2.5±0.2	3±0.3	3.5±0.5

RESULT AND DISCUSSION:

Temperature :

Temperature of water was determined at the time of sampling with the help of water analysis kit. The temperature of water depends upon the surrounding environment such as moisture present in air. Generally the temperature in Sinnar Tahsil is low due moister in air.

pH:

The pH of water is mainly depends on bicarbonate and carbonate ions present in water. Chemical buffering also leads to change the pH of water.

Electrical Conductivity:

EC of water is due to present of ions. The inorganic matter or salts from industries responsible for the high EC of water.

Turbidity:

The increase in turbidity of water is due to incompletely dissolve matter or aquatic vegetations.

Total Dissolve Solid:

High value of TDS enriches the nutrient status of water body which was resulted into eutrophication of aquatic ecosystem.

Alkalinity:

The organic matter suspended in water bodies or in earth responsible for increasing carbonate and bicarbonate those results in increase in alkalinity of water.

Total Hardness:

Hardness is due to addition of sewage and detergents into water bodies. Some detergent industries dump waste in water bodies, responsible for the increase in total hardness of water.

Calcium and Magnesium:

Calcium is often present in water, but due to suspension of industrial wastes the level of calcium increases. The level of magnesium is generally lower than calcium.

Dissolve oxygen and DOB:

Dissolve oxygen in water is normally affected by surrounding temperature and chemical reaction in ecosystem.

Chloride, Nitrate and Phosphate:

The high concentration of chloride, nitrate and phosphate in water may be due to organic waste from chemical industries.

CONCLUSION:

The result obtained from present study was campaired with standard [1-2]. The physico-chemical parameter in water from Sinnar Tahsil are slightly polluted due to contamination, by avoiding direct dumping of waste in water bodies or minimizing the pollution, quality of water in Sinnar Tahsil is maintain.

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TO STUDY THE EFFECT OF ENVIRONMENT ON HUMAN HEALTH

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"We begin to see, therefore, the importance of selecting our environment with the greatest of care, because environment is the mental feeding ground out of which the food that goes into our minds is extracted." –Napoleon Hill

Abstract :

Maintaining a healthy environment is central to increasing quality of life and years of healthy life. Changes in the India's climate stemming from the greenhouse effect are highly likely to damage human health. Food & fresh water supplies will be disrupted. Human health could be affected by even quite small changes in temperature. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors. Environmental factors are diverse and far reaching. Every minute, five children in developing countries die from malaria or diarrhoea. Every hour, 100 children die as a result of exposure to indoor smoke from solid fuels. Every day, nearly 1,800 people in developing cities die as a result of exposure to urban air pollution. Every month, nearly 19,000 people in developing countries die from unintentional poisonings.(Source: Health and Environment: Tools for Effective Decision-Making: the WHO/UNEP Health and Environment Linkages Initiative Review of Initial Findings, 2004.)

Key words - Health risks, Environmental pollution, Health

Introduction:

All organisms depend on their environments for energy and the materials needed to sustain life. clean air, potable water, nutritious food, and safe places to live. For most of human history, increases in longevity were due to improved access to these necessities. Advances in agriculture, sanitation, water treatment, and hygiene have had a far greater impact on human health than medical technology. Although the environment sustains human life, it can also cause disease.

Let us see the meaning of Environmental Health

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The World Health Organization (WHO) defines environment, as it relates to health, as "all the physical, chemical, and biological factors external to a person, and all the related behaviors." Environmental health consists of preventing or controlling disease, injury, and disability related to the interactions between people and their environment.All types of pollution – air, water and soil pollution – have an impact on the living environment.

The quality of environment was being degraded. The United Nations Stockholm conference on human environment identified four major areas of need as guidelines for international action in maintaining & improving the quality of life. –

1. The improvement of human settlements & health;
2. The development & use of water, land & energy resources;
3. Harmonizing development goals & social & cultural values with environment quality objectives;
4. The protection of living resources, the ocean, & climatic conditions.

Why Environmental Health Is Important?

Maintaining a healthy environment is central to increasing quality of life and years of healthy life. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors. Environmental factors are diverse and far reaching. The numbers of pollutant are increase day by day, so that environment becomes polluted.

Definition of Pollution

Pollution is the introduction of contaminants into the natural environment that cause adverse change, in the form of killing of life ,toxicity of environment , damage to ecosystem and aesthetics of our surrounding . The factors like radiation, pollution, microbes in air /soil, Natural disasters (hurricanes, earthquakes, floods), Pesticides and other chemicals, Global warming, Pests and parasites, Contaminants in food, Weather conditions (droughts, heat waves) etc are the factors which are responsible for disturbing The environmental balance. (Wikipedia)

Types of pollution

1. Air Pollution.
2. Water Pollution.
3. Noise Pollution.

4. Soil contamination (by lead, heavy metals)
5. Radioactive contamination.
6. Thermal pollution.

Objectives

1. To study the causes of pollution.
2. To study the impact of Environmental pollution on human health.
3. To find out the solution for minimising the environmental pollution.
4. To promote health for all through a healthy environment.

Assumptions:

1. Pollution free environment plays an important role for healthy life.

Hypothesis:

- Research Hypothesis: There is a significant effect of Environmental pollution on health.

Scope:

- All students of Ashoka College of Education

Limitations:

- This study is limited for S.Y and T.Y BSc B.Ed students of Ashoka college of Education.

Sampling Type:

- Purposive sampling

Steps followed in the Study:

1. The topic was selected. The information was collected about the environmental pollution and importance of Healthy Environment. A questionnaire was prepared. Survey was conducted on the selected sample - BSc. B.Ed students. Data was collected and analysed.

Data Analysis:

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Sr. No.	Questions	Responses in percentage		
		Agree	Strongly agree	Disagree
1.	Do you think that Healthy Environment is important for one's life?	0.00	100	0.00
2.	Do you think that there is relation between environment & health?	4.00	96.00	0.00
3.	Do you think that environmental pollution affects health?	4.00	96.00	0.00
4.	Do you think that nowadays environment is becoming more polluted?	4.00	96.00	0.00
5.	Do you think that most of the diseases occur due to polluted environment?	28.00	72.00	0.00
6.	Do you think that the % of child asthma is increasing day by day?	44.00	56.00	0.00
7.	Do vehicles create various types of pollution such as air pollution, Noise pollution etc?	0.00	100	0.00
8.	Does environment provide specific atmosphere for making plants & animals healthy?	12.00	84.00	4.00
9.	Do plants always help to reduce pollution?	28.00	72.00	0.00
10.	Do you frequently suffer from cough & cold problems?	56.00	32.00	12.00
11.	Can air born pollutants cause Asthma?	32.00	68.00	0.00
12.	Is the percentage of partial deafness increasing day by day?	56.00	44.00	0.00
13.	Do you think that Pesticides increases soil, water & air pollution?	40.00	60.00	0.00
14.	Cancer patients are increasing due to consumption of pesticidal fruits & vegetables.	52.00	48.00	0.00
15.	Do you think that the refrigerator, A.C. etc. which we are using are eco-friendly with environment & human health?	44.00	4.00	52.00
16.	Do you agree that human being is responsible for destruction of environment?	24.00	76.00	0.00
17.	Are biological factors responsible for clean environment?	32.00	68.00	0.00
18.	Does clean/ pollution free environment lead to good health?	0.00	100	0.00
19.	Are people starting to pay more attention to the link between health & environment?	40.00	52.00	8.00

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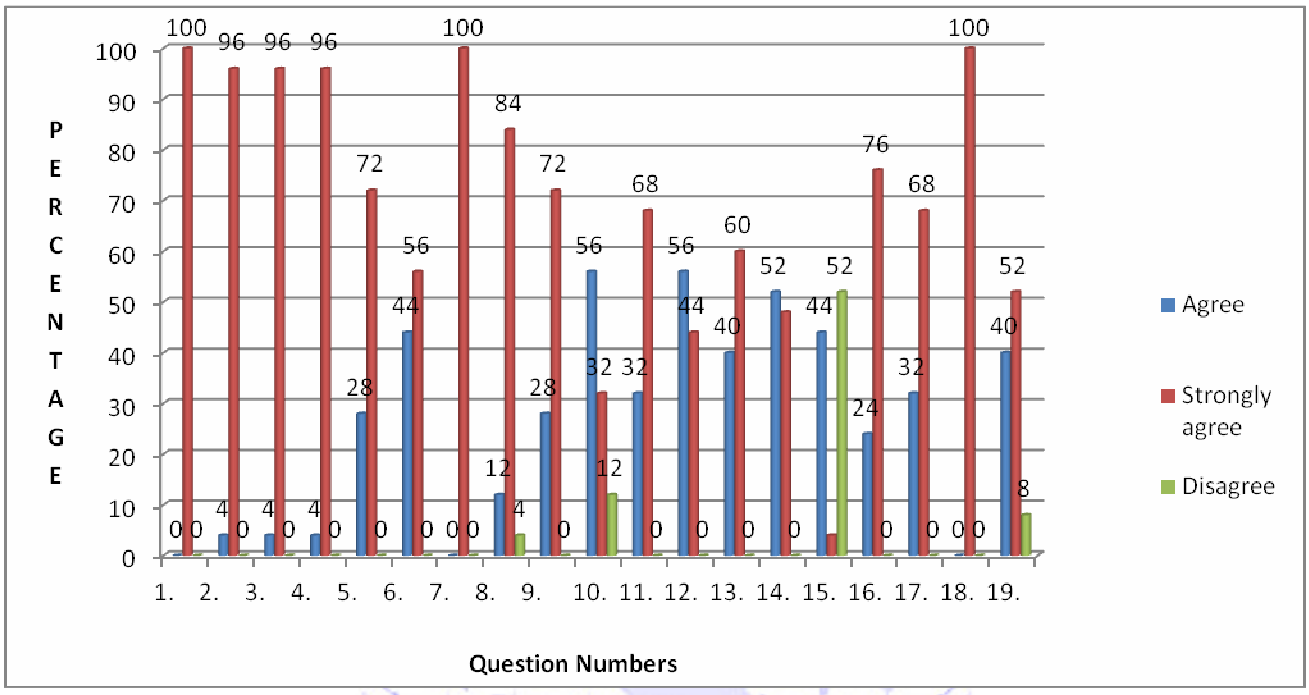
Data Analysis Graph: Responses in Percentage



Data interpretation:

From this survey I found that:

1. 1oo % students strongly agreed that healthy Environment is important for one's life.
2. 96 % students strongly agreed that there is a strong relation between Environment & health.
3. 96 % students strongly agreed that Environmental pollution affects health.
4. 96 % students strongly agreed that the Environment becomes more polluted.
5. 72% students think that most of the diseases occur due to polluted environment?
6. 56% students strongly agreed that the diseases like asthma increasing day by day?
7. 1oo % students strongly agreed that vehicles create various types of pollution such as air pollution, Noise pollution etc.
8. 84% students strongly agreed that environment provide specific atmosphere for making plants & animals healthy
9. 72% students think that plants play an important role for reducing pollution.
10. 68% students reported that air born pollutants causes asthma.
11. 56 % students from sample have suffered from cough & cold problems.
12. 56 % students agreed that the percentage of partial deafness is increases.

13. 60% students reported that overuse of pesticide increases pollution.
14. 52% students agreed that the cancer patients are increased due to consumption of pesticidal fruits & vegetables.
15. It is seen that 52% student's from sample are not using eco-friendly sources.
16. 76 % students from sample said that human being is responsible for destruction of environment?
17. 68% students strongly agreed that biological factors responsible for clean environment?
18. 1oo % students reported that clean environment leads to good health.
19. 52 % students strongly agreed that the people starting to pay more attention to the link between health & environment

Along with the above 19 objective questions, I also asked some of the open ended questions like

1. How Environmental pollution affects health?
2. What are the causes of Environmental pollution?
3. How do you minimise the Environmental pollution?
4. How are Biological factors responsible for clean environment?

Qualitative Analysis of Data:

On the basis of students' responses on the open ended questions it was found that:

Effects of Environmental pollution on health:

- Environmental pollution affects health in following ways
- **Short term effects:** are irritation to the eyes, nose and throat, Upper respiratory infections, Headache, nausea, and allergic reactions, Asthma and emphysema etc & Long term effects are Chronic respiratory diseases, Lung cancer, Heart diseases, Damage to the rain, nerves, liver or kidneys.
- Air pollution and exposure to hazardous chemicals are important causes of the environment-related burden of disease. The Vehicles and energy sectors are major sources of air pollution, while important sources of chemical pollution are agriculture, industry. The effects on health from exposure to chemicals and air pollutants vary from allergies to cancer. If the exposure is continuous or long term then, urban air pollutants can cause asthma, partial deafness, allergies, respiratory diseases and cardiovascular diseases. Heavy metals have been shown to cause neurological disorders and various cancers.

- Pesticides play an important role in increasing crop yields, but due to over use of pesticides hazards to human health and the environment. If we stopping use of pesticide then agricultural productivity is reduced. It leading to food shortages and increased food prices.
- Global climate change is due to the human production of greenhouse gases, burning of fossil fuels, deforestation etc. Climate change causes tremendous harm to the environment and human health Such as melting of ice caps, increase in sea level, Extinction of species. Resent example of climate change is Uttarakhand floods.
- A well-known example is the effect on the ozone layer depletion. -*R*eleases of CFC from heating, aerosol cans, refrigerator equipment remove some of the ozone, causing "holes". Ozone layer in stratosphere absorbs Sun's biologically harmful UV radiation. So ozone layer is also called "the protective umbrella" ozone-depleting substances used in cooling systems, refrigerator etc. The depletion of the ozone layer has led to increased exposure to UV-radiation and a greater risk of skin cancer. Environmental contamination can also cause psychological problems. Noise, quality of life and potentially contributing to depression.

Steps for reducing Environmental pollution:

1. Trees and Vegetation: Trees and other plants help cool the environment, making vegetation a simple and effective way to reduce urban heat islands. Shading Trees not only helps to reduce the urban heat island effect, but also it reduces air pollution, higher demands on cooling systems and health problems related to heat and pollution, Trees are a very simple, attainable means of reducing the effects. They act as nature's air conditioners. Leaves help reduce air pollution by "capturing" airborne particles, such as Nitrogen dioxide, NO2, Nitrogen oxide, NO, and Sulfur dioxide, SO2 etc.
2. Air pollution prevention efforts of companies have generally focused on waste reduction, reuse and recycling. So to solve these problems and to get over them we can change our lifestyles. If we do these simple things we could have a better world and we could live in a better way.
3. Alternative Energy sources Use natural Gases, like LPG (Liquefied Petroleum Gas) autos.
4. Do not Burst Crackers.
5. Useless Amount of Fuel for Vehicles.
6. Avoid using and use electric stoves (biogas).

7. More and more land should be brought under farming.
8. Waste matter should be dispose immediately.
9. Avoid drilling the Land for more underground water.
10. Avoid using more fertilizers and Pesticides.
11. Integrated Solid Waste Management.
12. Good agricultural practices.
13. Remediation of polluted soils.
14. Prevention of erosion and silting.
15. Containments to hazardous waste and waste water treatment using land treatment techniques.
16. Use 3R Principle: Reduce, Reuse & Recycle

Conclusion:

It is impossible to eliminate harmful emissions, but it is the responsibility of every one of us to reduce energy consumption. There appears to be a strong awareness of the need to make links between environmental conditions and health impacts.By following the Steps for reducing Environmental pollution one day definitely the environment will become clean & healthy. This path will encourage us to come out of & take up some positive challenges to build strong pillars of the nation.

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ASSESSMENT OF MYCOFLORA FROM MEDICINALLY IMPORTANT SEEDS

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ABSTRACT :

The whole plant or a particular part of plant used as medicine date back prehistoric period. In the recent years the medicinal plants are extensively used throughout the world. The medicinal plants and medicinally important seeds are very important source of ecofriendly medicine to avoid carcinogenic effect of allopathic medicines. Different parts of plants are used to prepare medicine against a variety of diseases of human beings. The use of seeds of certain plants used as medicine is common throughout India.

Storage deterioration of seeds is a serious problem in the humid godowns. To study the fungal invasion and deterioration of nine types of medicinally important seeds was chosen. The material selected for study was seeds of Ocimum, Fenugreek, black cumin, sesamum, carrot, cotton, kalongi, coriander and musk melon. The mycoflora from the seeds isolated by food poisoning technique. There was 21 types of fungal genera were obtained from nine types of seeds of medicinal importance which was responsible for seed deterioration. The dominant mycoflora which was common to most of the types of seeds was Aspergillus, Fusarium, Rhizopus, Mucor, etc.

Key words: Storage deterioration of seeds, food poisoning technique *Aspergillus, Fusarium, Rhizopus, Mucor, etc.*

Introduction:

In India there is great variation in soil type and all other environmental factors hence it is highly favorable for the growth and development of many types of varieties of medicinal plants. In India more than 2000 varieties of medicinal plants are present (Joseph Jose and Rayalakshmi, R, 2005). Human being is dependent on higher plants for their health care needs since the very beginning of human civilization.

To avoid the carcinogenic effect the world population diverted towards plant made medicines; different parts of medicinal plants are used in preparation of medicine and homeopathy in Ayurveda science, homeopathy and naturopathy, for the preparation of different types of medicines against various diseases of human beings, cattle and birds etc.

It has observed that the medicinal plants were affected by fungal pathogens which are responsible for degradation of the quality of medicinal plants directly by the physiological and metabolic alteration in affected plant organ. Hence we have selected nine medicinal plants to study the its seed borne mycoflora from the region Marathwada. This is the initial stage to divert plants pathologist to study diseases of medicinal plants and their management on which there is very few data is available.

Because of great variation in soil texture and other environmental factors, those are thousands or more than 2000 varieties of medicinal plants (Jpseph Jose and Rayalaxmi, 2005). Human beings are dependent on higher plants for their health care needs since the very beginning of human civilization. The different parts of medicinal parts are used to prepare different types of medicines for various diseases of human beings, cattles and birch etc. The medicinal plants are grown by use of seeds. The medicinal plants and medicinally important seeds are very important source of ecofriendly medicine to avoid carcinogenic effect of allopathic medicines. Different parts of plants are used to prepare medicine against a variety of diseases of human beings. The use of seeds of certain plants used as medicine is common throughout India. Storage deterioration of seeds is a serious problem in the humid go downs. The affected seeds by fungal pathogens which degrade the quality of medicinal plant directly by disturbing the physiological and metabolic procedures of affected plant part. To study the fungal invasion and deterioration of nine types of medicinally important seeds was chosen. The material selected for study was seeds of Ocimum, (*Ocimum sanctum*), Fenugreek (*Trigonella foenum-graecum*), black cumin (*Nigella sativa*), sesamum (*Sesamum nigrum*), carrot (*Daccus carota*), cotton(*Gossypium arboretum*), coriander (*Coriandrum sativum*), syzygium (*syzygium cuminii*); Terminalia (*Terminalia chebula*), Celastrus (*Celastrus*

paniculata) , Sadabahar (*Vinca rosea*) and Brassica (*Brassica nigra*).

The pathogenic fungi responsible for seed deterioration of seeds of medicinal plants were isolated on PDA (Potato Dextrose Agar) medium by food poisoning technique. The fungi were identified on the basis of growth pattern and spore types. A variety of fungi responsible for seed deterioration were *Alternaria alternata; Alternaria macrospora; Aspergillus niger; Aspergillus ustus; Colletotrichum indicum; Macrophomina phaseolina; Rhizopus nodosus; Sclerotium rolfsii Alternaria alternata; Alternaria tenuissima; Penicillium sp.; Chaetomium globossum; Curvularia lunata; Fusarium bulbigenum; Fusarium moniliforme* and *Rhizoctonia bataticola.*

Methodology:

The jungles and mountains of Maharashtra are famous for the largest flora of medicinal plants. During the survey we have visited the thickly populated plant areas of Maharashtra (Mahabaleshwar, Western Ghats, Kinwat Forest, Satara, Gawatala Forest, Mountains near Ajanta, Mountainous area closer to Pune). The seeds of medicinal plants were collected from different parts of Maharashtra from Ayurveda shops. During collection of seeds separate sterile polythin bag was used for each type of seed of medicinal plant type. The seeds were brought to the laboratory for further study. The fungal pathogen responsible for seed deterioration was isolated on solid PDA (Potato Dextrose Agar) medium; by inoculating seeds PDA amended petriplate in sterile conditions. The same procedure was adopted for isolation of responsible fungus of seed deterioration of each type of medicinal plant.

