Selected Papers on
“Avian Diversity and
Hydrobiology”

Dr. M. Y. Kulkarni
Head Dept. of Zoology
N.S.B. College, ACS Nanded – 431 602 (Ms.)

Dr. R. D. Barde
Head Dept. of Zoology
SGB College, Purna Dist. Parbhani

Siddhi Publications, Nanded
Maharashtra (India)
## INDEX

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Title of Papers</th>
<th>Name of Authors</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SYNURBIZATION - ADAPTATION OF BIRD WILD LIFE TO NANDED URBAN DEVELOPMENT</td>
<td>R. S. Sonwane and A. B. Harkal</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>CONSERVATION OF AVIAN DIVERSITY AT SITAKHANDI FOREST IN BHOKAR TAHSIL OF NANDED DISTRICT [M.S.]</td>
<td>V.S. Jadhav, V.S. Kanwate and A.B. Harkal</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>DIVERSITY AND POPULATION OF AVIFAUNA OF SANGVIKATI PERCOLATION TANK, TAL. TULJAPUR DIST. OSMANABAD (M.S.)</td>
<td>P. V. Darekar A.C.Kumbhar</td>
<td>20</td>
</tr>
<tr>
<td>4.</td>
<td>DEEP SEA FISHERY BIO RESOURCES - BIODIVERSITY AND STOCK ASSESSMENT</td>
<td>V.S.N Raghava Rao</td>
<td>30</td>
</tr>
<tr>
<td>5.</td>
<td>ASSESSMENT OF GROUND WATER QUALITY IN GOKUNDA TALUKA KINWAT OF NANDED DISTRICT, MAHARASHTRA (INDIA).</td>
<td>M. Maqdoom</td>
<td>35</td>
</tr>
<tr>
<td>6.</td>
<td>LIFE BECOMES MEASURABLE DUE TO EXCESS FLUORIDE IN GROUND WATER NEARBY NANDED CITY DISTRICT NANDED</td>
<td>J.U. Deshmukh</td>
<td>43</td>
</tr>
<tr>
<td>7.</td>
<td>STUDIES OF DISSOLVED OXYGEN IN PURNA RIVER, DIST. PARBHANI</td>
<td>V.K. Kadam</td>
<td>48</td>
</tr>
<tr>
<td>8.</td>
<td>DETERMINATION OF FLUORIDE CONTENT IN RIVER WATER OF PURNA CITY</td>
<td>M. U. Sabri A. B.Bhosle</td>
<td>56</td>
</tr>
</tbody>
</table>
Synurbization – Adaptation of Bird Wild Life To Nanded Urban Development

Rajkumar S. Sonwane1 and Arvind B. Harkal2
1Department of Dairy Science, Yeshwant Mahavidyalaya, Nanded.(MS) INDIA
2Department of Zoology, Shri Renukadevi Mahavidyalaya, Mahur Dist.Nanded.

ABSTRACT:
With the global high rate of urbanization and the rapid loss of wild habitat land, cities are now viewed as challenging ecosystems for sustaining biotic communities and rich diversity. The increase in population density is related to the increase in food abundance, and probably to the reduction in predation pressure. The loss of diversity is related to loss of habitat, the high human density, and negative interactions with synanthropic species. Recognizing that the urban habitat will continue to grow, efforts to turn the city into a more friendly habitat for a variety of bird species. The exploration of bird-urbization has entered a new era with individual-based tracking during multiple years. Attempt has been made to collect available information pertaining to Synurbization patterns of birds to Nanded in order to analyse the variations amongst different species. The necessity of bird’s Synurbization and conservation practices has been critically assessed.