The inoculated plates were incubated at room temperature 23 ± 1 C^0 temperature. The plates were observed daily. The fungus causing seed deterioration of medicinal plant was purified by repeated transfer of single hyphal thread on PDA (Potato Dextrose Agar) medium.

The pathogenic fungus was identified on the basis of growth pattern, hyphal details and spore type. Bilgrami (1963) reported list of seed borne fungi of same medicinal plants.

Table: 1. Seed mycoflora of certain medicinal plants of Maharashtra

Sr. no.	Medicinal Plant	Seed mycoflora
1.	Ocimum, (*Ocimum sanctum*)	• *Aspergillus niger* • *Alternaria alternata* • *Fusarium solani*

2.	Fenugreek (*Trigonella foenum-graecum*),	• Aspergillus niger • Aspergillus flavus • Rhizopus
3.	Black cumin (*Nigella sativa*)	• *Alternaria alternata* • *Alternaria tenuissima* • *Penicillium sp.* • *Chaetomium globossum* • *Curvularia lunata* • *Fusarium bulbigenum* • *Fusarium moniliforme* • *Rhizoctonia bataticola*
4.	Sesamum (*Sesamum nigrum*)	• *Alternaria sesame* • *Aspergillus niger* • *Aspergillus flavus* • *Fusarium vasinfectum*
5.	Carrot (*Daccus carota*)	• *Aspergillus niger* • *Aspergillus flavus* • *Rhizopus* • *Penicillium sp.* • *Fusarium solani*
6.	Cotton (*Gossypium arboretum*),	• *Alternaria alternata* • *Alternaria macrospora* • *Aspergillus niger* • *Aspergillus ustus* • *Colletotrichum indicum* • *Macrophomina phaseolina* • *Rhizopus nodosus* • *Sclerotium rolfsii*
7.	Coriander (*Coriandrum sativum*)	• *Alternaria alternata* • *Alternaria tenuissima* • *Aspergillus niger* • *Aspergillus flavus* • *Chaetomium globossum* • *Curvularia lunata* • *Fusarium bulbigenum* • *Fusarium miniliforme* • *Rhizoctonia bataticola* • *Stemphylium botryosum*

8.	Syzygium (*Syzygium cuminii*);	• *Aspergillus niger* • *Aspergillus flavus* • *Fusarium solani* • *Curvularia lunata* • *Macrophomina mangiferae*
9.	Terminalia (*Terminalia chebula*),	• *Aspergillus niger* • *Fusarium solani* • *Curvularia lunata* • *Fusarium solani* • *Rhizopus nodosus* • *Alternaria alternata*
10.	Celastrus (*Celastrus paniculata*) ,	• *Aspergillus niger* • *Alternaria alternata* • *Fusarium solani* • *Macrophomina celastrina* • *Colletotrichum celastris*
11.	Sadabahar (*Vinca rosea*)	• *Aspergillus niger* • *Cersocpora sp.* • *Aspergillus flavus* • *Fusarium solani*
12.	Brassica (*Brassica nigra*).	• *Cersocpora sp.* • *Aspergillus flavus* • *Fusarium solani* • *Aspergillus niger*

Result:

We have isolated numerous fungi from the seeds collected from various parts of Maharashtra. The fungi responsible for seed deterioration of various medicinal plants seeds were *Aspergillus niger; Alternaria alternata; Alternaria tenuissima ; Aspergillus flavus; Chaetomium globossum; Curvularia lunata; Fusarium bulbigenum; Fusarium miniliforme; Rhizoctonia bataticola; Stemphylium botryosum; Fusarium solani; Macrophomina celastrina Colletotrichum celastris; Fusarium solani; Curvularia lunata; Rhizopus nodosus; Cersocpora sp. Sclerotium rolfsii* and *Penicillium sp.* Due to improper environmental condition during storage of seeds in shops there is infection of saprophytes to the seeds. Bharath, (2006). Studied evaluation of different prtoctectans against seed mycoflora of Watermelon. It is not surprising that a high number of fungi have been isolated from nine types of seeds of medicinal use. Suryanarayanan (1978), .Literature on seed mycoflora of medicinal plants was reveled and observed by several workers. Batista, et. al, (2003) reported association of toxigenic fungi to seeds of medicinal plants. Agrawal and Singh (1974)

reported relative percentage incidence of seed borne fungi associated with different varieties. Seeds are regarded as main source of for transporting plant pathogenic fungi over long distances. Numerous evidences exist in agriculture literature for the international spread of plant diseases as a result of the importation of seeds that were infected or contaminated with pathogens (Agrawal and Sinclair 1996). The infected seed plays a very important role in the transmission of plant pathogenic fungi and development of disease (Agrawal 1981). The seeds are important source of inoculum that carries of some important fungus causing seed-borne diseases as well as disease in the field which results in considerable losses in yields. Some of the seed-borne fungi were found to be very destructive, caused seed rot, and decreased seeds germination. Also, cause pre and post germination death, Bolkan, et. al, (1976); Elarosi (1993).

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PHYSICO- CHEMICAL PARAMETERS OF GODAVARI RIVER PAITHAN, AURANGABAD DISTRICT.

Shaikh Yasmeen
And
Shaikh Meheraj Begum.

Abstract

Water is the single most vital component of the life. Study of parameters of water to confirm its highly essential, physic- chemical parameter of Godavari river, Paithan District Aurangabad were monitored. The parameters studied were temperature, pH and dissolved oxygen in different seasons i.e. summer, monsoon and winter. The study reveals the parameters shows a wide range of variations ased on the seasonal changes.

Keywords : Godavari River, water parameters, seasons.

Introduction

Water has a unique place on planet as it supports life on earth. The entire fabric of life is woven around it. Man uses this important resource collected in depressions on earth or creates depressions by blocking the streams and constructing reservoirs, because of industrial development and unplanned urbanization. This important resource for life has been polluted to a point of crisis.

The adverse impact is felt on the unique physical and chemical properties of water. The fish and other organisms that inhabit these reservoirs are also affected which in turn influence the functions of the reservoir. Quality of water is important for drinking, irrigation, fish production, recreation and other purposes. The water quality deterioration in reservoirs usually results from acidification, heavy metal contamination, organic pollution, obnoxious fishing practices and excessive nutrient input that leads to eutrophication. The effects of these imports into the reservoir not only affect the socio-economic functions of the reservoir negatively, but also lead to the loss of structural biodiversity of the reservoir. The physico-chemical properties of water quality assessment give a proper indication of the status, productivity and sustainability of a water body. The changes in the physicochemical characteristics like temperature, transparency and chemical elements of water such as dissolved oxygen, nitrate and phosphate provide valuable information on the quality of the water, the source (s) of the variations and their impacts on the functions and biodiversity of the reservoir

Hence, the consideration of the physico-chemical factors in the study of limnology is basis for the understanding of trophic dynamics of the water body. The physical and chemical properties of water immensely influence uses of a water body for the distribution and richness of biota. Each factor plays its own role but at the same time the final effect is the actual result of the interactions of all the factors. These factors serve as a basis for the richness or otherwise biological 19 productivity of any aquatic environment. Looking at the importance of understanding physico-chemical properties of water in a waterbody for supporting various biota, a study was planned to find out physico-chemical status of water of Lotus Lake, a perennial Lake present at Toranmal. Following parameters are considered.

Materials and methods

The enclosed water body is naturally created, mostly rocky and without much clay. It does not recieve any type of sewage discharge. It has population of algae, weeds and grass. Usually domestic cattles graze in that area. The water body is flooded during monsoon, generally from July to December and the water level considerably reduced, partially in May- June.

The environmental parameters like temperature, dissolved oxygen and Ph were recorded. The samples of water were collected in clean dark brown air tight bottles and transported immediately to the laboratory. Samples were collected for dissolved oxygen in 250 ml DO bottles and oxygen fixed by adding alkali iodide for further analysis in laboratory. The samples were analyzed by Winkler's method, azide modification (APHA 1989 and Trivedi and Goel 1986).

The temperature of the water was recorded with the help of standard centrigrade thermometer in ^{o}C, pH was recorded with the help of pH meter(Kannan.K.1991, Kaushik S. and D.N. Saksena 1999). The replicates of these determinations were used in calculations.

Results and discussions

The environmental parameters like temperature, pH and dissolved oxygen showed varying levels in summer, monsoon and winter (table). Temperature of the water was maximum (28 -32 ^{0}C) in summer, while it was minimum in monsoon and winter (23 – 25 ^{0}C and 18 – 22 ^{0}C respectively) pH fluctuated from (8.1 – 8.4) in summer, (7.5- 8.0) in monsoon but in winter it was between (7.1 – 7.4) . Dissolved oxygen was less in summer between (4.05– 5.25) while in winter it was from (4.06 – 6.48) and in monsoon (5.07-7.01).

Temperature is a measure of the intensity (not the amount) of heat stored in a volume of water measured in calories and is the product of the weight of the substance (in gms), temperature (ºC). In general atmospheric and water temperature depend on geographical location and meteorological conditions such as rainfall, humidity, cloud cover, wind velocity, *etc*.

Seasons	Temperature (^{o}C)	pH	DO (mg/l)
Summer (April-May)	28 – 32	8.1 – 8.4	4.05-5.25
Monsoon (July-August)	23- 25	7.5-8.0	5.07-7.01
Winter (Dec-January)	18-22	7.1-7.4	4.06-6.48

Table : Physico - chemical parameters of water.

Hydrogen ions (acidic) as well as hydroxyl ions (alkaline) are the result of the ionization of water. Any change in the concentration of any one of these ions brings about a change in the concentration of the other.

Dissolved oxygen is essential to the respiratory metabolism of most aquatic organisms. The dynamics of oxygen distribution in inland waters are governed by a balance between inputs from the atmosphere and photosynthesis and losses from the chemical and biotic oxidations. DO is a very important parameter for the survival of fishes and other aquatic organisms.

In present study high pH value were recorded in summer, than monsoon and winter. Temperature remains high in summer than monsoon and winter. Dissolved oxygen increased in monsoon, winter and summer.

Acknowledgement:

The authors are sincerely thankful to UGC New Delhi, for providing major research projects and also thankful to principal Dr. Anees Fatema for providing facilities.

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TO STUDY THE EFFECT OF URBANIZATION ON THE ENVIRONMENT

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ABSTRACT

Increase in a population at particular area and development of industries is termed as Urbanization. Movement of people from rural areas to urban areas symbolize the urbanization. Because of uncontrolled increasing urbanization in India, degradation of the Environment is take place rapidly and leads to the various problems like increase in temperature, poor water quality, are pollution, noise pollution and the biggest problem is of waste disposal. It is impossible to stop urbanization but we should take care that there is minimum impact on the environment

Key words – Urbanization, Environmental pollution, Effect on Environment

INTRODUCTION

Process that leads to the growth of cities due to industrialization and economic development is urbanization. The population is growing at the rate of about 17 million annually which means a staggering 45,000 births per day and 31 births per minutes. If the current trend continues, by the year 2050, India would have 1620 million populations. Due to uncontrolled urbanization in India, degradation of the environment has become a biggest problem which increasing with high speed and causing many problems like residential problem, poor water quality, air pollution, noise pollution, smoke and increase in temperature, and the problems of disposal of solid wastes.

What is urbanization?

Definition

Urbanization is a population shift from rural to urban areas, and the ways in which society adapts to the change.....(Wikipedia)

OR

An increase in a population in cities and towns versus rural areas. Urbanization began during the industrial revolution, when workers moved towards manufacturing hubs in cities to obtain jobs in factories as agricultural jobs became less common.....(Business Dictionary)

The area where all non-agricultural occupation like manufacturing industry, management,

and trading is refer as urban area. The movement of people from villages to urban area is called as urbanization. It is a phenomenon related with industrial revolution and associated economic development

An area is classified as rural and urban depending upon various criteria such as population size, density, occupation.

In the recent census of India, town is defined as follows:

a) **Statutory towns:** All places with a municipality, corporation, Cantonment board or notified town area committee, etc. so declared by state law.

b) **Census towns:** Places which satisfy following criteria:-

i) A minimum population of 5000;

ii) At least 75% of male working population engaged in non agricultural pursuits; and

iii) density of population of at least 400 persons per sq km

Effect of Urbanization on Environment

1. **Temperature of the Environment**

Dense building developments, heat emissions, human activities, etc., has a great impact upon the local climate of a city. Urban Heat Island (UHI) effect is one of the well known effect of urbanization. The effect shows the difference in the rate of cooling, urban cooling rates are slower than rural ones. Some of the main factors that may bring about the difference in temperatures between urban and rural areas include:

- More of the sun's energy being absorbed and stored in urban because of high heat absorbing capacity of the buildings.
- High and dense numbers of building in the urban area blocks the air flow and reduce the emission of the heat in the environment.
- A man-made emission like air conditioning, transportation and industries in urban areas reduces wind speeds and inhibits cooling by convection.

2. **Water Quality:**

We know the water quality of our urban water supplies. Big cities mean big development over large areas, which can certainly have an impact on the local water supply. It's not that hard to imagine that as cities grow, things happen that can harm the quality of the local water resources. That is why most governments must take measures to protect rivers, streams, lakes, and aquifers when small towns grow into big cities.

Here are some water-quality issues that relate to urban development.

- Population Growth
- Erosion and Sedimentation
- Urban Runoff
- Nitrogen
- Phosphorus
- Sewage Overflows
- Waterborne Pathogens
- Pesticides

Urbanization can yield positive effects if it takes place up to a desirable limit. Extensive urbanisation or indiscriminate growth of cities may result in adverse effects. They may be as follows:

i. roblem of over population: Over population is the biggest problem in the cities.It has resulted in accommodation problem, growth of slums etc.

ii. ost of living: High cost of living is a major problem of cities. In Metro cities like Mumbai, Bangalore etc. it is very difficult for middle class family to survive.

iii. roblem of Pollution: In industrialized cities pollution is a major problems. It may be caused by industries or by excessive movement of vehicles.

Thus urbanisation has its own merits and de-merits. Urbanization can't be avoided. But the negative effect of urbanization can be minimised.

Policy Implications:

The following policy initiatives may be recommended to overcome the problems of urbanization in India:

- To build community involvement in environmental programs and promote the individual's responsibilities toward the environment.
- To open communication that would help people become environmentally literate so that they can carry out their civic responsibilities.
- To preserve natural environments.
- To make public transportation clean, efficient, and accessible to the community.
- Government, with private help, provides essential services that will

improve the quality of life.

- To control population growth and disease.
- To allow environmental technologies to be more accessible and at lower cost to the community.
- To empower citizens with knowledge and skills.

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BIOCHEMICAL ALTERATION OF BAEL (AEGLE MARMELOS L.) FRUIT INFECTED BY ASPERGILLUS NIGER

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Abstract

The rot of bael fruit caused by Aspergillus niger during storage has selected in present investigation, regarding physiological changes or bio- deterioration of chemicals nutrients during pathogenicity after infection. In present investigation infected fruits were collected and fungi isolated on PDA, cultures were maintained in slants .After this physiological status were examined by taking the test for nitrogen ,protein ,reducing and non reducing sugars, total sugars and ash content of healthy and infected fruits .The percentage of content compared between healthy and diseased bael fruit .By using different methods of titrimetry and calorimetry percentage of chemicals were estimated.

From above investigation it was observed that there is drastic changes in chemicals in infected fruits caused by Aspergillus niger.

Keywords: Aspergillus niger ,biodeterioration ,physiology and healthy.

Introduction :

The bael (Aegle marmelos) is a one of the very familiar fruit with broad spectrum of medicinal properties .The fruit in nutritious, proteineous and extensively used in preparation of various types of medicines of Ayurvedic ,naturopathy, homeopathy and rural medicines .The bael fruits are tough skinned which is commonly sold in Indian market. The stocks are stored in godowns .The long duration of fruits affects the healthy quality due to infection of various xerophytic fungi .The rot of bael fruit caused by Aspergillus niger during storage period has been selected to find out the physiological status of bael fruit.Singh and Kainsa(1983) reported association of Aspergillus species with the rot disease of grapes, orange,lemon,and bael fruits during storage periods. Sharma, B.B (1962) Studied the dry rot of bael fruit. In the present study the physiological status such as

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nitrogen, protein, total amino acids total phenols ,total sugars ,reducing and non reducing sugar and total ash content of healthy as well as infected bael fruits were estimated by using a manual of laboratory techniques by N Raghuramula.

Materials and Methods:

The diseased and healthy fruits of bael were collected in separate sterile polythene bags from godowns and confirmed the pathogen on the basis of morphological features of fungal growth and sporulation.The fungus responsible for rot disease of bael during storage periods was isolated by inoculating infected fruits tissues on PDA(Potato Dextrose Agar) medium. The purity of culture achieved by inoculating hyphael threads on freshly prepared PDA amended petriplates.

The set of 10 healthy bael fruits of same size ,shape and age groups were rinsed with sterile warm distilled water after this rinsed with 0.01Hgcl$_2$ solution to sterilize the surface area. Now the fruits were artificially split opened. The 4mm discs of pure culture harvested by sterile cork borer was inoculated at the split open region of fruits. The inoculated fruits were incubated at room temperature 24-25+.1°c.After 12 days of infection period the fruits were used to estimate physiological status as mentioned above .The results were compared with the healthy fruits table. 01.Protein content was estimated by Kjeldhal method and total sugar estimation by the method described in laboratory manual in biochemistry(Jayaraman 1981).The reducing sugar was determined by dinitrosalicyclic acid method (Miller,1972),while non reducing sugar i.e sucrose content total amino acids was estimated by the method described by Ranganna (1979).Total phenol was estimated by the method proposed by Malik and Singh(1980),total free amino acids were estimated by the method proposed by Ranganna (1979).

Table: Physiological status of rotted bael after 12 days of inoculation period

Serial no.	Estimated content	Healthy riped fruit	Infected riped fruits
1.	Protein %	2.2750	5.1550
2.	Total free amino acid %	6.27	1.25
3.	Total sugar %	17.12	1.99
4.	Reducing sugar %	6.04	6.45
5.	Total ash %	4.23	4.00

Result :

The protein content of infected tissue is more than healthy due to the association of fungus with host tissue. The total sugar content and total free amino acid was higher in healthy tissues .There is slight increase in reducing sugar in infected tissue .Similar slight increase in reducing sugar

in apple fruit reported by Manjari etal(1980).The ash content is slightly decreased in infected tissues as compared to healthy tissues.

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GROUNDWATER QUALITY WITH SPECIAL REFERENCE TO FLUOROSIS OF GOREGAON-MANGAON CITY, DISTRICT RAIGAD, (MS) INDIA.

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Abstract :-

Raigad district of Maharashtra is famous for Rice production and Industry. Major area of the district is covered by large number of small and big Rice Production of land. Rice land use huge amount of fertilizers, which are potential, sources of fluoride. In this study, monitored the fluoride level and some other parameters of groundwater of a large area occupied by different types of small and big rice land of Raigad revenue circle.

Determination of physical parameter and chemical parameters of water Like pH, total hardness, alkalinity, TDS and fluoride content were carried out to identify the quality of the water of Mangaon and Goregaon region.

Keywords : Water quality, Groundwater, fluoride, Fluoride kit etc.