INTRODUCTION
Recent decades have seen an increasing tendency for birds to colonize cities. This phenomenon Posed the need for a new term - synurbization, which was created by theriologists-ecologists. It denotes an adjustment bird populations to specific
conditions of the urban environment, in connection with regular existence (often breeding) there in the wild state. The term is not applied to individual birds which have come (or been brought by humans) to an urban area accidentally and which live there for a limited time. Synurbization is related to two other terms used in this field: synanthropization and urbanization. Synanthropization refers to the adaptation of bird populations to human-created (anthropogenic) conditions in general and urbanization refers to changes in landscape (environment) caused by urban development. Therefore, synurbization is the particular case of synanthropization under the specific conditions of urbanization. The phenomenon of synurbization has been described mainly for birds and mammals, but it is known also in other animal groups (e.g. amphibians). It is a subject of increasing interest to science, because it demonstrates ecological and behavioral plasticity and microevolutionary changes in bird populations under anthropogenic pressure. It is also a point of interest in applied ecology, because it implies the possibility of enriching and managing urban wildlife. This paper presents characteristic features of synurbic populations. Eusynanthropic species living in cities - e.g. parrots and cranes.

Although the study of urban birds has a fairly long history, urban ecosystems have been largely ignored throughout many decades of ecological research. Since the early 1990s, a different view emerged, accepting urban settings as ecosystems that are structured and function like other natural ecosystems. This theoretical view represents an emerging realization that by now, most of the world’s land is managed and dominated by humans (approximately 50% of the human population lives in cities). Wildlands are continuously converted to agricultural fields and urban areas. Consequently, urban environments can no longer be viewed as lost habitat for wildlife, but rather as new habitat that, with proper management, has the potential to support diverse bird communities. During the last decade urban
ecosystems have therefore become ecological challenges in conservation, restoration, and reconciliation ecology [4, 9]. Designing sustainable urban ecosystems that support species-rich bird communities also includes maintaining key ecosystem services, such as clean air and water, waste decomposition, and pest control. Recent zoology/ecology coined a new term, synurbization, as an analogy to the existing term of wider meaning – “synanthropization.” Synurbization denotes adjustment of wild animal populations to specific conditions of urban environment. The new term, was introduced by theriologists and it is accepted in ornithology as well. The term “urbanization,” in turn, should be in ecology applied for changes in landscape (or environment) caused by urban development. The growing and global tendency towards synurbization, observed recently in animal world, is a response to world-wide expansion of urban development (urbanization). More and more bird populations colonize cities, and some of them are in urban conditions much more successful than in their native natural habitats. Keep in above view the necessity of bird’s Synurbization and conservation practices have been critically assessed as below.

THE PHENOMENON

More and more bird species, represented by growing numbers of local populations, are settling and increasing their abundance in cities. In India (Nanded), bird species, have colonized highly urbanized areas since the middle of the century. Processes of synurbization also concern wild populations of birds introduced (or reintroduced) to cities by man. Synurbization is a wildlife response to global expansion of urbanization. The majority of contemporary fauna species shaped their ecological and behavioral status during the last 1 to 500 million years, while urbanization, in the scale of landscapes, has occurred only during the last 100-200 years. In terms of nature, cities are “explosion” of new and “strange” type of
environments (complex of habitats, landscape) characterized by the highest anthropogenic pressure. Urban development destroys natural habitats, but also creates new, free ecological niches covering areas which grow rapidly. This expanding “ecological vacuum” attracts more and more animal populations. Some of them overcome the ecological barriers posed by urbanization and adapt successfully to specific conditions offered by the new niche.

In Berlin, among 170 breeding bird species recorded, 97 (57%) are included in the Red List, of which 29 (17%) have become extinct, and 40 (23%) are threatened by extinction or highly endangered. Synurbization of some species could cause practical problems when their populations grow to high concentrations. Such problems cause roosting of starlings (Sturnus vulgaris) and corvid birds (Corvidae) in cities. Winter roosting concentration of rooks (Corvus frugilegus) and other corvids in Warsaw were estimated at approximately 250 thousand of birds and in Moscow, approximately 800,000. An example of such problems is the Canada goose in North American cities. Current scientific knowledge, and practical experiences, offer wide range of possibilities to stimulate, and to control synurbization processes. Cities could be refugee and conservation areas for some endangered species. A spectacular example of this is recovery is the peregrine falcon. Successful recovery in North America and Europe of this nearly extinct bird is connected with rapid growth of its urban population. In this case synurbization of peregrine was stimulated by introduction of this species in many cities and protection measures taken there. Managing urban wildlife by stimulation and control of synurbization processes should be aimed to support natural functions and structure of the city ecosystem, with ecological and social needs of man and with the general strategy of nature conservation in mind.
In Berlin, among 170 breeding bird species recorded, 97 (57%) are included in the Red List, of which 29 (17%) have become extinct, and 40 (23%) are threatened by extinction or highly endangered [10]. Synurbization of some species could cause practical problems when their populations grow to high concentrations. Such problems cause roosting of starlings (Sturnus vulgaris) and corvid birds (Corvidae) in cities. Winter roosting concentration of rooks (Corvus frugilegus) and other corvids in Warsaw were estimated at approximately 250 thousand of birds and in Moscow, approximately 800,000. An example of such problems is the Canada goose in North American cities. Current scientific knowledge, and practical experiences, offer wide range of possibilities to stimulate, and to control synurbization processes. Cities could be refugee and conservation areas for some endangered species. A spectacular example of this is recovery is the peregrine falcon. Successful recovery in North America and Europe of this nearly extinct bird is connected with rapid growth of its urban population. In this case synurbization of peregrine was stimulated by introduction of this species in many cities and protection measures taken there. Managing urban wildlife by stimulation and control of synurbization processes should be aimed to support natural functions and structure of the city ecosystem, with ecological and social needs of man and with the general strategy of nature conservation in mind.

**STUDY AREA:**

This study assesses the habitat potential for Nanded (railway station to mill area). This area were selected because they had available urban forest data from wide range of urbanization situation such as market place, traveling facility, medical facility etc.
CHANCE FOR URBAN WILDLIFE:

The main consequence of urban development for wildlife is a decrease in its species and ecological diversity. The growing tendency towards synurbization observed recently in birds is an optimistic chance for enriching diversity of urban wildlife. But, increasing synurbization processes do not change the fact that a global ecological crisis is affecting urban fauna, particularly its diversity, as well as the whole animal world. Examples in the inner area of Nanded, many bird species have decreased populations or vanished since the middle of century. In the same period, species have increased their populations in this area, as a result of synurbization and often in connection with expansion of the geographic range of the species (Data of Nanded). The overall avifaunal diversity of inner Nanded decreased, despite of the intensive synurbization processes shown by several species.

OBSERVATIONS:

Nanded is a big and developing city and its surrounding Villages are converted into urban areas it affects adversely on the environment and wild life by the grace of God the most of the birds build their nest on the surroundings of Railway stations huge number of birds by occupying the trees. As the sunset
begins the birds (like Minahs, Parrots and Cranes etc.) comes to settle on the trees beyond our estimation as the night raises bird’s numbers increases till after the fore night it’s number get reduced. Due to the huge number of birds it is very difficult to distinguish between the leaves and the birds.

Synurbanization is necessary-Through synurbanization birds control the insects pests and urban waste (food) and dispersion of seeds and improves the Natures beauty.

**CONCLUSIONS:**

The term “synurbization” denotes more precisely the phenomenon of the adjustment of bird populations to the urban environment than the term “urbanization,” which should be applied to changes in the landscape caused by urban development. The synurbization of bird populations is an increasing phenomenon worldwide. It is a response of wildlife to the global explosion of urbanization, which creates new ecological niches acceptable to some bird species. These adaptations seem to be within the biological plasticity range of the species. Imprinting probably plays an important role in synurbic adjustments. But, evidence was also found suggesting genetic differences distinguishing urban populations. The increasing phenomenon of synurbization shows that there are chances for some kind of coexistence between nature and expansion of urban civilization. It does not, however, change the fact that an ecological crisis is affecting the fauna in cities just as in the animal world as a whole. Present knowledge offers possibilities for enriching poor diversity of wildlife in cities, and to manage it with city dwellers’ needs and general strategy of nature conservation in mind.

**REFERENCES**

population in urbanization gradient. Acta theriol. 23: 341-358


Conservation of Avian Diversity at Sitakhandi Forest in Bhokar Tahshil of Nanded District [M.S.]