Introduction

In Goregaon -Mangaon, from ten years the percentage of rice land and Population of human being are increases, incidence of fluorosis has been raising in recent years alongside the mindless extraction of groundwater [1, 2]. Lack of rainfall has meant that the district is largely depends on groundwater, both for irrigation and drinking water requirements. Incessant digging of bore wells has given rise to sharp rise in the fluoride concentration in the ground water. Fluoride and other dissolved salts in drinking water have exceeded the safe limit in the past two decades. A high intake of fluoride (> 1.5mg/l) in drinking water over the prolonged period is known to cause damage to the enamel of the teeth, and eventually result in skeletal complications leading to fluorosis [3]. WHO

(2006) [4] has considered fluoride as one of the very few chemicals that have been shown to cause significant effects in people. There is a narrow margin between the desired and harmful doses of fluoride [5]. Low concentration of fluoride in drinking water have been considered beneficial to prevent dental carries [3], but excessive exposure to fluoride can give rise to a number of adverse effects such as causing fluorosis. WHO has set a limit value of 1.5 mg·L−1 for fluoride in drinking water [6]. This necessitates an accurate, simple, rapid and cost effective analytical method is of high importance.

Water is an essential natural resource for sustaining life and environment that we have always thought to be available in abundance and free gift of nature however chemical composition of surface or subsurface water is one of the prime factors on which the suitability of water for domestic, industrial and agriculture purpose depends. Fresh water occurs as surface water and ground water in this groundwater contributes only 0.6% of the total water resources on earth. It is major and preferred source of drinking water in rural and urban areas particularly in India. Water content many minerals like calcium, magnesium and fluoride etc. in this fluoride essential in minute quantity for normal mineralization of bone & teeth (for formation of dental enamel) [7] fluoride stimulate growth of many plant species [8] but on other hand when fluoride is taken up in excessive amount may prove toxic to plant and on feeding may toxic to animal & human as fluorosis. Fluorosis is now worldwide problem not only India. the 20 developing countries like Argentina, U.S.A., Algeria, Libya, Turkey, Iran, China, Australia, south Africa, Kenya, Iraq, Srilanka, Canada, Thailand, Newzealand, Japan, and India etc[9-14]. But in the era of economical growth groundwater is getting polluted due to urbanization & industrialization. Presence of various hazardous contaminants like fluoride, nitrate, sulfate and other heavy metals etc. in underground water has been reported from different parts of India. It is well established that India has two acute public health problem induced by utilization of groundwater as a source of drinking water having excess fluoride and arsenic though the origin of these two hazardous elements is attributed to geological reasons. In India fluoride is major inorganic pollutant which natural origin in groundwater.

In this paper, the data interpreting to fluoride concentrations in the groundwater and River water of Goregaon- Mangaon region in Maharashtra state of India has been presented.

1. Study area

Goregaon –Mangaon District Raigad is located in south western side of Maharashtra State. The District Head Quarter of Raigad District is Alibag. Raigad is situated on western coast of India and on shore of Arabian Sea. The Latitude of Raigad : 18.39 N and The Longitude of Ragad : 72.55 E. Groundwater is the source of water, used for domestic purposes. The lithology is also responsible for the quality of groundwater.

2. Material and Method:

2.1. Instruments & Chemicals

- Fluorides colour comparator: It contains a colour comparator, which has five numbers colour slots of colour, ranging from Red to yellow corresponding to the fluorides content in the water sample [15-16].
- Micro thermometer, digital pH meter, titration set etc.

2.2. Sampling

Ten drinking water samples were taken from Mangaon-Goregaon region. Good quality half litre polythene bottles were used for sample collection. Samples were collected directly in the rinsed bottles without using any preservatives, from hand tube wells, bore well, river etc. After the water samples were transported to the laboratory, fluoride analyses were performed immediately.

Figure 1 Collection of Sample from the various Areas.

2.3. Matching the colour

For matching the colour of test water with the colours on the Comparator, place the test bottle (3 ml) contain water sample with Fluoride test reagent in comparator. Hold the comparator against light, placing it between source of daylight and the observer, at his eye level. Match the colour of test water with colour on comparator. There are six numbers colour slots provided for fluorides contents corresponding to 0.0, 0.5, 1.0, 1.5, 2.0 and 2.5 ppm level as shown in Figure 2.

The Water temperature measure by micro thermometer and pH value of water sample under investigation was measured using digital pH meter. The pH meter was standardising by buffer of pH 4.0 and pH 9.2 and Alkalinity and Hardness was determined by titrimetric method.

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Figure 2 Determination of fluoride in water by using kit.

2.4. Determination of Fluoride

Take 3 cm^3 sample in a test bottle, then add 8 to 10 drop of Fluoride test reagent, shake well and place the test bottle contain water sample with Fluoride test reagent in comparator. Hold the comparator against light, placing it between source of daylight and the observer, at his eye level. Match the colour of test water with colour on comparator then record reading one by one.

Sr.no	Location & Source	Temp	pH	TDS (mg/dm3)	Alkalinity (mg/ dm3)	Fluoride (ppm/dm3)
1	Mukund nagar (Goregaon-BW)	27	6.84	200	40	0.4
2	Kumbharali (Goregaon-BW)	26	6.81	250	60	0.43
3	S.S Residency (Goregaon-BW)	27	7.04	250	50	0.47
4	Gajanan residency (Goregaon-BW)	29	6.99	190	50	0.42
5	Mangaon –Stand (BW)	28	7.00	200	40	0.52
6	Mangaon Kachery Road(BW)	28	7.01	180	50	0.67
7	MangaonVakdai nagar(BW)	27	6.9	190	40	0.79
8	Mangaon Petrol Pump(BW)	29	7.02	150	50	0.65
9	Mangaon (Kal river) (Upstream)	22	7.24	500	90	0.72
10	Goregaon (Kal river) (Downstream)	24	6.91	550	110	0.96

All Samples collected from Goregaon-Mangaon Region(*BW: Bore Well and Kal river)*

3. Results and Discussion

From the Above project various conclusions are derived by our experiences during the field work.

1. Fluoride is present in surface water as well as in subsurface water in the study area of Raigad District.
2. Fluoride is Presence due to fluoride content minerals occurring in soil and rock in the Area.
3. Fluoride generally occurs in Fertilizers and pesticides.
4. Dental Fluorosis is occurring is due to increasing percentage of the Fluoride in water.

4. Conclusion

The significance of fluoride in water has always been subject of debate. Whereas an intake fluoride is less quantity (less than 1.5 ppm) is known to be beneficial for human health in preventing dental caries high fluoride concentration in water causes dental and skeletal fluorosis, In this method determination of fluoride content was highlighted.

According to this results, Bore well and River water of Goregaon-Mangaon Region is good for drinking and domestic purpose.

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CONSERVATION PSYCHOLOGY IS AN EMERGING TREND OF PSYCHOLOGY FOR BIODIVERSITY CONSERVATION.

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Abstract :-

Environmental psychology is the study of relationship between people and their physical environments. These psychologists focus on areas such as the effect of physical environment on our emotions, the way an individual behaves towards other and the amount of stress he or she experiences in a particular settings. With the rise of the environmental movement, there was more attention to the natural environment and more acknowledgment of the ways in which human behavior has an impact on the environment. Bonnes and Bonaiuto (2002) review the development of environmental psychology from a focus on the spatial–physical environment to concern with sustainable development. From the beginning, environmental psychology has included researchers concerned with the health of the environment, and a great deal of research relevant to conservation psychology has been done by environmental psychologists. Some of the relevant psychological research has addressed the impacts of exposure to nature for individual well-being; the ways in which humans interact with nature; perceptions of nature and of environmental risks; decision-making about environmental policies; conceptions of environmental ethics; and the ways in which people's self-concepts are intertwined with the natural environment. Important psychological constructs include knowledge, behavior, values, and attitudes at the individual level; and norms, incentives, barriers, and behavior settings at the system level. Psychologists are employed by, or consult for, environmental management agencies, planning authorities, and government bodies (Reser, 2007). The field of conservation psychology arose not in response to a lack of research, but in response to a lack of visibility and identification: both psychologists and non psychologists are often unaware of the body of psychological research related to sustainability. Conservation psychology also seeks to provide a community for psychologists across all sub disciplines who want to reflect their concern for the future of the planet in their professional identity.

Key Word: - Psychology, Conservation, Environment, Biodiversity, Human behavior

Psychology is the scientific study of the behavior, especially those affecting behavior in a given context. So it helps to understand human behavior and promoting it for human welfare. Now days Psychology is defined as the scientific study of Conscious and unconscious stages. With same principal following branches of psychology works

Biopsychology is a branch of psychology that studies the biological bases at behavior. These psychologists specialize in a wide range at topic that focus on the operation of brain and nervous system.

Environmental psychology is the study of relationship between people and their physical environments. These psychologists focus on areas such as the effect of physical environment on our emotions, the way an individual behaves towards other and the amount of stress he or she experiences in a particular settings.

Along with these one more branch of psychology called conservation psychology is worked in field of environment conservation, the goal of it is not only to understand the interdependence between humans and nature but to promote a healthy and sustainable relationship. The explicit value basis of conservation psychology is unfamiliar to some scientists, who would prefer to simply describe behavior rather than take a stance with a prescriptive component (Crosby et al., 2004). But psychology already has a clear value basis: the goal of promoting human well-being. If choosing research questions with an eye to their relevance compromises the integrity of one's results then all of medical research would be suspect. Weak or inappropriate methodology and non-vigilant thinking are the real threats. There is wide consensus about the value of the natural environment, but not always about the need for change or the direction of change in order to promote sustainability. Conservation psychology seeks to direct rigorous research toward the goal of sustainability, and to rely on the results of that research to make recommendations about specific techniques.

The objectives of studying psychology for biodiversity conservation are as follows

1. To understand human behavior
2. To find out reasons behind human behavior
3. To predict human behavior
4. To control the human behavior
5. To change the behavior and mental processes through the use of scientific methods.

Understanding human behavior means, in part, understanding how individuals are affected by the setting in which they find themselves. This includes the natural environment and changes in that environment due to things like climate change, overpopulation, and the loss of wild landscapes.

Environmental issues are social issues as well, and socially-constructed perceptions of environmental change have an impact on human social behavior. It is also important to understand why people spend so much time and money interacting with aspects of the natural environment; indeed, a significant proportion of human behavior occurs in a setting that, if not directly in nature, invokes nature through windows, pictures, or potted plants.

Promoting human welfare requires awareness of how intimately connected it is to the natural environment. It is well known that environmental toxins can have direct impacts on human health. Less visible are the possible effects on mental functioning. There is a large body of research documenting the detrimental effects of lead, mercury, and polychlorinated biphenyls (PCBs) on cognitive functioning and sometimes social behavior (Moore, 2003). Less directly, environmental problems will ultimately affect the well-being of everyone on the planet: global warming and overcrowding affect social behavior and intergroup conflict; opportunities for interaction with animals and nature affect emotional well-being and stress reduction. The goal of sustainability articulated by the World Commission of Economic Development (WECD) report in 1987 explicitly linked the two goals of environmental health and human development, including attention to human as well as environmental welfare.

Saunders (2003) and Mascia (2003) articulate a set of areas for conservation psychology research that reflect psychological knowledge and our complex definition of care. Saunders argued that conservation psychology should address (i) how humans care about nature, and (ii) how humans behave toward nature. Mascia added the cognitive component, (iii) how humans develop beliefs and knowledge about nature. He also recognized that humans function within a social context by adding two more foci: (iv) human-to-human relationships that are relevant to conservation, and (v) the relationships between humans and social institutions.

Conservation psychology is the study of the reciprocal relationships between humans and environment, with a focus on how to encourage conservation of nature and biodiversity. It is applied branch of psychology that uses psychological principles, theories, or methods to understand and solve issues related to human aspects of conservation.
In addition to being a field of study, conservation psychology is also the actual network of researchers and environment worker who work together to understand and promote a sustainable and harmonious relationship between people and the natural environment. In conservation psychology there are two broad outcome areas:

- Behavior of people toward nature (with the aim of creating positive behavior change at

different levels and sustainable relationships)

- Way people for care and value of nature (with the aim of creating harmonious relationships in environmental component and an environmental ethic)

Same that of conservation biology the conservation psychology also has a strong focus related to biodiversity conservation and environmental sustainability. Conservation psychology includes studies of human relationships with plants and animals, care about the nature, the development of an environmental identity, empathy, relationships between environmental sustainability and nature with psychological view, significant life experiences as precursor of environmental concern, development of a sense care, moral reasoning in relation to the natural environment, problems resolution, the significance of direct nature experiences, environmental attitudes , values, beliefs, and behaviors.

As human being is consider as main threat to environment and most of the environmental problems are caused by human behaviors, human behavioral changes are necessary to conserve and protect nature. Psychologists have much to offer in terms of understanding human-nature experiences and what motivates people to protect such relationships. Conservation psychology closely link with environmental psychology, as well as other sub-disciplines of psychology, but it is distinctive in its focus on the natural environment and its explicit outcome orientation. Like conservation biology, conservation psychology has a strong mission of biodiversity conservation and environmental sustainability.

Conservation psychology helps to analyze the Role of Humans in Nature, Environmental Attitudes, Parameters of Environmental Assessment, Restorative Effects of Nature, Environmental Perception and Environmental Cognition which provides solution for following environmental problems,

- Effects of Noise pollution
- Effect of Weather and Climate
    - On Temperatures and Behavior
    - On Wind and Behavior
    - On Barometric Pressure and Altitude
- Global warming
- Natural Disasters like flood, earthquakes
- Effects of Toxic substances
- Air Pollution and its impact on Behavior

- Management of Natural resourses
- Make awareness among the people
- Policies to Encourage Environmentally friendly Behavior in society

Thus with conservation psychology one can understand of human-animal relationships, empathy, how responsibility and care about environment develops, the formation of an environmental identity of nature, relationships between a psychology with nature and environmental sustainability, understanding the experiences related with environmental problems, development of a sense of place to protect biodiversity, moral reasoning for the natural environment, risk perception, conflict resolution, the significance of direct nature experiences, and environmental attitudes, beliefs, values, and behaviors. Keeping all these objectives and goals we can say that conservation psychology is an emerging trend of psychology for biodiversity conservation.

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THE EFFECTS OF BOATING AND WATERSPORTS ON BIRDS OF GANGAPUR DAM, NASIK, MAHARASHTRA

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Abstract:

Gangapur grassland ecosystem is famous for its birdlife. It comes under an important area. It has being proposed by government to develop various recreational activities near the gangapur dam. Human disturbances to wildlife are growing concern. Past studies have showed that recreational activities has affected the breeding in animals, also the nesting behaviour in birds. The following study suggests simple measures to control human disturbance and human behavior would reduce impact of recreational activities on birdlife.

Key words : recreational activities, birdlife

Introduction

Gangapur Dam is situated 16 kms west from Nashik city. It is the main catchment area for drinking water supplied to Nashik city. Surrounding the water body are undulating grasslands .There are also parches of semi ploughed and ploughed fields where crops have been harvested. Crops such as 1- Wheat, 2- Harbara 3- Jawhar are grown and harvested seasonally. Also vegetables such as tomato, brinjal, chilli etc are grown.

Gangapur dam is sorrounded by grasslands, around 20,000 gather during winter in this area. ABirdlife is very rich in this area and certain RDB (Red data book) species have also been sighted. Gangapur grasslands comes under IBA (Important bird areas) under BNHS. Bombay Natural History Society (BNHS) – organization which works for conservation of Nature since 1883. This site falls in Biome-11 (Indo-Malayan Tropical Dry Zone). The Birdlife International (undated) listed 59 species in this biome.

Few of the bird species found are Oriental White-backed Vulture *Gyps bengalensis* ,Long-billed Vulture *Gyps indicus,* Lesser Florican *Sypheotides indica,* Lesser White-fronted Goose *Anser erythropus,*Eastern Imperial Eagle *Aquila heliaca,*Lesser Kestrel *Falco naumann,* Common Pochard *Aythya ferina,* Blue-winged Teal *Anas querquedul,* Northern Pintail *Anas acuta*, Gadwall *Anas*

strepera and Northern Shoveller *Anas clypeata,* Cormorant *Phalacrocorax niger* and Median Cormorant *P.fuscicollis.* The most interesting sighting is of the globally threatened Lesser Florican *Sypheotides indica* in the Gangapur grasslands.

Importance of Birds

Birds play important role in nature. Here are few important roles bird play:-

Birds as agent of dispersal

Birds play important role as seed dispersal and is very well documented.The bird abundance and the seed dispersal are strongly correlated. Seed dispersal and seed establishment help in restore the various plant communities. This will help in protecting the different floristic plant species, maintaining the floristic composition and ecosystem structure. Also few of the wading birds help in fish egg dispersal; fish eggs get stuck on their legs which help in dispersal of fish egg and relocate the fish species to different part of water body.

Birds as Biological Control :-

Many of the birds are insect feeders. Birds feed their young ones with the larval and adult stage of insects. Also many insects act as vectors to number of diseases like mosquito causes malaria. If the bird population is reduced the pest population will increase leading to increase in the vector population and damage to agricultural crops.

Birds as Bioindicator

Monitoring helps us to provide information for ecological assessment, which can provide early warning of changes that could negatively affect species or ecosystems. Many waterbirds are chosen to act as bioindicators. Several studies show that waterbirds may be used as bioindicators of conditions encountered in wetlands, at both local and regional spatial scales. Waterbirds are used as bioindicators recently in 10 years. Different parts of birds can be used to investigate the heavy metal pollution of wetland systems. Waterbirds has shown to track environmental variations at both species, trophic and community level.

Birds as aesthetic value to nature

Birds are considered are symbol of freedom strength. The beautiful colorations and sound of birds has always attracted the humans to birds. Many birds like eagle inspire us. Since ancient times the birds were used as messenger. Birds have significance in myths, legend, symbols and ceremonies in many tribal cultures around the world.

Governmental Proposal for development of water sports & Boating

GOVERNMENT OF MAHARASHTRA
WATER RESOURCES DEPARTMENT
B - 1 TENDER DOCUMENT
VOLUME - I
Name of Work :-
Construction Entrance Canopy Building J.T. Building, Maintenance Shed, Electric & Telephone arrangement works Inspection Chowki No. 1 & 2, Widening Of Approach Road, Compound Wall, Site Development Work, S.T.P. Line, Approach Road Parking Area, Toilet Block, Administrative Building & Amphitheatre For Boat Club @ GangapurDam.Dist.Nashik
Estimated Cost :- 6,27,19,329/-
Tender Amount :- 6,27,19,329/-
CHIEF ENGINEER
NORTH MAHARASHTRA REGION, (W. R. D.), NASHIK
SUPERINTENDING ENGINEER & ADMINISTRATOR,
COMMAND AREA DEVELOPMENT AUTHORITY, NASHIK
EXECUTIVE ENGINEER
NASHIK IRRIGATION DIVISION, NASHIK

Impact of recreational activities on birds

The human activities, disturbances by the noise of crafts, movement of the crafts in the water bodies and the water pollution due to oil spill in the water bodies could possibly lead to change in behavior, breeding, and nesting habits of birds.

Studies have shown that human disturbances would effect on breeding of waterfowl which include several components of reproduction, declining numbers of breeding pairs, increased desertion of nests, reduced hatching success, and decreased duckling survival. Human disturbance would lead to change food habits of water birds, feed only at night, lose weight, or desert the feeding area.

Waterbirds and migratory birds might respond to loud noises and rapid movements, such as boats powered by outboard motors, and to visible features, sailboats.

Boats would interact with the aquatic vegetation producing wave movement, turbulence from the propulsion system. Waterboats would also emit gases and also lead to oil spills in the water body. This would lead to water pollution. This will have multiple effects on birds population and nesting behavior.

Policy implications

A number of effects of boating activities on wildlife have so far been identified.So steps should be taken to reduce the impact of human and water sports on birds. We cannot stop the development but we can try to reduce the impact of development on birds and bird habitat.

Following are few of the suggestion which would help in reducing the effects of water sports on birds

1. Particular number of people should be allowed to visit the area.
2. Limiting in number of people who want to enjoy the watersports.
3. Zonation should be made where human activities should be not allowed.
4. Employees with good knowledge of environment and having aesthetic sense and environmental ethics should be employed.
5. Sailing boats instead of motors boats can be used.
6. Proper check on garbage disposal specially plastic should be done.

   Evaluation should be done which factors cause maximum disturbances to birds.

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EFFECTIVENESS OF FUNGICIDE AGAINST ALTERNARIA AND ITS EFFECT ON BIODIVERSITY.

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Abstract :

Alternaria species infect the various crops belonging to several families and reduce yield both qualitatively and quantitatively. There are several methods which are being employed to control this group of fungi like application of chemical fungicide, herbal extract and natural product, by seed treatment, use of resistant varieties, biological control agents and other methods. One of the most effective measures to control the disease caused by Alternaria is the application of fungicides. So the number of new chemicals are evaluated and use to control disease but these chemical fungicides causes serious health hazards to human beings ,cause environmental pollution and they affect on biodiversity. Hence, now a days use of other methods of disease control is necessary because they are more economical, eco-friendly,safe and no adverse effect on biodiversity.

Key word - Alternaria, fungicide, Biodiversity.

Introduction :

A number of *Alternaria* species infect the various crops belonging to several families and reduce yield both qualitatively and quantitatively.

Genus *Alternaria*

The genus *Alternaria* was first recognised by Nees in 1817 [8]. *Alternaria* belongs to the sub-division Deuteromycotina, class Hyphomycetes, family Dematiaceae. Species of the genus are cosmopolitan, surviving both as saprophytes as well as weak parasites. Among the different diseases caused by the genus *Alternaria*, blight disease is one of the most dominant one that causes average

yield loss in the range of 32-57% (Conn and Tewari, 1990). In several cases, small dark coloured spots are also formed on pods and tender twigs (Valkonen and Koponen, 1990). A comprehensive, comparative account of morphological differentiation of different Alternaria species occurring on cucurbitaceous, brassicaceous and solanaceous crops are described by Narain et.al[7] (2003), Khalid et.al .[5] (2004) and Deshwal [2] (2004).

Management of diseases caused by *Alternaria*

There are several methods which are being employed for management of *Alternaria* disease like application of chemical fungicide, herbal extract and natural product, by seed treatment, use of resistant varieties, biological control agents and other methods but Chemical control is an important tool in the prevention and control of crop diseases.

By Chemical Fungicides

They are most effective when applied before infection because new plant growth is vulnerable to infection and fungicides must be reapplied at regular intervals during the period of pathogen activity in order to keep plants adequately protected. Fungicides can be broadly grouped based on their mode of action , general use and chemical composition.

Thiram (75%) proved as the most effective fungicide at 5000 ppm while complete inhibition of *Alternaria* was noticed at 10,000 ppm in the case of Thiram (TMTD 80%) and Arasan 50% (Sahni and Singh, 1967). Fugro et.al. [3] evaluated some fungicides for disease control and found that Dithane M-45 was significantly superior to others against A. cucumerina causing leaf blight of watermelon. It was followed by Bavistin, Dithane ,Z-78, Difoltan, Blitox and Bordeaux mixture. For the control of *Alternaria* blight of cauliflower, Captafol was found best followed by Dithane M-45 to provide maximum yield [13] Mancozeb (0.2%) was found most effective for inhibiting the mycelial growth of A. solani [1] .The effectiveness of mancozeb in controlling early blight of tomato was confirmed by Singh et.al. [12] . Among non-systemic fungicides Iprodione and mancozeb and among systemic fungicides thiophanate methyl was found to be effective under in vitro conditions by Prasad & Naik [9] . Sarkar and Chaudhary [10] observed that when polyram was applied thrice @ 2.5kg/ha at 15 days intervals it was significantly superior than the Captan 50% SP and Mancozeb 75%WP, in reducing early blight of tomato caused by A. solani and also in increasing the yield. Tiwari et.al. [15]found that mancozeb was more economical when sprayed twice rather than once and thrice. Thippeswamy et. al. [14] reported that mancozeb, carbendazin and captaf were most effective against A. solani which infected brinjal. Sidlauskiene et.al.Kamalet.al. [4] found that

Alternaria blight and *Alternaria* fruit rot of tomato were lower when foliar spray was done with Indofil M-45, with disease incidence of 1.7% and 4.0%, respectively. [11] found that Amistar was very effective in controlling *Alternaria* leaf spot in cucumber, cabbage and tomato, as it reduces the disease incidence by 88-93% where as Euparen + Bion were found to increase biological efficiency. Kumar et.al. [6] tested 17 fungicides in vitro against A. brassicae,incitant of *Alternaria* blight of radish, out of which Iprodione, Mancozeb, Achook, Ridomil-MZ, Ziram and Captan proved to be most effective as they inhibited growth of fungus completely, followed by Blitox-50 which caused 95.27% inhibition.

By seed treatment

This method is an effective measure in controlling *Alternaria* diseases as it helps in reducing primary inoculums. The hot water treatment of seeds at 50°C for 30 min to control *Alternaria* diseases in cabbage was recommended by Walker (1952) while Ellis (1968) recommended same temperature for 25 min to eliminate *Alternaria* infection from Brassicaceae seeds.

By disease resistant varieties

With the release of various disease resistant varieties, the in-built resistance is increased and it becomes economical for the farmers making it effective throughout the life. For example, *Cucumis melo* line MR-1 is resistant to *A. cucumerina* (Thomas *et al.*, 1990),

By bio-control agents

Various bacteria and actinomycetes shows antagonistic properties and they have no hazardous effects on biodiversity so they are used to control Alternaria. The antagonists like *Chaetomium globosum*, *Trichoderma harzianum*, *T. koningii* and *Fusarium* spp. effectively controlled seed-borne *A. raphani* and *A. brassicicola* in radish (Vananacci and Harman, 1987) Effective inhibition of mycelial growth of *A. solani* causing leaf blight of tomato by *Bacillus subtilis* and *Trichoderma viridae* has also been reported (Babu *et al.*, *Mamgain et al.*2000).

By herbal extracts and natural products

The use of various herbal extracts and natural products is increasing because these cause no harmful effect on biodiversity like a chemical fungicide. The neem leaf extract showed high efficacy to inhibit the radial growth of *A. solani* (43.3 and 26.7% at 0.1% and 0.01%, respectively) (Sharma *et al.*, 2007). The extracts of *Canna indica*, *Convolvulus arvensis*, *Ipomoea palmata*, *Cenchrus catharticus*, *Mentha piperita*, *Prosopsis spicigera*, *Allium cepa*, *A. sativum*, *Lawsonia inermis*,

Argemone mexicana, *Datura stramonium* and *Clerodendron inerme* completely inhibited the spore germination of *A. brassicae* isolated from leaves of cauliflower (Sheikh and Agnihotri, 1972).

By other methods

Several other methods can also be employed which would help to control disease caused by *Alternaria* species. Gomez-Rodriguez *et al.* (2003) found that intercropping of tomato with marigold (*Tagetes erecta* L.) induced a significant reduction in early blight caused by *A. solani*.

Conclusion

From the above study it is concluded that the *Alternaria* is a very destructive fungus for crops, but by using advanced techniques it becomes easier to control this cosmopolitan fungus. One of the most commonly used method is the use of chemical fungicides, but these fungicides causes serious health hazards to human beings, they cause environmental pollution and affect on biodiversity. Hence, now a days use of alternative methods for disease control is needed to reduce the effect of chemicals on biodiversty such as growing disease resistant varieties, use of herbal extract and natural products, use of bio-control agents, by seed treatment or other methods because they are more economical, eco-friendly and safe to the biodiversity.

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IMPACT OF INDUSTRIALISATION ON ENVIRONMENT

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Abstract :

Nasik is one of the major industrial cities. Many a times, industries don't follow the norms which result in polluting the environment may be that is why Nasik stands 45th among 88 cities in the country, and is 6th in the state as per state pollution control board. Only because industries donot follow the norms it leads to increase in pollution and affects environment badly.

INDIA- A developing nation…

A prosperous nation needs well developed industries to provide the amenities of life to its citizens. At present Indian economy is the 10th largest economy in the world and one of the major reasons for its development indeed goes to industrialization.

Five Year Plans of India-

Five-Year Plans (FYPs) are centralized and integrated national economicprograms.After independence, India launched its First FYP in 1951, under socialistinfluence of first Prime Minister Jawaharlal Nehru. The process began with setting up ofPlanning Commission in March 1950 in pursuance of declared objectives of theGovernment to promote a rapid rise in the standard of living of the people by efficientexploitation of the resources of the country, increasing production and offeringopportunities to all for employment in the service of the community.

2nd Five Year Plan basically focused on rapid industrialization- heavy & basicindustries were planned to be established and to be developed.More or less every five year plan focused on industrialization. It was the 8th Five Year Plan which was introduced when our economy was facing major economic crises which gave 3 keys words namely Industrialization, Privatization and Globalization.

Industrialization and its growth-

When India became independent, very few industries existed in the country like textiles and sugar. Industry contributed only ten percent to the national income in 1950-51, while agriculture had

a share of fifty-two percent. At present the agriculture share has decreased whereas the share of the industry has gone up since independence. Industrial growth is the need of the hour.

Maharashtra- Nashik

Maharashtra is India's leading industrial state. Almost 46% of the GSDP is contributed by industries in Maharashtra.

Nasik – An industrial Zone

Nasik is one of the major industrial cities. There are nearly 15,000 commercial units across the six industrial areas in Nasik- Satpur, Ambad, Sinner, Dindori, Vinchur and Peth. While majorities are micro, small and medium enterprises, there are nearly 200 large scale projects as well. Together, these provide employment to about 1, 50,000 people.

Every company or business usually starts out with its own set agenda, which differs from business to business. A lot of businesses exist simply to make money, but at the same time these companies should not forget that they have certain responsibility towards the environment

Pollution Control Act-

The responsibility of industries towards its environment is of utmost importance. Industries should strictly follow applicable government regulation on pollution control. For the same purpose a uniform law all over the country came in existence called Pollution Control Act. The purpose of this Act is to protect the outdoor environment against pollution and to reduce existing pollution, to reduce quantity of waste and to promote better waste management.

Impact of Industrialization on Environment in Nasik-

Many a times, industries don't follow the norms which result in polluting the environment may be that is why Nasik stands *45th among 88 cities in the country*, and is *6thin the state as per state* pollution control board.

Pollution perhaps is the number one problem bothering almost everyone today. Nasik is turned out to be *sixth most polluted city in Maharashtra and is mostly polluted by industrial pollution*. Though Pollution Control Act came in 1977 but to what extent are the industries actually following the norms of the act is a big question in front of us.

As industries are accountable for profit, they are also accountable for maintaining the environment healthy, for which they should abide by the norms, laid down in the Pollution Control Act and should use security measures to reduce pollution.

NEGATIVE EFFECTS -

1. Many a time's industries don't abide by the law which has resulted into making Nasik city from heaven of Maharashtra to the 6th most polluted city in the state. Date:Sep 1, 2012.The plastic and food processing factories don't have proper effluent treatment system. TheMaharastra Pollution Control Board (MPCB) has issued show cause notices to 11 plastic and food processing factories in Nasik for polluting the Godavari river. The industries were found releasing their untreated effluent into the river and have been given 15 days to respond. These factories have been charged with violating Section 33 (A) of the Water Pollution (Prevention and Control) Act of 1974. The show cause notices were issued on August 29 after MPCB visited the area. The factories were releasing effluents into the river along the Tigrania road in Tapovan. Repeat offenders Earlier in July, MPCB had inspected 40 factories in the same area and found 11 of these functioning without consent to operate. Consent from the respective state pollution control board is mandatory for any factory to operate in the country. On July 25, too, MPCB had issued show cause notices to these 11 factories.
2. Facts say that the Godavari River is the second largest river in India, which originates from Trimbakeswar, Nasik, is mostly polluted by industrial pollution. Recently, notices were issued to more than 15companies (11 plastic and food Processing Factories and 04 others) to close down for defying pollution control norms. These companies have not installed machinery to control water pollution. A continuous review of Maharashtra Pollution Control Board has shown that more than 61 industries of Nasik either were releasing their untreated effluent into the river or were functioning without the consent.
3. As industries are accountable for profit, they are also accountable for maintaining the environment healthy, for which they should abide by the norms, laid down in the Pollution Control Act-1977 and should use security measures to reduce pollution. Having many temples and pilgrimage sites, Nasik is known to be a holy city in India where Kumbha- Mela is held and this event is going to happen in near future wherein lacks of pilgrims would use this river Godavari water as holy water, which may endanger their lives.

Suggestions -

1. The proper treatment should be given to the sewage and industrial effluents of Nashik city properly before discharging it into the river so as to reduce pollution load of the Godavari

river water. NMC should ensure the availability and efficiency of existing sewage treatment plants.

2. All the industries should abide Pollution Control Act.

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1. *http/business.outlookindia.com:* Maharashtra is India's leading industrial state. Almost 46% of the GSDP is contributed by industries in Maharashtra. Nasik is one of the major industrial cities. There are nearly 15,000 commercial units across the six industrial areas in Nasik-Satpur, Ambad, Sinner, Dindori, Vinchur and Peth. While majorities are micro, small and medium enterprises, there are nearly 200 large scale projects as well. Together, these provide employment to about 1, 50,000 people.
2. www.times- April 23, 2012 & October 12, 2012- The Godavari River is the second largest river in India, which originates from Trimbakeswar, Nasik, is mostly polluted by industrial pollution.
3. www.times-September1,2012- Show cause notices were given to 11 factories of nasik for polluting the river Godavari. In one of the resent survey it was found that Nasik is the 6th most polluted city in Maharashtra.

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CROP DAMAGE DUE TO CLIMATIC CHANGE: A MAJOR CONSTRAINT OF ONION FARMING IN CHANDWAD AND YEOLA TAHSIL. (NASHIK)

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ABSTRACT

India is the second largest producer of onion in the world, but far behind of many countries in terms of productivity onion is among the most important horticultural crops grown worldwide for its culinary preparations and spicing food dishes. Besides being used as condiments, the medicinal properties of onion add value to its importance. Maharashtra is a pioneer state in onion production contributing 25% of country's onion. To ascertain reasons for low productivity of onion, it was thought imperative to find out the constraints faced by farmers in respect of onion production. The data has been collected from total 100 farmers, 10 each from 10 villages from Chandwad and Yeola tahsils. It was found from the study that crop damage due to erratic rainfall at the time of harvesting of kharif onion and nursery preparation of Rabi onion was the major constraint faced by 73% farmers. In the year 2010, monsoon was delayed by one month and afterwards there was continuous rainfall till November and 200-300 mm rainfall was recorded in onion growing states in the month of Oct-Nov which was unusual. In November, there were unseasonal heavy rains in many onion growing pockets of Maharashtra, which caused damage to onion crop in different stages. The erratic and untimely rains damaged the kharif, late kharif crop as well as rabi onion nursery. The kharif onion ready for harvest was affected by 30-

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40%, late kharif which was planted in Sept-Oct got affected by 15-20% and rabi nursery damaged by 20-25%. It has been observed that the kharif crop planted in flat beds, which is a regular practice by farmers, gets affected by Anthracnose disease due to water stagnation. Bulb development was affected due to soil borne diseases like bulb rot, besides foliage damage by Colletotrichum. There is need for mass demonstrations of DOGR developed techniques of planting seedlings on raised bed (BBF) and irrigation through drip or sprinkler.

Key words : Constraints; Climatic change; Onion production; Crop damage;

India is the second largest onion producer after China in the world, but far behind of many countries in terms of productivity. The productivity of onion (16 t/ ha) is low as compared to USA (49 t/ha), Netherlands (35 t/ha) and China (22 t/ha). Maharashtra is leading state in area, production, productivity and export of onion. It is a pioneer state in onion production contributing 25% of country's onion. 90% of export augmented from Maharashtra alone amounting to Rs. 800-900 crores. The districts like Nashik, Pune, Ahmednagar, Satara, Solapur, Dhule, Nandurbar, Usmanabad, Aurangabad and Buldhana are leading in onion production. The rural people in these districts of Maharashtra are mainly engaged in onion farming which is the major source of their income. The rapidly changing global market economy, urbanization and growing need for value added products gradually changing subsistent agriculture to commercial agriculture. Extensive variability in quantity and distribution of rainfall causes severe crop damages and economic losses to farmers.

OBJECTIVES –

To study the climate changed impact on an onion farming in study region.

METHODOLOGY

The chandwad and Yeola two tahsils of Nashik districts were selected for the study. Five villages were randomly selected from each tahsils. Ten farmers from each village were selected for the study on the basis of randomized sampling method. Questionnaire schedule has been developed by taking experts' views into consideration. The data has been collected with the help of pre-tested interview schedule from total 100 farmers, 10 each from 10 villages viz, Nimbale, Usavad, Daregaon, Vaki (B) and Dugaon from Chandwad and Nilkhede, Patoda, Andarsul, katarani and Deshmane from Yeola tahsil. Respondents were interviewed personally in their respective villages. The collected data was tabulated, statistical tools were applied, and interpretations were made in the

light of objectives.

RESULTS AND DISCUSSION

It was revealed from findings (Table 1) that crop damage due to erratic rainfall was the top most problem faced by 76% farmers in chandwad tahsil. Other important constraints faced by onion growing farmers were labour shortage at the time of transplanting (74%), spurious seed supply from various companies (70%), lack of scientific knowledge of farmers (66%), and inability of farmers in maintaining isolation distance during seed production (58%).

Table 1. Constraints in onion production and post harvest management in chandwad tahsil

Sr. No.	Constraints	Freq. (N=50)	%	Rank
1	Inability to maintain isolation distance during seed production	29	58	V
2	Spurious seed supply from seed companies	35	70	III
3	Weed problem	26	52	VI
4	Labour shortage at the time of transplanting	37	74	II
5	Fertilizer shortage	16	32	X
6	Unavailability of insecticides, pesticides and herbicides in time	9	18	XIII
7	Unable to control pest and diseases	17	34	IX
8	Lack of scientific knowledge about field operations	33	66	IV
9	Crop damage due to erratic rainfall	38	76	I
10	Non scientific way of grading and packaging	7	14	XIV
11	Non scientific storage structure	19	38	VIII
12	More cost involved in transportation	10	20	XII
13	Market price fluctuation	22	44	VII
14	Less marketable share due to bolters, twin bulbs, etc	19	38	VIII
15	Competition in the market	12	24	XI

Source : Tabulated by Researcher

It was observed from findings (Table 2) that heavy rainfall at the time of harvesting of kharif onion and nursery preparation of rabi onion causes crop damage was the major constraint faced by 70% farmers of Yeola tahsil. The problems like labour shortage (68%), supply of spurious seed (66%), poor scientific knowledge of farmers about field operations (62%) and their inability in maintaining isolation distance while seed production (46%) were the other important constraints.

Table 2. Constraints in onion production and post harvest management in Yeola tahsil

Sr. No.	Constraints	Freq. (N=50)	%	Rank
1	Inability to maintain isolation distance during seed production	23	46	V
2	Spurious seed supply from seed companies	33	66	III
3	Weed problem	20	40	VI
4	Labour shortage at the time of transplanting	34	68	II
5	Fertilizer shortage	11	22	X
6	Unavailability of insecticides, pesticides & herbicides in time	7	14	XIII
7	Unable to control pest and diseases	11	22	X
8	Lack of scientific knowledge about field operations	31	62	IV
9	Crop damage due to erratic rainfall	35	70	I
10	Non scientific way of grading and packaging	5	10	XIV
11	Non scientific storage structure	14	28	VIII
12	More cost involved in transportation	8	16	XII
13	Market price fluctuation	19	38	VII
14	Less marketable share due to bolters, twin bulbs, etc	13	26	VIII
15	Competition in the market	9	18	XI

Source: Tabulated by Researcher

It was found from the study (Table 3) that crop damage due to erratic rainfall at the time of harvesting of kharif onion and nursery preparation of rabi onion was the major constraint faced by 73% farmers. Labour shortage at the time of transplanting (71%), spurious seed supply from seed companies (68%), lack of farmers' scientific knowhow about field operations (64%) and inability to maintain isolation distance during seed production (52%), etc were also the important constraints faced by the farmers. Beside these, weed problem (46%), market price fluctuation (41%), non scientific storage structure (33%), less marketable share from produce (32%), inability to control pest and diseases (28%), fertilizer shortage (27%), competition in the market (21%), more cost involved in transportation (18%), unavailability of pesticides in time (16%), and non scientific way of grading and packaging (12%) were the other constraints faced by them.

Table 3. Overall Constraints in onion production and post harvest management (N=100)

Sr. No.	Constraints	Percentage (%)	Rank
1	Inability to maintain isolation distance during seed production	52	V
2	Spurious seed supply from seed companies	68	III
3	Weed problem	46	VI
4	Labour shortage at the time of transplanting	71	II
5	Fertilizer shortage	27	XI
6	Unavailability of insecticides, pesticides and herbicides in time	16	XIV
7	Unable to control pest and diseases	28	X
8	Lack of scientific knowledge about field operations	64	IV
9	Crop damage due to erratic rainfall	73	I
10	Non scientific way of grading and packaging	12	XV
11	Non scientific storage structure	33	VIII
12	More cost involved in transportation	18	XIII
13	Market price fluctuation	41	VII
14	Less marketable share due to bolters, twin bulbs, etc	32	IX
15	Competition in the market	21	XII

Source: Tabulated by Researcher

June to December is the production period for kharif onion, planting of seedlings of late kharif crop and raising nursery for rabi season. In the year 2010, monsoon was delayed by one month and afterwards there was continuous rainfall till November and 200- 300 mm rainfall was recorded in onion growing states in the month of Oct-Nov which was unusual. In November, there were unseasonal heavy rains in many onion growing pockets of Maharashtra, which caused damage to onion crop in different stages. The erratic and untimely rains damaged the kharif, late kharif crop as well as rabi onion nursery. The kharif onion ready for harvest was affected by 30-40%, late kharif which was planted in Sept-Oct got affected by 15-20% and rabi nursery damaged by 20-25% (NHRDF, 2010). Sowing of rabi nursery also got delayed in Maharashtra. It has been observed that the kharif crop planted in flat beds, which is a regular practice by farmers, gets affected by Anthracnose disease due to water stagnation. Bulb development was affected due to soil borne diseases like bulb rot, besides foliage damage by Colletotrichum. Knowing this critical production gap, DOGR developed techniques of planting seedlings on raised bed (BBF) and irrigation through drip or sprinkler. Many farmers are adopting this practice and enhancing their onion productivity.

Gadge, et.al. (2011) found cases of 10-12 tons/ha yield in flat bed, while 20-25 tons/ha was observed in the field of farmers who planted seedlings on raised beds and used micro-irrigation as per DOGR recommendation under same rainfall pattern.

Adaptation Measures for Climate Change in Onion Farming:

- Agronomic management of date of planting to escape periods of high rainfall.
- Planting on broad bed furrow (BBF) instead of traditional flat beds may reduce losses from flooding in kharif season.
- BBF planting coupled with drip irrigation can help to overcome drought and salinity conditions.
- Irrigation by micro-sprinklers can avert the micro temperature in summer season by reducing effect of high temperature on bulb development.
- Integrated pest management system control measures to the observed problem and also take a range of influencing factors including weather into account to cut cost on pesticides.
- Introduction of water saving techniques such as irrigation coupled with fertigation. Studies showed savings of 40% water, 30% labour, 30% nitrogen with yield increase of 15% by drip irrigation (NRCOG, 2003).
- Mulching with organic waste and bicolour polythene not only conserves moisture but control weed population and maintain soil temperature.

CONCLUSION

It was inferred from the study that crop damage due to erratic rainfall at the time of harvesting of kharif onion and nursery preparation of rabi onion was the major constraint faced by 73% farmers. Agricultural/ horticultural output gets directly or indirectly affected due to change in rainfall pattern. Aberrant weather conditions have always been unpredictable and often impairing realizable crop yields. Extensive rainfall, cloudy weather in kharif and late kharif season reduce crop yield up to 60-70%. The soil-borne and fungal disease build-up is very high during kharif season. Excess rainfall associated with poor drainage enhances soil- borne diseases. Developing varieties resistant/tolerant to aberrant weather conditions would be crucial in future. Innovative agronomic practices, viz., raised bed planting; micro-irrigation, fertigation, mulching, etc are possible adaptation measures to climate change in onion. There is need for mass demonstrations of these technologies by development departments to increase yield level of onion crop even in adverse climatic conditions.

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CHEMICALS USE IN AGRICULTURE: BENEFITS AND HAZARDS

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ABSTRACT

Agriculture was developed to produce crops and livestock for human consumption. As the human population increases, the amount of food produced is very important. Many crops each year are destroyed by agricultural pests, which results in an economic loss every year. Due to this high loss in food production, some chemicals are often used to try to combat the problem. More commonly the chemicals uses in agriculture are pesticides and inorganic fertilizers. These chemicals are used to increase the crop production to meet the demand of growing population. If the farmers continued to use 1950's technology, they would have to plant 10 million square miles of additional land to generate the food that is produces today. In addition, agricultural chemicals are used because they produce certain effects with less effort. Many of these chemicals are hazardous and present risks to human and animal health, the environment and trade if not used correctly. The production of pesticides started in India in 1952 with the establishment of a plant for the production of BHC near Calcutta, and India is now the second largest manufacturer of pesticides in Asia after China and ranks twelfth globally. In India 65% of the pesticide used is insecticide, as against 44% globally. The main use of pesticides in India is for cotton crops (45%), followed by paddy and wheat. Crop protection products contribute to the production of a stable and predictable supply of high quality, affordable food. They will also help to adapt the challenges of climate change by enabling farmers and energy producers to secure maximum outputs from the land we have available. Pesticides help to preserve the integrity of the natural environment by ensuring that we get maximum production from existing farmland leaving more land available for wildlife. Although there are benefits to the use of pesticides, there have also been many problems associated with their use. In India the first report of poisoning due to pesticides was from Kerala in 1958, where over 100 people died after consuming wheat flour contaminated with

parathion. Pesticides can reach surface water through runoff from treated plant and soil. Most common herbicides: 2,4-D, diuron, prometon Insecticides: diazinon, chlorpyrifos. In India, 58% of drinking samples drawn from various hand pumps and wells around Bhopal were contaminated with organo chlorine pesticides above the EPA standards. The hydrophobic, persistent and bioaccumulable pesticides are strongly bound to soil, include endosulfan, endrin, DDT, lindane and heptachlor. Triclopyr herbicide inhibits soil bacteria that transform ammonia into nitrite. Glyphosate reduces the growth and activity of free-living nitrogen fixing bacteria. 2,4-D reduces N fixation by the bacteria. Although the fertilizers are use to increase the crop production, they have some advantages and disadvantages. Formulation are blended with accuracy, that you can buy different blends for different types of plants. These nutrient-rich salts dissolve quickly and are immediately available to the plants depending on them to provide essential nourishment. However, Excessive application of fertilizers affects the environment negatively and it a waste of time and money to the growers. Chemical fertilizers are salt. Excess concentration can cause dehydration and destroys plant tissue which is known as salt burn. Chemicals are safe when use correctly. The crop protection industries must promote the safe and responsible use of chemicals.

Key Words :- Agriculture, Chemicals, Pesticides, Fertilizers.

Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. It also contributes a significant figure to the Gross Domestic Product (GDP). Sustainable agriculture, in terms of food security, rural employment, and environmentally sustainable technologies such as soil conservation, sustainable natural resource management and biodiversity protection are essential for holistic rural development. Indian agriculture and allied activities have witnessed a green revolution, a white revolution, a yellow revolution and a blue revolution. The major part of Indian economy hinges on agriculture, a significant part of the population counts their earnings through farming. There are numerous forms of cultivation on which farmers rely. Revolving around the agriculture, the traditional farming has started transforming to innovative methods for increasing the yield. Aggravating the agricultural situation is an ongoing. Agriculture accounts for as much as a quarter of the Indian economy and employs an estimated 60 percent of the labour force, it is considered highly inefficient, wasteful, and incapable of solving the hunger and malnutrition problems. Despite progress in this area, these problems have continued to

frustrate India for decades. It is estimated that as much as one-fifth of the total agricultural output is lost due to inefficiencies in harvesting, transport and storage of government-subsidized crops (india.gov.in).

What do you think is the main goal of agriculture? Agriculture was developed to produce crops and livestock for human consumption. As the human population increases, the amount of food produced is very important. Unfortunately, there are other organisms which consume the crops that are meant for humans. Many crops each year are destroyed by agricultural pests, which results in an economic loss every year. Due to this high loss in food production, some chemicals are often used to combat the problem.

More commonly the chemicals used in agriculture are pesticides and inorganic fertilizers. These chemicals are used to increase the crop production to meet the demand of growing population. If the farmers continued to use 1950's technology, they would have to plant 10 million square miles of additional land to generate the food that is produces today. In addition, agricultural chemicals are used because they produce certain effects with less effort. Many of these chemicals are hazardous and present risks to human and animal health, the environment and trade if not used correctly.

Use of chemicals: hazards and risk:

The definition of a hazard is the potential for something to cause harm. The definition of risk is the potential for harm from exposure to the hazard. Something can be hazardous but, if you are not exposed to it, there is no risk. Similarly, there is no risk from exposure to non-hazardous material. You need both hazard and exposure for there to be a risk. Most pesticide active substances are hazardous. They have been designed to control living organisms, such as weeds, plant diseases and pests. Use of pesticides therefore involves theoretical risks to both those who apply them and to those who consume treated produce. As with the examples above, this risk can be managed by taking sensible precautions and reducing exposure.

"We have many hazardous products in our home but the risk depends on how we use them"

Pesticides: Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest. Pest is any harmful, destructive or troublesome animal, plant or microorganism. There are many different types of pesticides in the market today, but the most common are herbicides and insecticides, which kill or manage unwanted plants and insects. The damage caused by agricultural pests is a global problem, and over the past half-century, the amount

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of pesticides used has increased fourfold.

The production of pesticides started in India in 1952 with the establishment of a plant for the production of BHC near Calcutta, and India is now the second largest manufacturer of pesticides in Asia after China and ranks twelfth globally (Mathur, 1999). There has been a steady growth in the production of technical grade pesticides in India (Fig.1).

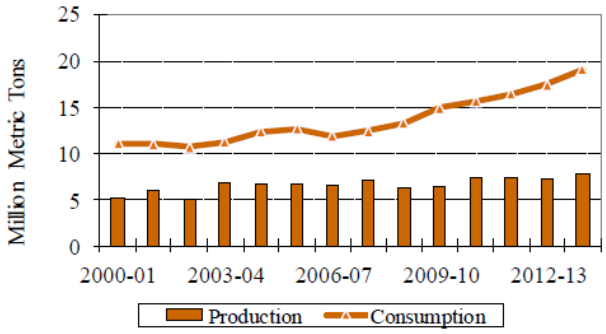

Fig.1: Production rate of pesticides in India

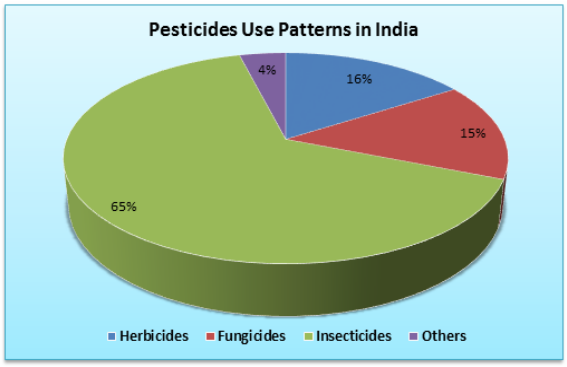

Fig. 2 Pesticide use pattern in India

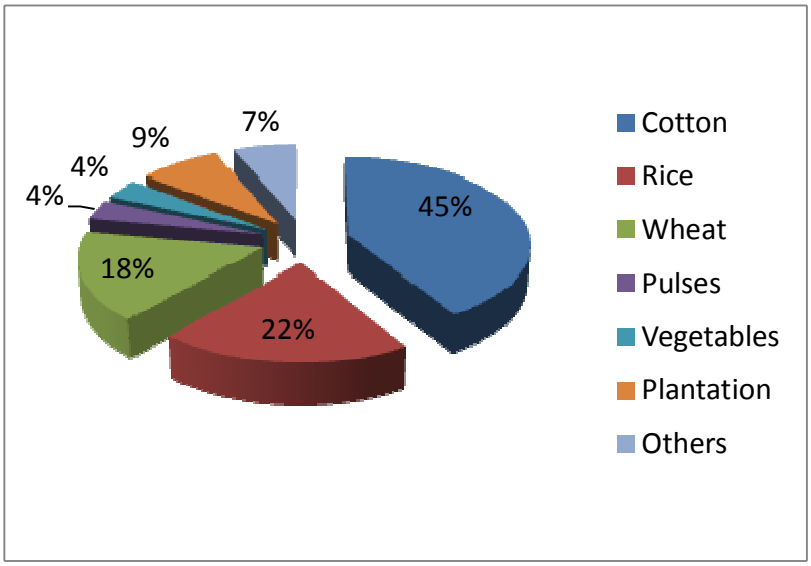

Fig. 3 Crop wise pesticide consumption in India

The pattern of pesticide usage in India is different from that for the world in general. As can be seen in Fig. 2, in India 65% of the pesticide used is insecticide, as against 44% globally (Mathur, 1999). The use of herbicides and fungicides is correspondingly less heavy. The main use of pesticides in India is for cotton crop (45%) followed by paddy and wheat (Fig. 3).

What happens after application of pesticides? When pesticides are applied the goal is that they will remain in the target area long enough to control a specific pest and then degrade into

harmless compounds without contaminating the environment. Once applied, many pesticides are mobile in the environment (air, soil, water). This movement can be beneficial (moving pesticide to target area, such as roots) but can also reduce the effect on the target pest and injure non-target plants and animals. The movement of applied pesticides can occur through runoff, chemical degradation, volatilize (gas vapour), leaching and breakdown in soil, leaching and degradation by microbes and photo degradation (sun). Therefore, ideal pesticides have following characteristics:

a) Affects only target pests
b) Harms no other species
c) No genetic resistance
d) Breaks down quickly in the environment
e) Be more cost-effective than doing nothing.

Over the years, the widespread use of pesticides has had several benefits and also caused many problems.

Benefits of pesticides: Crop protection products contribute to the production of a stable and predictable supply of high quality, affordable food. They will also help to adapt the challenges of climate change by enabling farmers and energy producers to secure maximum outputs from the land we have available.

1) Allow agricultural producers to improve the quality, quantity, and diversity of our food supply
2) Protection of crop losses/ yield reduction: In medium land, rice even under puddle conditions during the critical period warranted an effective and economic weed control practice to prevent reduction in rice yield due to weeds that ranged from 28 to 48%, based on comparisons that included control (weedy) plots. Weeds reduce yield of dry land crops (Behera and Singh, 1999) by 37–79%. Severe infestation of weeds, particularly in the early stage of crop establishment, ultimately accounts for a yield reduction of 40%. Herbicides provided both an economic and labour benefit.
3) Increase profits for farmers: Due to the use of pesticides, it is possible to combat pests and produce larger quantities of food. By producing more crops, farmers are also able to increase profits by having more produce to sell.
4) Save money on labour cost: Pesticides also increase farm profits by helping the farmers to save money on labour costs. Using pesticides reduces the amount of time required to

manually remove weeds and pests from fields.

5) Keeping food safe: There are many dangerous pests and diseases that can attack and contaminate food supplies. Pesticides help to prevent and control the moulds, mites and insects that would otherwise infect and infest our food.
6) Preserving the natural environment: Pesticides help to preserve the integrity of the natural environment by ensuring that we get maximum production from existing farmland leaving more land available for wildlife.
7) Mitigating the impacts of climate change: Increased food production capacity, reduces the amount of produce we need to import. This minimizes the carbon dioxide emitted during transport. Producing fuel from energy crops is seen as a key way to reduce carbon emissions. If we want to produce both food and fuel without bringing more land into production, the responsible use of pesticides is necessary to secure sufficient yields.
8) Used in timber, turf, horticulture, aquatic, and structural pest control industries
9) Homeowners and home gardeners often use pesticides in their homes, yards and on pets.

Hazards of Pesticides: Although there are benefits to the use of pesticides, there have also been many problems associated with their use. When pesticides are used, they do not always stay in the location where they are applied. They are mobile in the environment and often move through water, air and soil. The problem with pesticide mobility is that when they travel, the pesticides come in contact with other organisms and can cause harm. Pesticides have also been shown to disrupt the balance of an ecosystem. In many situations when a pesticide is used, it also kills non-pest organisms. This can drastically alter the natural balance of the ecosystem. By removing non-pest organisms, the environment can be changed to favour the pest. In addition to causing harm to wildlife, pesticides that travel from their original location are known to cause harm to humans specially production workers, formulators, sprayers and agricultural farm workers.

1) Impact through food commodities – pesticide residue: In India the first report of poisoning due to pesticides was from Kerala in 1958, where over 100 people died after consuming wheat flour contaminated with parathion (Karunakaran, 1958). In a multi-centric study to assess the pesticide residues in selected food commodities collected from different states of the country (Surveillance of Food Contaminants in India, 1993), DDT residues were found in about 82% of the 2205 samples of bovine milk collected from 12 states. About 37% of the samples contained DDT residues above the tolerance limit of 0.05 mg/kg (whole milk basis).

The highest level of DDT residues found was 2.2 mg/kg. The proportion of the samples with residues above the tolerance limit was highest in Maharashtra (74%), followed by Gujarat (70%), Andhra Pradesh (57%), Himachal Pradesh (56%) and Punjab (51%).

2) Surface and ground water contamination: Pesticides can reach surface water through runoff from treated plant and soil. Most common herbicides: 2,4-D, diuron, prometon Insecticides: diazinon, chlorpyrifos. In India, 58% of drinking samples drawn from various hand pumps and wells around Bhopal were contaminated with organo chlorine pesticides above the EPA standards (Kole *et al*., 2002).
3) Soil contamination: The hydrophobic, persistent and bioaccumulable pesticides are strongly bound to soil, include endosulfan, endrin, DDT, lindane and heptachlor. Polar pesticides mainly herbicides also include carbamates and fungicides moved from soil by runoff and leaching. Soil holds the positively charged paraquat. Adsorption increases with decreasing pH for ionizable pesticides e.g. 2,4-D, 2,4,5-T and atrazin.
4) On beneficial soil microorganisms: Triclopyr herbicide inhibits soil bacteria that transform ammonia into nitrite. Glyphosate reduces the growth and activity of free-living nitrogen fixing bacteria. 2,4-D reduces N fixation by the bacteria, also reduces the activity of N-fixing blue-green algae. Oryzalin and trifluralin inhibit the growth of certain mycorrhizal fungi. Oxadiazon reduces the number of mycorrhizal fungi spores.
5) On non-target plants: Pesticide exposure can cause sub lethal effects on plants. Phenoxy herbicides including 2,4-D can injure nearby trees and shrubs if they drift or volatilize onto leaves. Glyphosate herbicide can severely reduce seed quality. Herbicide clopyralid can reduce yields in potato plants.
6) Bioaccumulation and Biomagnifications: Another major problem associated with pesticide use is bioaccumulation and biological magnification. Bioaccumulation occurs when a substance builds up in the body because the body does not have the proper mechanisms to remove it. Many synthetic pesticides are not able to be broken down. Once they enter the body of an organism, they are permanently stored in the body tissue. Organisms that are higher in the food chain will have increased concentrations of pesticides because they consumed many lower level organisms and received the pesticides stored in those organisms. Biological magnification, also known as biomagnifications, is the term used to describe when chemicals, in this case pesticides, increase in concentration with each level of the food chain. A famous example of biomagnification is with the pesticide known as DDT.

7) Genetic resistance: Genetic resistance is one problem associated with pesticide use that has become more of an issue over the years. Genetic resistance is when a species' genetic makeup changes over generations and results in the species becoming resistant to something that used to cause it harm. In relation to pesticide use, genetic resistance has occurred in many pests over the years, especially insects.

Inorganic fertilizers: A chemical Fertilizer is known as inorganic fertilizer when its constituents are originated through synthetic means making them non- degradable. To sustain reliable and hastened growth, these fertilizers are added to the soil. Generally these fertilizers are manufactured keeping in mind the natural elements needed by the plants for healthy and convenient growth. They contain one or more of the essential growth nutrients such as nitrogen, phosphorus, potassium and various other nutrients.

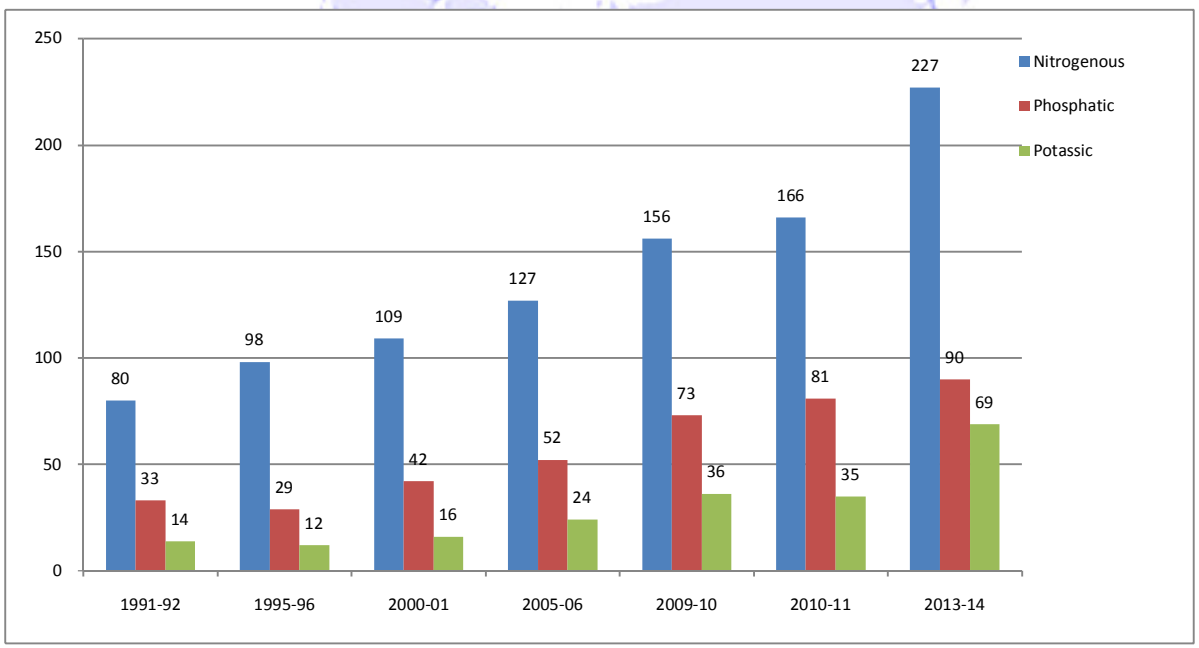

Fig. 4 Fertilizer consumption in India, lakh tonnes

Fertilizer consumption in India has increased significantly in the last decade. Total NPK consumption increased from 125 lakh tones to 282 lakh tones between 1991-92 and 2010-11 (Fig. 4). In India the cereal crops specially wheat and rice accounts for approximately fifty percent of fertilizer consumption. Although the fertilizers are used to increase the crop production, they have some advantages and disadvantages.

Benefits of Inorganic Fertilizers:

1) Predictable and reliable
2) Formulations are blended with accuracy, that you can buy different blends for different types of plants.
3) Balanced distribution of the three main essential nutrients (NPK) needed for optimum plant growth.
4) Commercial formulated fertilizers allow you to know exactly which nutrients you're giving your plants, rather than guessing at the composition of organic formulas.
5) Fast acting. These nutrient-rich salts dissolve quickly and are immediately available to the plants depending on them to provide essential nourishment in the form of nitrogen, phosphorus and potassium.
6) By providing nutrients like nitrogen, fertilizers help plants thrive despite the threat of weeds and disease
7) Precise content of nutrients e.g. 18:18:00 etc. The precise content of fertilizers is important to know the individual soil requirement as well as specific plant needs. Knowing exactly which nutrients and in what quantities you are adding to the soil will ensure growing plants will have the correct nourishment they need for healthy development.
8) Easy to use and transport.

Disadvantages of Chemical Fertilizers:

1) Excessive application of fertilizers affects the environment negatively and it a waste of time and money to the growers.
2) The nutrients like nitrate when wash off the soil into natural water systems and into groundwater cause problem to natural habitats and human health.
3) Many of these fertilizers are acidic, long term used increase the acidity of the soil which reduces the beneficial soil organisms and also stunts plant growth.
4) Long term used of fertilizers can lead to chemical imbalance in the recipient plants.
5) Too much use of chemical fertilizers may sometimes burn the plant or even kill them.
6) The process of manufacturing these fertilizers releases greenhouse gases and other pollutants into the environment. They are of short life span unless they are used in a controlled release form.
7) Due to surplus application of fertilizers it may lead to excess growth of some plant varieties.

8) Incorrect application is dangerous and there is potential harm from excess.
9) Chemical fertilizers are salt. Excess concentration can cause dehydration and destroys plant tissue which is known as salt burn.
10) Eutrophication: Overgrowth of aquatic vegetation due to extra nitrogen

Summary:

1) Chemicals are safe when use correctly
2) The use of chemicals ensures that we get the quantity and quality of fresh food at affordable prices
3) The crop protection industries must promote the safe and responsible use of chemicals
4) Chemicals use in agriculture is vital to sustainable agriculture.

"All substances are poisons; there is none which is not a poison, the right dose differentiates a poison and remedy"

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IMPACTS OF APPLICATION OF CHEMICALS ON BIODIVERSITY

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Abstract :

Thousands of kinds of chemicals are used daily for a very wide range of purposes. Many of these are released into the environment as the result of normal regulated use, or through failure to comply with regulations. The result is exposure of biodiversity, as a component of the environment, to potential diffuse or point source pollutants.

Protection of human and animal health are primary drivers for regulating chemicals, but pollution remains a major potential threat to biodiversity, and the regulations include (to varying degrees) an assessment of the risk to the environment. In essence, there are separate processes based around the uses of chemicals e.g. Plant Protection Products, Biocidal Products, Veterinary Medicines, Personal Care Products, Pharmaceuticals, and general (industrial) chemicals. In the cases where there are direct releases to the environment.

The final step in the approach is to prescribe actions, including prioritisation, on the basis of the final assessment of level of concern. The grading of risk from 'not of concern' through to 'major concern' allows us to be more consistent in how we respond to risk from chemicals to biodiversity.

Keywords : Biodiversity; pollution;

Introduction:

Biodiversity underpins life on Earth, and refers to the variety found in biota from genetic makeup of plants and animals to cultural diversity.

People depend on biodiversity in their daily lives, in ways that are not always apparent or appreciated. Human health ultimately depends upon ecosystem products and services (such as availability of fresh water, food and fuel sources) which are requisite for good human health and productive livelihoods. biophysical diversity of microorganisms, flora and fauna provides extensive knowledge which carry important benefits for biological, health, and pharmacological

sciences.

Be current regulatory measures intended to test the effects of chemicals for biodiversity cannot appropriately address the complexity and dynamics of interactions between living systems, and with their abiotic environment. Chemicals can originate from millions of consumer, agricultural and industrial products and processes. In certain instances, the release of a chemical is accidental, while in others it is a side effect of other processes, or due to their intended form of use. Once in the environment , some chemicals can persists for long periods of time and/or be broken down into other chemicals with further risk properties.

As water carries away soil, it can also cause the runoff of pesticides and fertilizers that are applied in abundance to commercial crops, and of cattle and livestock wastes. In Quebec in 1990-91, an average of 190 000 tonnes of nitrogen and 120 000 tonnes of phosphorus were applied to agricultural lands in the form fertilizers, or were present as livestock wastes. Excess nutrients that enter lakes and rivers as runoff can contribute to eutrophication of aquatic environments, altering and degrading the biodiversity of aquatic ecosystems

Consequently, there is a lack of knowledge of the effects of chemicals on systemic properties of biodiversity and on complex interactions among living beings. For example, it was shown that the effects of the combined presence of the herbicide atrazine and of high levels of nutrients, led to effects in frog populations due to changes in the ecosystem at large. Atrazine reduced phytoplankton growth, resulting in higher levels of nutrients and therefore higher levels of algae. These, in turn, fed a wider array of gastropods which are intermediate trematode hosts, which spread the infection to frogs.

Effect of Chemicals on Biodiversity

General chemicals are currently poorly regulated, with an estimated 30,000 chemicals in use that have not yet had any environmental risk assessment. This gap is being addressed by the EU (European Commission, 2003) 'Registration, Evaluation and Authorisation of Chemicals' (REACH) Regulation that came into force in June this year. This will require manufactures to register their chemicals and carry out a risk assessment process including an environmental risk assessment. The UK competent authority for REACH is the Health and Safety Executive. However, this process will take until 2020 to complete.

Chemicals may produced unforeseen health and environmental impacts when interacting with other natural or manufactured chemicals. Aquatic sediments can store certain chemicals and with changing environmental conditions, release them either suddenly or over an extended period of

time. Substances used in long life products may be a major source of chemicals emissions both during their use and once they have been dumped in the environment (e.g. CFCs from isolation foam). Under the current risk estimation approaches in eco-toxicology, chemicals' effects are then estimated for groups like plants, invertebrates, fish, birds or mammals.

To test a wide range of classes of chemicals, we undertook analysis of four different approved chemicals; two rodenticides (difenacoum and brodifacoum), a plant protection product and veterinary medicine (cypermethrin) and an industrial chemical (Decabromodipheyl ether (decaBDE) - a brominated flame retardant). We also reviewed a formerly widely used and much studied chemical that is now banned, DDT.

1) **Decabromodiphenyl ether (decaBDE) :** A flame retardant used to reduce fire risk in many products. A chemical with high human safety benefits, but its persistence has raised concern that it may have long term environmental and biodiversity affects. The approvals process identified that decaBDE is a highly persistent brominated flame retardant, being neither readily nor inherently biodegradable.
2) **Brodifacoum :** A rodenticide known to affect rodent predators, restricted to indoor use. It is relatively persistent in soil and water, and in exposed animal tissues, particularly the liver. Anticoagulant rodenticides are very toxic, disrupting the normal blood-clotting mechanisms, resulting in increased bleeding tendency and, eventually, profuse hemorrhage. Brodifacoum is currently restricted to indoor only use in the UK due to its potency. The framework confirms the volume of usage and hence exposure to biodiversity beyond the target rodents is limited but widespread.
3) Difenacoum This rodenticide is one of the market leaders, used in public health, agricultural and domestic situations. The approved use includes measures to minimize its availability to non-target biodiversity. Anticoagulant rodenticides are very toxic, disrupting the normal blood-clotting mechanisms, resulting in increased bleeding tendency and, eventually, profuse hemorrhage
4) Cypermethrin Cypermethrin is a synthetic pyrethroid insecticide approved as a plant protection product and a veterinary medicine. The conservation community noticed its impact on freshwaters (e.g. major cause of white-clawed crayfish deaths) due to its use as sheep dip.
5) **DDT :** If DDT were a new chemical today the regulatory approvals process would probably allow its use, but with restrictions to prevent it entering water systems. Approvals testing

(stage 1) would show that DDT and its metabolites and degradation products are extremely persistent but relatively immobile in soil. They would also find that DDT is of low to moderate toxicity to mammals, birds, earthworms and bees, but extremely toxic to aquatic organisms. However, due to its binding to soil, the movement to soil and water would probably be considered to be low, and management to reduce DDT entering water courses would reduce risks to aquatic organisms.

Methods of conservation of plant biodiversity

When a chemical is approved for use, or a change in use, it can then be assessed through the framework.

The chemical properties assessed are:

i. persistence in the environment, either in the approved form or as a degradation product;
ii. whether it is likely to be available to affect biota (its exposure potential);
iii. bioaccumulation characteristics, i.e. whether it is likely or known to accumulate in biota;
iv. toxicity.

Within this regulatory process, judgments on the potential impacts on biota rely almost exclusively on laboratory studies and scale of use judgments are fairly restricted, quite a limited consideration of where and how much the product will be used. On the use of monitoring data and research findings to evaluate whether the QERA is robust in its assessment of potential impact on biodiversity or should be modified. The assessment of potential exposure and impacts in biota is further developed using a combination of information from both regulatory chemicals monitoring and other types of monitoring information:

i. presence of chemicals in physical media from regulatory monitoring (sampling in air, water and sediments);
ii. evidence of chemicals-related mortality in wildlife from regulatory compliance monitoring (Wildlife Incident Investigation Scheme);
iii. presence of chemicals in biota and possible effects (inter alia Predatory Bird Monitoring Scheme, Cetacean Standings Investigation Programme);
iv. evidence of possible population level effects from chemicals, drawing on the range of surveillance data that are available from national schemes, for example trends in abundance or distribution of populations, breeding success and survivorship;
v. results from research on effects of chemicals in free-living organisms.

Conclusion

Biodiversity is necessary for life and that species preservation is important to all of us. Every species is linked with a multitude of others in an ecosystem. All living organisms are part of food webs that include plants and animals of other species. Minor disruptions in a particular ecosystem tend to lead to changes that eventually restore the system. But large disturbances of living populations or their environments may result in irreversible changes. Thus protecting biodiversity from adverse effect of harmful chemicals is a future need.

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POTENTIALITY OF GOBAR GAS GENERATION & POPULATION

(A case study of Shrirampur Taluka, Dist- Ahmednagar, MH)

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Abstract :

Gobar gas is one of the eco- friendly non –conventional energy resources which are used for domestic's purpose for rural area of India. Livestock dug (cow, buffalos) is used as raw materials. The methane gas 55%, carbon dioxide 45% is released from dung after decomposing produce energy. Conventional energy resources are limited & harmful for environmental but non- conventional energy resources are eco- friendly. Energy resources are directly or indirectly in the entire process of evolution, growth and survival and it plays a vital role in the socio-economic development and human welfare of country. Energy has come to be known as a `strategic commodity' in today's 21st century.

Key words - Gobar gas, Energy Resource.

Introduction:-

Non-conventional energy resources are necessary in today's global warming, climatic changes condition. Gobar gas is an important for domestic purpose non – conventional energy resource rural part India& It is replace for fire-wood, kerosene oil for cooking & other purpose.

Gobar gas is mainly produces from cattle & buffalo dung. It is eco-friendly, non- polluting energy resources. India is agriculturist country & livestock rearing is supportive business in mostly rural part of India. It is estimated that about 22425 million cubic meter gas can be generated every year in our country with plenty of animal dung.

Gobar gas plant can be established above surface, below the ground. Initially only construction cost after very low maintain cost. Which is beneficial for rural people of India specially women for domestic cooking & others purpose.

Study area :

Shrirampur taluka is one of tahsil out of 14 Talukas of Ahmednagar district in Maharashtra.

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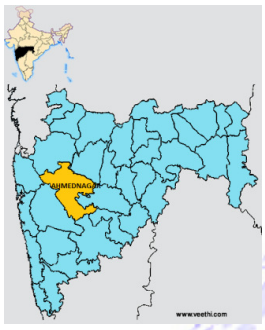
This talukalies between 19^0 45'to 20^0 30' north latitude& $74^0$0' to 74^0 30' east longitude of Ahmednagar district.



Objective :

The present paper attempt to search the potentiality of Gobar gas generation in the Shrirampur taluka in Ahmednagar district of Maharashtra.

Database & methodology :

This present paper based on secondary data regarding population census of 2011. According 2011 census Shrirampur consist 287500 people out of 198218 people living in rural part in 40822 households & the data of livestock population 19th census which is collecting from Panchyatsamiti office of the Shrirampur taluka. The simple mathematical techniques are utilized like addition, subtraction, multiplication & dividation are used analysing potentiality of gobar gas generation of rural part of Shrirampur.

Sr. No.	Section	No. of Villages	Cow Pop.	Buffalo Pop.	Total
1.	Shrirampur	6	6119	4081	10206
2.	Ukkalgaon	6	6692	619	7317
3.	Kuranpur	6	4810	97	4913
4.	N. Khairi	3	4387	625	5015
5.	Takalibhan	9	13767	556	14332
6.	Malunja	3	5164	302	5469
7.	Naur	7	4484	98	4589
8.	Matapur	4	8466	425	8895
Total		**44**	**53889**	**6803**	**60736**

Discussion :

Gobar gas is non-conventional sources of energy in rural part. Which use for domestic purpose for cooking & other. It saves cut trees which are used for as fire-wood in rural part. Also important for female health because it give relief from chula smoke.

Generally 227 litter gobar gas is required for cooking per person per day& generally one cow provide 10 kg and Buffalo provide 15 kg dung per day. One kg. Dung produces 48.5 litre gases. According to present data, the study carried out potentiality of gobar gas generation of Shrirampur Tahsil.

Potentiality of raw material & gas generation :

Livestock	Raw Material (Dung)	Per Day Available R.M.	Production of Gas
Cow (10 kg/day)	53889 x 10	598890 x 48.5	29046165
Buffalo (15 kg/day)	6803 x 15	102045 x 48.5	4949182.5
Total			**33995347.5**

Gas Production & Population Ratio (Generally 227 lit. Gobar gas is required for cooking/ person/day)

Pop. Of Study area (2011)	Gas requirement /person/day (litre)	Total Gas require/day (lit.)	Available Gas Prod. Potential (lit.)	Result
287500	227	65262500	33995347.5	31267152.5

(Among total population 149760 peoples can fulfil their requirement of gas and remaining 137740 peoples are unsatisfied.)

Conclusion :

According to present study, it indicates that potentiality gobar gas generation in study area showing the unbalance in gobar gas generation and population ratio.

But whatever potentiality of gobar gas generation if it will be achieve, then reduce in firewood's and help in stopping deforestation and also reducing use of conventional energy resources like Kerosene, LPG gas etc. And it is also helping for better female health

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EFFECTS OF CHEMICALS ON WATER QUALITY AND CYANOBACTERIAL DIVERSIRY FROM NANDUR MADHYAMESHWAR DAM OF NASHIK DISTRICT.

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Abstract :-

Cyanobacterial blooms most commonly seen during the summer season in ponds, lakes and reservoirs. In these areas aquatic animals mortality, odorous water and fish and human skin irritation, death of fishes and eye inflammation have been commonly seen. The influence of physicochemical factors on the occurrence of cyanobacteria and its toxin levels were evaluated in natural and drinking water. For present study Nandur Madhyameshwar dam is selected where water released from Gangapur and Darana water reservoirs is stored and subsequently released from here through canals for irrigation. Silts and organic matter that are carried away with water flow are accumulated in the lake, due to which islands and shallow water ponds have been created. This resulted in the biological enriched conditions by which aquatic vegetation has been stabilized. Thus the site has turned into good wetland habitat described as 'Bharatpur of Maharashtra". The increased amount of pollutants from agricultural waste, pesticides, fertilizers, sewage waste and industrial waste cause eutrofication of the water at Nandur Madhyameshwar and promote cyanobacterial bloom formation. The increased amount of cyanobacteria subsequently reduces the water quality.

Key word :- Cynobacteria, Eutrofication, Water quality, Pysio-chemical properties.

Introduction: -

To define efficient water management program for preservation of ecosystems the analysis of micro flora, community structure and defined bio indicators of water quality is an important tool and it also essential in environmental monitoring programs. First record of using biological methods to monitor river water quality was introduced by Kolkwitz and Marsson (1908). Many of methods have been defined to monitor rivers water quality include employing algae, bryophytes, macro invertebrates and fishes(Whitton and Kelly, 1995).However, more recent investigations have demonstrated that water quality and nutrient concentration in the river waters had the greater effect on the photosynthetic organisms as algae (Kelly and Whitton, 1998). With this respect algae such as diatom communities have been widely used as bioindicators (Whitton and Rott, 1996; Prygiel *et al.*, 1999), and defined as biotic indices such as IBD index (based on diatoms) in the rivers water quality monitoring programs. It has been found that in special ecosystem of some rivers, cyanobacterial dominance and cyanotoxic effect on the studied communities would have lower values than expected (Aboal *et al.*, 2002). These results highlight the necessity of incorporating corrections in biotic indices, definitions and monitoring programs and also to consider the cyanobacterial communities. In recent studies it is shown that the structure of cyanobacteria communities have changed from upstream to downstream of the rivers with physical and chemical conditions and nutrient load in the water (Perona et al., 1998; Aboal *et al.*, 2002; Douterelo *et al.*, 2004; Maldonado *et al.*, 2011). Such investigations led to define the cyanobacteria as water quality bioindicators.

Aquatic vegetation obstructs navigation, chocking rivers, irrigation channels, dams etc., impede drainage and interfere swimming recreation on water bodies. Their diversity and biomass influence primary productivity and complexities of tropic states. The fresh water resources are dynamic in nature of physico-chemical status due to environmental and anthropogenic pressure.

It is commonly found on shallow water covers densely the water surface of the dam and interferes with fishing. Many of these vegetation survive well in the new environments and grow at a fast rate i.e. they compete with native vegetation which can lead to ecological shifts and also affect the quality of water. They increase water loss through absorbs and transpire more water by evapo-transpiration. They were reducing the storage, conveyance capacity of dams and Impede recreational activities like swimming, fishing and boating. They may also cause physico-chemical changes like reduction in oxygen levels and present gaseous exchange with water resulting in adverse fish production. They can provide a favorable and

protected habitat for disease vectors mainly the insects. The impacts were noticed that dams are seriously affected by unwanted growth of aquatic vegetation. The rapid spread of aquatic vegetation in the dams is affecting socio-economically.

Algal organisms are rich source of novel and biologically active primary and secondary metabolites. These metabolites may be potential bioactive compounds of interest in the pharmaceutical industry (Rania and Hala, 2008). The existence of bioactive compounds in algae is to be expected due to co-occurrence of these organisms in aquatic natural communities, where an inhibitory interaction occurred between producers and competitors within the same habitat. These metabolites may be synthesized under stress conditions and low growth rate (Keating, 1978). It is generally accepted that algae which lack physical defenses produce toxic chemicals to protect themselves in hostile environments. From review articles it was found that more than 750 species of algae are reported by various workers in Jalgaon district, but none of the algae had been used for any commercial purpose. During last few decades there has been an increase in research activities performed on the fresh water algae especially related to their taxonomy studies of higher algae and on Cyanobacteria. There are about 160 genera and 1,500 species in Cyanophyceae. In India, the class is represented by 98 genera and 833 species. The members of Cyanophyceae (Myxophyceae) are commonly known as blue-green algae as their principal pigment is a bluish-green c- phycocyanin. They also contain chlorophyll a, ß-carotene and c-phycoerythrin. Various strains of Cyanobacteria are known to produce intracellular and extracellular metabolites with diverse biological activities such as antialgal, antibacterial and antifungal and antiviral activity (Kalireioglu *et al.*, 2006). As result of some studies Cyanobacteria considered as Bioindicator in Enviroment Monitoring programme of aquatic ecosystem. Algae are found to be rich source nutrients like carbohydrates, lipids and proteins. Thus they act as growth promoting substance for fungi like *Candia albicans* and *Asperigillus niger*.

Study Area

Nandur Madhyameshwar Bird Sanctuary is located in Niphad Tehsil of Nashik district in Western Maharashtra. A stone pick up was constructed in 1907-13 across the river Godavari just below the confluence of Kadwa and Goadavari rivers at Nandur Madhyameshwar The water level is always fluctuating in Nandur Madhyameshwar Lake. The water released from Gangapur and Darana water reservoirs is stored at Nandur Madhyameshwar and subsequently released from here

through canals for irrigation. Silts and organic matter that are carried away with water flow are accumulated in the lake, due to which islands and shallow water ponds have been created. This resulted in the biological enriched conditions by which aquatic vegetation has been stabilized. Thus the site has turned into good wetland habitat described as 'Bharatpur of Maharashtra".

The water reservoir gives panoramic scenic view of the surrounding and its fascinating fauna attracts the visitors throughout the year. It is considered as one of the important waterfowl habitats by the International Union of Conservation of Nature (IUCN) spread over a protected area of about 10012 and core area nearly about 1765 hectares, the sanctuary comprising of evergreen forest and trees at the confluence of the Godavari and Kadwa rivers. It is also a home for many endangered species of birds, this sanctuary is established in 1950.

The water quality of Nandur Madhyameshwar Dam is measured in report of Maharashtra pollution control board and ICAR (2011) the average temperature of aquatic system is 23.2◦C with temperature range between 22.0 to 24.7◦C; water is slightly basic with PH ranges between 8.02 to 8.41.Water Transparency level was found to be 59cm and varies between 26 to 97 cm. The oxygen indicator parameter values shows good oxygen content and moderate level of pollutants. The DO is around 6mgl-1 and BOD is 5mgl-1. Palmer and Nygaard indices reading shows moderate organic pollution and moderately eutrophic condition of aquatic system. But there are no any report has been made on cyanobacterial communities, their relationship with physico-chemical properties of water to determine water quality indicators and compared with universal patterns in Nandur Madhyameshwar Dam of Nashik District. The present work is decided to carry out due to this need.

Significance of the study

The proposed work is of great significance with reference to prepare base line data about existing Algal diversity cyanobacterial diversity in particular, Physico-chemical properties of water, characteristic feature of various Birds habitats. This type of study is essential in estimation of algal biodiversity, cyanobacterial diversity in particular as well as helpful in future to assess biodiversity of particular region.

Objectives of the study

- To collect comprehensive data of existing Cyanobacterial flora from study area.
- To report their seasonal occurrence.
- To report ecological significance of cyanobacteria.

- To asses physico-chemical properties and their interrelationship with Cyanobacteria.
- To convey the findings toward society due to their value in human health.

Methodology

- Selection of study sites by appropriate site selection methods.
- Collection of water samples through scientific methods.
- Sampling will be carried out during the period of monsoon, winter and summer season.
- Laboratory analysis of samples for taxonomic investigations of cyanobacteria and physico-chemical parameters of water samples.
- Authentic Identification of Cyanobacterial species will be carried out by using Standard literatures (Fritsch1935; Prescott,1978; Anand, 1998; Krishnamurthy, 2000 etc), Standard keys and other reference material, consultation of senior workers, organizations will be carried out whenever necessary.

Review of Research and Development in the subject

While tracing the historical details of the development of botany, including phycology, in India, it was found that the earlier work on the study of Indian algae were undertaken mostly by foreign workers. Some of these include the works of Royle (1839) on the algae of northern India, Griffith (1849) on *Chara,* Carter (1858) on *Eudorina,* Wallich (1860) and Hobson (1863) on desmids, Dickie (1882) on algae of Himalayan regions, Lagerheim (1888) on desmids of Bengal, Turner (1892) on Cyanophyceae and Chlorophyceae, and Borgessen (1990) on Indian marine algae. Ghose S.L.(1919–1932) and his student Randhawa M.S.(1932–1959) carried out some major works on Indian algae, including their researches on blue green algae, Zygnemaceae and Oedogoniales. But the main credit of starting an extensive survey of Indian freshwater and marine algae goes to the dedicated researches of Professor M.O.P. Iyengar, who established a strong school of algae at University of Madras, and due to his researches, Prof. Iyengar has been rightly called as the *Father of Modern Algology of India* by Randhawa (1959).Some of the major researches of Prof. Iyengar included (i) his discovery of a green alga, *Fritschiella tuberosa* (1932),(ii)*Ecballocystopsis* (1933); (iii) *Characiosiphon* (1936),(iv) *Cylindrocapsopsis* (1957), and (v) some life-history details of *Siphonocladus, Dictyosphaerium, Polysiphonia platycarpa,* etc. Desikachary, a student of Prof.M.O.P. Iyengar, worked on several blue-green algae, Bacillariophyceae and Rhodophyceae. He is known for his monograph of "Cyanophyta". A survey

of the literature on the Cyanophycean flora of different habitats of Maharashtra revealed that the blue green algae occurring in the fresh water habitat in the Satpuda ranges have remained unexposed. Some reports are available on the blue green algae collected from fresh water and hot water springs of Maharashtra (Kamat, 1963; Thomas & Gonzalves, 1965; Barhate & Tarar, 1983, 1985; Mahajan, 1986).

Result and conclusions:-

Various types of insecticides, Pesticides, organic chemical used in agricultural field as well as human domestic waste released in water bodies are the main pollutants in water of Nandur Madhyameshwar dam affects its algal flora. In the present study attempts have been made to correlate effect of water quality on members of Cyanobacteria.

Cyanobacteria are well known for their bloom formation but there are no results of toxic bloom formation in Nandur Madhyameshwar. However, we not rule out the effect of pollution and water quality on Cynobacterial blooms.

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MICROPROPOGATION OF AEGLE MARMELOS (L) CORR. FOR PLANT BIODIVERSITY CONSERVATION

Jamdhade Pranita Uttamrao

ABSTRACT

Biodiversity refers to life on earth and varieties found in biota from genetic make up of plants and animals to cultural diversity. It plays crucial role in productivity of genetic resources provides numerous ecosystem services that are beneficial to human well being at present and in the future. Plants are the important component of ecosystem. In recent years increased globalization affects the population of plants.So its an urgent need to conserve genetic diversity of plant resources by developing protocols for micropropagation. Plant tissue culture technique offer an integrated approach for rapid multiplication and production of material with active ingredients. In the present studies protocol for the mass production of medicinal plant Aegel marmelos (L) corr. (Rutaceae) was developed successfully.

Key Words: Regeneration, micropropagation, medicinal plant species.

Introduction

Biodiversity mean "The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes di Biodiversity is a broad concept. It's not only about plants and animals, but also about healthy ecosystems and the services these ecosystems provide to society.versity within species, between species and ecosystems."

Biodiversity provides numerous ecosystem services that are crucial to human well-being at present and in the future. Climate is an integral part of ecosystem functioning and human health is impacted directly and indirectly by results of climatic conditions upon terrestrial and marine ecosystems. Marine biodiversity is affected by ocean acidification related to levels of carbon in the atmosphere. Terrestrial biodiversity is influenced by climate variability, such as extreme weather events (ie drought, flooding) that directly influence ecosystem health and the productivity and availability of ecosystem goods and services for human use. Longer term changes in climate affect the viability and health of ecosystems, influencing shifts in the distribution of plants, pathogens, animals, and even human settlements.

Biodiversity loss also means that we are losing, before discovery, many of nature's chemicals and genes, of the kind that have already provided humankind with enormous health benefits. Specific pressures and linkages between health and biodiversity include: India has 2.4% of world's area with 8% of global bio-diversity. It is one of the 12 mega-diversity hot-spot regions of the world. Across the country, the forests are estimated to harbour 90% of India's total medicinal plants diversity. Only about 10% of the known medicinal plants of India are restricted to nonforest habitats.

Medicinal plant use is the most common medication tool in traditional medicine and complementary medicine worldwide. Medicinal plants are supplied through collection from wild populations and cultivation. Many communities rely on natural products collected from ecosystems for medicinal and cultural purposes, in addition to food.

Need of conservation

The plants used in the phyto-pharmaceutical preparations are obtained mainly from the naturally growing areas. The genetic diversity of medicinal plants in the world is getting endangered at alarming rate because of ruinous harvesting practices and over-harvesting for production of medicines, with little or no regard to the future. Also, extensive destruction of the plant-rich habitat as a result of forest degradation, agricultural encroachment, urbanization etc. are other factors, thus challenging their existence.

TOOL FOR CONSERVATION: PLANT TISSUE CULTURE

Plant tissue culture refers to growing and multiplication of cells, tissues and organs of plants on defined solid or liquid media under aseptic and controlled environment. In vitro culture is one of the key tools of plant biotechnology that exploits thetotipotency nature of plant cells (Haberlandt, 1902) and unequivocally demonstrated for the first time in plants by Steward et al. (1964). The commercial technology is primarily based on micropropagation, in which rapid proliferation is achieved from tiny stem cuttings, axillary buds, and to a limited extent from somatic embryos. The process of micropropagation is usually divided into several stages i.e., prepropagation, initiation of explants, subculture of explants for proliferation, shooting and rooting, and hardening. These stages are universally applicable in large-scale multiplication of plants.

Aeglemarmelos (L.) Corr., (Rutaceae) commonly known as "Bael Tree" also called as "Climate purifier". It acts as a sink for chemical pollutants as it absorbs poisonous gases from atmosphere and make them inert; which emit greater percentage of oxygen in sunlight as compared to other plants.But it is a popular vulnerable medicinal plant mostly found in tropical and subtropical

regions. Almost all parts of the tree are used in preparing herbal medicine for treating diarrhea, dysentery, dyspepsia, malaria, fever, jaundice, and skin diseases such as ulcers, urticaria, and eczema.The plant is rich in alkaloids, among which aegline, marmesin, marmin, and marmelosin are the major ones . Tissue culture protocols have been developed for several plants but there are many other species like *Aeglemarmelos L.* which are over exploited in pharmaceutical industries and need conservation.

Materials and Methods :-

Seed of Aegle marmelos (L.) corr.(Bael) were collected from the best quality and large size mature bael fruits. For seed germination, seeds were first washed under running tap water for 3 - 5 min. Floating seeds were considered to be empty and discarded. Later the seeds were dipped in 70% alcohol for 30 sec, followed by washing with distilled water. The seeds were surface sterilized with0.2% (w/v) mercuric chloride for 10 min. with continuous shaking. Finally it was washed four times with sterilized distilled water.

Culture media and Growth Conditions :-

Full strength M.S medium (Murashige and Skoog, 1962) supplement with 3 %sucrose (Hi media Mumbai, India) ,0.2% Clerigel (Hi - media, Mumbai India) and different combination of Auxin (2,4 - D,NAA,IBA) and Cytokinin(BAP,KIN) at the concentration 0.5,1.0.....3.0 mg/l was used as the callus induction medium. The pH of the medium was adjusted to 5.8 before the addition of Clerigel .Culture bottles were filled with 50 ml of the media.The media was autoclaved at 15 lbs. (12 f C) for 15 min. Cotyledon explant were used to induce the embryonic callus from Aegle marmelosL. (Corr).The surfacesterilized seeds were incubated to callus induction medium.

DATA RECORD AND RESULT

Table :- Effect of PGR's onMultipleshoot induction From Somatic Embryonic Callus of *Aeglemarmelos*(L.) corr. from cotyledon explant.

Concentrations of PlantGrowth Regulator (mg/l)				Frequency of Callus formation	Frequency of Somatic embryonic callus	Color of callus/ somatic embryo	No of shoot induced	Mean ± SE
NAA	2,4-D	BAP	KIN					
0.1	-	2.0	-	+	+	Yellowish green	10	8± 0.577
0.2	-	2.0	-	+++	+++	Yellowish light green	22	18± 1.632
0.3	-	2.0	-	++++	++++	Yellowish green	36	28± 1.527
0.4	-	2.0	-	+++++	+++++	Whitish	52	45 ±2.848
-	1.0	-	-	+	-	Creamish	-	-
-	1.5	-	-	+++	-	Creamish	-	-
-	2.0	-	-	++++	-	Creamish	-	-
-	2.5	-	-	+	-	Creamish	-	-
1.0	0.5	-	0.5	+	+	Yellowish	07	5 ± 0.577
1.0	0.5	-	1.0	+++	+++	Yellowish	12	9 ± 0.881
1.0	0.5	-	1.5	+++	++++	Yellowish	32	28 ± 1.201
1.0	0.5	-	2.0	+++++	+++	Creamish	25	19 ±1.452

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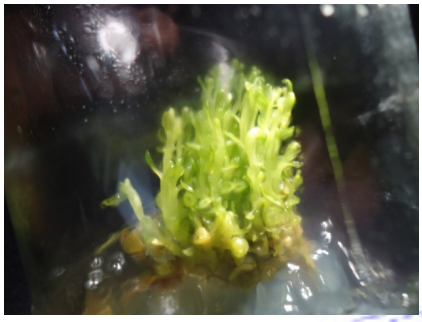

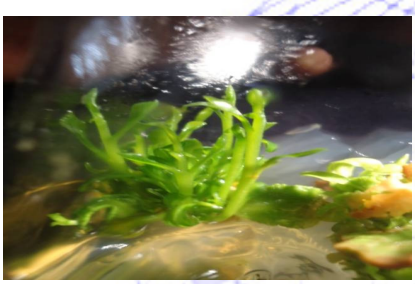

Results and Discussion :-

Effects of different Auxins and Cytokinins on the cotyledon explants for callus induction: Effects of different Auxins and Cytokinins were studied by using cotyledon as an explants. The basic culture medium utilized in present piece of work was Murashige and Skoog medium (MS) supplemented with different concentration of Auxins and cytokinins.Results obtained during experiment revealed that when 2,4-D and NAA tried alone and in combination of BAP and KIN, shows callus induction. Maximum proliferation of callus was achieved on (2 mg/ L) 2, 4 D when it was tried alone and in combination (2 mg/L) BAP and from (0.2 mg/L to 0.4 mg/L).Increase in concentration of NAA subsequently increased the proliferation of cotyledons tissue.

Highest rate of callus induction was recorded on MS medium supplemented with NAA, with (1mg/L +0.5mg/L) KIN (2.0 mg/L) of and 2, 4 D (0.4 mg/L)and NAA with (2.0 mg/L) of BAP. Callus induced in present study were showing variability in terms of color and texture Yellowish, Green, Light Green, White, creamish color callus were frequently observed with different type of texture viz. smooth, rough, crystalline. Callus developed in present piece of work were showed somatic embryogenesis with different types of Shapes .In this study, cotyledon the medium containing combination of BAP (2.0mg/L) + NAA (0.4 mg/L), explants capable to induce somatic embryogenesis. After six week, somatic embryos were actively developed radical and apices active

within 15days, cotyledons were turned dark green, shoot were elongated.

Rhizogenesis was achieved by sub-culture fully elongated shoots on MS medium containing 1.0 mg/L of NAA.

Conclusion

The field performance of these tissue cultured plants depends on the selection of the initial material, media composition, growth regulators, cultivar and environmental factors Fresh strategies of afforestation management and restoration of depleting natural resources blending with modern technologies are also required. The result presented here indicates that in vitro regeneration of complete plantlets is possible using callus culture through somatic embryogenesis of Aegle marmelos The mature embryos are known to be a good source for initiating callus which possesses high regenerative capacity , Tissue culture protocols have been developed for several plants but there are many other species, like Aegle Marmelos which are over exploited in pharmaceutical industries and need conservation.

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BIODIVERSITY OF PREDATORY LADYBIRD BEETLES (COLEOPTERA: COCCINELLIDAE) FROM THE NASHIK DISTRICT, (MAHARASHTRA), INDIA.

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Abstract -

A survey of predatory and ladybird beetles (Coleoptera: Coccinellidae) from Nashik district, Maharashtra, (India). 300 beetles were collected from various talukas of Nashik district. In Nashik district, over a period of two years (June 2013 to May 2015). A total of 350 adult Coccinellid specimens were collected and identified to 5 species, of which 5 species were recorded for the first time from within the Nashik. These 5 newly recorded species belonged to 4 genera of two tribes and two subfamilies. The following 4 species belonged to the sub family Coccinellinae and tribe Coccinellini: Coccinella septempunctata Linn, Cheilomenses sexmaculata (Fabricius), Hippodamia variegate (Goeze) and Hippodamia convergens. Only one species from to the subfamily Cocidulinae and tribe Novini: Micraspis discolor (Fabricius).

Key words : New record, Coccinellid beetles, Coccinellidae, Coleoptera, Predatory

Introduction-

Coccinellids or ladybirds, are members of family Coccinellidae, and are amongst the most familiar beetles known variously as ladybirds (generic English, Australian and South African), ladybugs (North American). The family name comes from its type genus, *Coccinella*. Most of them have bright shining colours with a pattern of spots or patches against a contrasting background. Many appear to be distasteful to birds, and their conspicuous appearance is an example of anosmatic warning coloration (Moreton, 1969). Numerous species of coccinellids are predators and major

biological control. agents of hemipteran pests such as aphids, mealybugs and scale insects, as well as thrips (Thysonoptera) and mites (Acarina) in all parts of the world (Moreton, 1969; Hawkeswood, 1987; Majerus, 1994). Some are specific in their food choice; whilst many are polyphagus.Most members of the coccinellidae are beneficial as biological control agents to injurious insect in California. The cottony cushion scale *Icerya parchais* is a pest of citrus, is effectively controlled by the beetle *Rodalia cardinalis* from Australia (Majerus, 1994). In India the same insect was controlled on nilgiris by the introduction of *Rodalia cardinalis* from Australia. A large number of coccinellids are predaceous on aphids, mites,whiteflies, sacle insects, mealybugs etc. of the vegetable and horticultural pest in India. The family Coccinellidae comprises 5,200 described species worldwide (Hawleswood, 1987).

A survey of the available literature revealed only a few studies on the species composition of coccinellid beetles in India with no specific mention about the previous record from the Nashik district. However, Poorani (2002b) has listed 400 species of ladybird beetles from India subregion. Omkar & Bind (1993) have reported 6 species of ladybird beetles from Lucknow region to this omkar & Bind (1995, 1996) added 17 new species. Omkar & pervez (1999, 2000, 2002) further reported 17 more species from the same region. Poorani (2003) also reported new species *Telsimia flavomaculata* from Karnataka, India.

Review of literature reveals that the information on diversity and rearing of coccinellid beetles from Nashik district is scanty and no works have been so far reported. Hence, the present work is aimed to carry out diversity surveillance. The objective of this study was to investigate the species composition of coccinellid beetles within the Nashik district of the Maharashtra, India and create awareness among the teachers, students and farmers about the importance of coccinellids (Ladybird beetles).

Location:

Maharashtra state is included in Oriental zoogeographical region under the administration of Indian Government and has tropical environment. Maharashtra located in the North centre of Peninsular India, with a command of the Arabian Sea through its port of Mumbai.

The Nashik district (India) includes Dindori, Kalwan, Deola,Bagalan, Malegoan, Niphad, Sinner, Triambkeshwer, Yeola, Peth, Chandwad, Nandgaon, Surgana. A total of 5species were recorded. Identification of these beetles showed that they belonged to 4 genera of 2 tribes and

2subfamilies. The following 4 species belonged to the sub family Coccinellinae and tribe Coccinellini: *Coccinella septempunctata* Linn, *Cheilomenses sexmaculata* (Fabricius), *Hippodamia variegate* (Goeze) and *Hippodamia convergens*. Only one species from to the subfamily Cocidulinae and tribe Novini: *Micraspis discolor* (Fabricius).

Materials and Methods

The study was conducted to observe the diversity of coccinellids beetles from Nashik District (Maharashtra). The adult beetles were collected from different localities of Nashik district in early morning and evening. Each locality was repeatedly sampled throughout year (June 2013 to May 2015) by hand picking method. The adult beetles of each species were preserved, stored and used for identification. Each specimen was tagged with the information about host plants and locality.
Some beetle are reared at laboratory condition and released agricultural area.

Observation and Discussion-

The Nashik district (India) includes Nashik region, Dindori, Kalwan, Deola,Bagalan, Malegoan, Niphad, Sinner, Triambkeshwer, Yeola, Peth, Chandwad, Nandgaon, Surgana. A total of 5 species were recorded. Identification of these beetles showed that they belonged to 4 genera of 2 tribes and 2subfamilies. The following 4 species belonged to the sub family Coccinellinae and tribe Coccinellini: *Coccinella septempunctata* Linn, *Cheilomenses sexmaculata* (Fabricius), *Hippodamia variegate* (Goeze) and *Hippodamia convergens*. Only one species from to the subfamily Cocidulinae and tribe Novini: *Micraspis discolor* (Fabricius).

1.*Coccinella septempunctata*

2. *Cheilomenses sexmaculata*

3. *Hippodamia variegate*

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4.*Hippodamia convergens*

5. *Micraspis discolor*

***Coccinella septempunctata* (7- spotted lady bird beetle): (Fig. 1)**

Sub family: Coccinellinae

Tribe: Coccinellini

The adult beetle (*Coccinella septempuntata*) is relatively large, 7-8 mm in length, and 4.0-6.6 mm in width, form oval, strongly convex. Head is black in colour, with a pair of semicircular frontal spots, one on either side of inner margin of eyes. Pronotum is black, with a pale yellow or white anterolateral spot. Ground colour or elytra red, orange or yellow, elytral pattern in typical form with seven black spots (one common spot around scutellum, and three on each elytron), with small whitish patches on either side of scutellum. Ventral side more or less completely black. Last visible abdominal segment with a median bunch of hairs in males. Post-coxal plates on abdominal ventrite one incomplete with an associate oblique line. Larva dark slaty grey to dark brown, with orange yellow or reddish areas. Its larvae alligator shaped and its range from 0.28 to 0.31 inch in length. Pupal stage duration is depends on the temperature. Eggs are spindle shaped, small and yellow colour. In 1 to 3 month period the female can lay from 200 to 1000 small (0.04 inch or 1 mm in length) egg

Host Plants:

These beetles were found as predatory on many species of aphids as pest of Grasses, pea, Cowpea, Potato, Corn leaf, Wheat leaf, *Arachis hypogea, Vigna radiata (Fabaceae)* and many vegetable plants.

Seasonal Occurance & Distrubution:

Coccinella septempuntata were abundant in August to December as compared to other surveyed months, and distributes widely in Deola, Kalwan, Sinnar, Vani and Nashik region.

Cheilomenses sexmaculata: **(Fig.2)**

Sub family: Coccinellinae

Tribe: Coccinellini

Cheilomenes sexmaculata is also known as six- spotted zigzag beetle. The beetles are medium sized 3.3-6.2 mm in length, and 3.0-5.3 mm in width. Body outline broadly oval to subrounded, dorsum moderately convex and shiny. The elytra are dark brownish coloured. Head is dark brown in coloured. Ground colour orange, light red, yellow or pinkish with markings in the typical form: head with a black marking in posterior half, pronotum with a T-shaped median marking connected to a broad black band along posterior margin; elytra with six black maculae including two zigzag lines and a posterior black spot, sutural line with a narrow to moderately broad black stripe. The larva is dark grey to brown coloured, with yellowish patches. The pupae are yellow with blackspots.

Host Plants:

The adult beetles were found on grasses, maize, cotton, all cereals plants, *Arachis hypogea* and many vegetable crops. The adult beetles were found feeding on yellow aphids in Calotropis, cotton and maize plant and also some other aphid species found on herbal plant in the garden.

Seasonal Occurance & Distrubution:

Cheilomenes sexmaculata were active almost throughout the year in Nashik district (Deola, Kalwan, Sinnar, Vani) with many generations.

Hippodamia convergens: (Fig. 3)

Sub family: **Coccinellinae**

Tribe: Coccinellini

The adult beetle measures 4-7 mm long and 4-6 mm in width. It is narrow, elongate, oval, and weakly convex. Head is yellow with a black transverse marking. Pronotum black with white anterolateral margins and a pair of median eyes, sometimes fused together. Scutellum is black in coloured. Body colour is orange or red, with whitish/creamy yellow areas adjacent to scutellum and thirteen black spots are present on elytra, one postscutellar spot and six on each elytron. Ventral side more or less completely black. These beetles are predaceous as both larvae and adult. Their larvae are active, elongate and voracious.

Host Plants:

Hippodamia convergens were found in Green grasses, vegetable crops and feed on some brownish aphid species present on herbal plant in the garden.

Seasonal Occurance & Distrubution:

The specimens of *Hippodamia convergens* were active almost throughout the year in Deola, Vani, Sinnar, Kalwan in Nashik district, with many generations.

Hippodamia variegate: **(Fig.4)**

Sub family: Coccinellinae

Tribe: Coccinellini

The adult beetle measures 4-7 mm long. Body is narrow, elongate, oval, and weakly convex. Head is yellow with a black transverse marking. Pronotum black with white anterolateral margins and a pair of median eyes, sometimes fused together. Scutellum is black coloured. Beetle colour is orange or red, with whitish/creamy yellow areas adjacent to scutellum and nine black spots is present in elytra, one postscutellar spot and four on each elytron. Ventral side more or less completely black.This beetle are predaceous as both larvae and adult. Their larvae are active, elongate and voracious.

Host Plants:

Hippodamia variegata were found in Green grasses, Wheat, sorghum, alfalfa, vegetables, greenhouse crops, orchard crops, and most crops attacked by aphids, vegetable crops and also predatory on some aphid species present on herbal plant in the garden.

Seasonal Occurance & Distrubution:

The specimens of *Hippodamia variegata* were active almost throughout the year in Deola, Vani, Kalwan, Niwane, Satana in Nashik district, with many generations.

Micraspis discolor **(Fabricius) complex: (Fig. 5)**

Sub family: Cocidulinae

Tribe: Novini

Adults beetle of *Micraspis discolor* is measure about 4.5 mm in length and 3.0 mm in width. The color of the elytra is yellowish red without spot on elytra. Head is black coloured but white line is present in the middle region of the head. Antenna is short.

Host plant:

The adults beetle *Micraspis discolor* were found in Green grasses, vegetable crops, cotton plant, rice, cowpea, cabbage, wheat and also present in aphid infested grasses.

Seasonal occurrence & distribution:

The specimens of beetle *Micraspis discolor* were active throughout the year in Deola, Kalwan in Nashik district, with many generations. Adults beetle *Micraspis discolor* is most active during July- November month.

Conclusion:

Five different species from four genera belonging to sub-families Coccinellinae, and Coccidulinae existed in the Nashik district. The species were identified as, *Coccinella septempunctata, Cheilomenses sexmaculata, Hippodamia convergens, Hippodamia variegate, Micraspis discolor* (Fabricius) complex.

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BIODIVERSITY IN CHINUA ACHEBE'S NOVEL THINGS FALL APART

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Abstract :

African literature is noteworthy contribution to the world literature. It contains literature of African writers with African sensibility and fervour. Chinua Achebe is a representative writer of African literature. His novel Things Fall Apart is replete of biodiversity in animals, birds, flora and fauna of Nigeria. The description of Ibo society and the life style show that nature is at the centre of their life. They respect the biodiversity respect it by worshiping it like their God. They try to preserve it and wish to transfer it to the further generation.

Key words : African literature, Africanness, Ibo community, clan, Umofians, Amalinze, agadi-nwayi, coco-yams, cassava

Preliminary :

African literature contributes to a significant segment of twentieth century. It presents the writing about African aborigines living on African soil reflecting the African inhabitant sensibility and atmosphere. The significance of African Literature lies in its Africanness that is rich with oral tradition of folk songs. African literature is gaining importance in research and has become one of the major subjects of study in colleges and universities all over the world. Chinua Achebe from Nigeria is one of the eminent writers of African literature. His novels contain pervading sense of Africanness and constitute to the major content in the history of African literature. His novels have Nigerian setting in particular the Ibo community in the tribal society. *Things Fall Apart* is Achebe's first and most cherished novel that depicts the anarchic tendencies in the Ibo society. He attempts to trace the vicissitudes of the Ibo society at the outset of the completely biodiversity landscape describing varieties of trees, flowers, leaves, fruits, plants, weeds, medicinal plants, birds, animals, insects etc. The aim of the present paper is to shade light on these varieties rich with biodiversity, artistically portrayed by Chinua Achebe in *Things Fall Apart.*

The novel is a story of an Ibo warrior, Okonkwo and his society told in the three parts. It

successfully depicts the resistance within the individual and the resistance between the individual and his society. It has extensive use of African nature images including the harmattan, a African dusty wind, palm trees and oil, natural wine. The traditions and customs have animal and fruit names. Though the novelist has used English language but the extensive use of prose rhythm successfully conveys the African sense of Africa tradition of oral story narration style. The expression of various images reflecting the biodiversity of African natural scenery including palm tree palm oil and palm wine and harmattan, an African wind carrying dust particles etc expressed in Ibo community proverbs in clans. There is description of locusts coming and rejoice of Umofians since for them it is a source of their food and grace of their nature God. The survival of Ibo community depends of the earth and the conventional cycle of season. That is why there is frequent description of worshiping of God Earth. The New Year and the new harvest are celebrated in fervour and with the festivities as gift of God. They consider it as their wealth. Their day today activities are described in detail; tapping of palm trees for production of wine, making medicines from shrubs and herbs, conserving plants and trees etc. Human beings are projected as the children of God earth. At the same time the God earth may also become ruthless if it is offended by destructing actions by human beings and it may not give food and other natural resources.

The Ibo life that is full of ceremonies is exposed as a highly stylistic. There is continual exposure to respect towards ancestors, their lifestyle, their values and customs. Okonkwo, the protagonist of the story is presented as a self-made man who greatly worships his ancestors and their values. He is a heroic figure; lover of wrestling who always remembers throwing of Amalinze, the famous unbeaten wrester of neighbouring village. The villagers of Umuofia are depicted as fearing from a powerful war medicine called as agadi-nwayi. It is a special medicine with a spirit of one legged old woman. There is description of Oracle of Hills and Caves. The characters visit the place for knowing their future. It is described as a perfectly holy place. There is a detail description of people visiting to other people and the ceremony of welcoming the guests. When Okonkwo visits his friend Nwakibe to request him of lending 800 yam seeds, he is welcomed with great honour. He is welcomed by a ritual of breaking a kola nut and drinking of palm wine. So a perfectly natural welcome with fruits and palm wine is offered. In this way in every ritual there is use of natural fruits and palm wine. The entire family of Okonkwo work hard in the farm for a good harvest. Surprisingly enough the crops also have gender; man and woman. It is said that Okonkwo's family toil for woman's crop including coco-yams, cassava and beans and not yam which is man's crop. There is a reference to drought and flood; the two natural calamities that depict nature's power. Okonkwo becomes depressed because of the

calamity but Unoki offers him consolation to come out from the despair. A very interesting ritual is described; the Ibo community follows a break from work, a kind of holiday called as 'Week of peace'. This comes in the period between harvest time and planting period. It is a kind of honour to the nature and mother earth. In fact they consider the earth as living identity and call it as their mother. The farming work is jointly done by all the family members. Nwoye and Ikemefuna prepare yam seeds in order to plant in the fields. Okonkwob being the head of the family berates the seeds since both of them are too young so he will judge and correct their mistakes. Yams are described as a symbol of manliness and strength. Then there is detailed description of planting the seeds in the before the monsoon season. The rain starts heavily making the seeds ready for growing. All the family members remain at home in order to wait for the crops to grow. This is how the novelist minutely describes the complete farming process from developing the plants up to growing of the fruits. When the harvest comes there is happiness everywhere in nature. The Ibo community's biggest festival, the Yam festival is described. The yam is given such an importance that there is complete festival for it. The yam festival is an occasion of thanks giving ceremony to Ani, the mother earth. Ani is a local deity; a source of fertility, intermediary of morality. She is supposed to have direct contact with the dead ancestors. The new yam festival is considered as beginning of the New Year. Therefore it is a time of celebrating and feasting. All the family members and guests together celebrate it. Okonkwo participates in the yam festival since he worships the mother earth as a convention inherited by his ancestors. There is example of Okonkwo's reverence towards trees and plants. When his wife is found cutting off leaves of banana trees he harshly beats her considering it as a kind of sin. He becomes so much frustrated that he goes for hunting in order to refresh his mood.

Women are given respect and honour in the Ibo community like the mother earth. Oknonwo is served dishes of food from his wives and he eats from every dish as his obligation. The most senior wife first gives fire to the cooking and it is her right to bring first the yams for cooking. When the palm wine is made for the first time it is first presented to the women of the family to enjoy while they cook. In the wedding ceremony the bride also takes the palm wine. Later male relatives gather and sit in the encircling position. The in-laws arrive with fifty pots of palm wine which is a kind of great honour, a kind of richness. Obuerika breaks kola nuts and proposes all with the first toast in the name of God. All the people gathered in the wedding drink palm wine and then the young men start singing songs of the old men, describing their vigour and strength. The bride comes out and performs a solo dance with a cock in her hand as a symbol of joy.

There is a reference to locusts descending on the clan. Okonkwo and his children are very happy when they experience locusts descending while they are working on the farm. The sight is fully

described in its beauty. The oldest person in the clan remembers his good old days, the time when locusts arrived. Everything is drenched and everyone from the clan comes out from his house to catch the locusts. They enjoy eating them freely as a gift from earth God. Okonkow's family is described as enjoying and crunching the locusts happily as family joint activity. Okonkwo regularly taps palm trees and also talks about the variety of tastes as if he is master in the palm wine. Men are welcomed by kola nuts and palm wine. So there is a lot of reference to palm trees and wine in the novel. There is description of Akuke, the bride of sixteen year old who bring the kola nuts for her suitor and men sitting at the door in her watching a bride by the male suitor. There is description of her shaking hands removing her waist beads in such a perfect manner that they don't fall in the fire. In the hut men are described with negotiating the price of twenty cowries as a dowry for Akueke. She brings a cock in her hand while dancing the celebrity of the marriage.

Okonkwo is described as working like a medicine man that cures ailment with help of medicinal plants and herbs and shrubs. He brings herbs and asks Ekwefi, his wife to boil water and throws herbs in it. He puts Ezinma inside the hot pot by standing on the wooden stool. He covers her completely with the help of mat and keeps her in it until she is fully drenched with her sweat. Ultimately she falls asleep. The novel has bedtime time stories told by Okonkwo's wife and other women of the clan to their children. Almost all the stories have animals and trees as the characters. These are folk tales with supernatural elements. Ekwefi tells the story of a tortoise who wish to join the feast of birds organised in the sky. Animals are also used an offering to in-laws and God. Umuike is the famous market where Obierika visits to buy a huge boat in order to gift to his in-laws. There is a reference to a cow which starts running in others fields and women rush to catch it before it damages the fields. After the exhausting work the women return back to their work of cooking for the family.

Conclusion :

Thus Chinua Achebe's novel *Things Fall Apart* is completely doomed in the biodiversity of animals, birds, plants, trees, herbs, shrubs, leaves, flowers etc aspects of nature. The spectacle created is completely natural in fact genuinely wild. It is indeed a perfect African novel and readers no matter how far he/she is away from wild Africa, but he is caught in the sensual beauty full of biodiversity.

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