V. S. Jadhav¹ V.S., V. S. Kanwate² and A. B. Harkal³

²Nagnath College Aundha.
³Dept. of Zoology Renukadevi Mahavidyalaya Mahur, India

ABSTRACT

The Sitakhandi forest is 9 Km away from Bhokar. The forest consist of various plant and trees like Teak (Tectona grandis), Neem (Azadiracta indica), Babul (Acacia arabica), Mango (Magniferra indica), Sitaphal, (Annona squamosa), Chinch (Tamarindus indica), Pimpal (Ficus religiosa), Bor (Zizyphaus Jujuba), Dhawada (Anogeissues latifolia), Moha (Madhuca indica). The forest consist of various types of grasses, some wild animals are also visit at various habits in this forest. There are many local birds; migratory birds are also visits various habits of the forest. Such as House crow, Bulbul, Common myna, House swift, Parakeet, Lapwing, Dove, Black Drango, Cuckoo etc. birds are found.

So for no scientific data is available for on the avian fauna of these forest the present study is carry out from June 2009 to July 2011 for avian fauna of given spots.

Key words-Avian diversity, Sitakhandi forest.

INTRODUCTION

The Sitakhandi forest is 9 Km away from Bhokar. The forest consist of various plant and trees like Teak (Tectona grandis), Neem (Azadiracta indica), Babul (Acacia arabica), Mango (Magniferra indica), Sitaphal, (Annona squamosa), Chinch (Tamarindus indica), Pimpal (Ficus religiosa), Bor (Zizyphaus Jujuba), Dhawada (Anogeissues latifolia), Moha
(Madhuca indica). The forest consist of various types of grasses, some wild animals are also visit at various habits in this forest. There are many local birds; migratory birds are also visits various habits of the forest. Such as House crow, Bulbul, Common myna, House swift, Parakeet, Lapwing, Dove, Black Drango, Cuckoo etc. birds are found.


MATERIAL AND METHODS

The present study avian diversity identified at the spots as per guidelines given by Ali and Ripley (1996), Ali (2002), Chitampelli (2002) by using binoculars 7x and 8x Magnification. The present study is based on observation made June 2009 to July 2011, regular visits for the survey and identification of birds monthly visits were done in morning (7am-10am) and evening (4 to 5-30pm) hours. The birds are observed on the basis of their common names, scientific names, total counts and nature of abundances and migratory behavior.

In Sitakhandi total 80 species of birds were identified out of them 24 Residential Common (RC), 24 Residential Uncommon (RU), 09 Residential rare (Rr), 05 Residential Migrant Common (RMc), 01 Residential Migrant (RM), 05
Residential Migrant rare (RMr), 02 Migrant Uncommon, (MU), 02 Migrant rare (Mr) , 02 Winter Migrant Common (WMc), 05 Winter Migrant Uncommon (WMu) and 01 Winter migrant rare (Wmr).

The different types of birds were recorded at Sitakhandi due to local environmental conditions and season has impact on composition and diversity occurrence birds. The bird’s population was more during winter and summer (Kulkarni et.al. (2005). It was noted that birds move out from one station to other to avoid unfavorable, environmental conditions. (Ghazi (1962), Davidar (1985), Ali (1932), Kulkarni et.al (2006), Singh (1929), Gaikwad et.al. (1997), Manakadan et.al. (2001), Wadatkar (2001), Prasad (2003), Jathar et.al. (2004), FSI (2001), Bird Life international (2001), Gazetter of India (1974).

The species feed on fishes therefore affecting reservoir fishery. They are also carries pathogens (Lagler (1978), Jhingran (1988)) and there it is necessary to reduce their population. These can be done by eradicating aquatic weeds and clearing the periphery margins of reservoirs. K.B. Patel (2011) observed 39 species of birds from Patan district also find out taluka wise population status. The results indicated that 5 to 10 species of birds were found very common in most of the taluka. These were Cattle egret, Blue Rock Pigeon, Rose-ringed Parakeet, Green Bee eater, Babbler, House sparrow.

Present research work focused on the qualitative and quantitative aspects of avian diversity that can be used to understand and help in prioritization of areas for conservation. In order to conserve local bird population structure and status of bird is essential. During study period there is no observed globally threatened species or nearly threatened species of birds. Conservation and suggestion

The following action plan is proposed for the conservation of birds and wetlands of Sitakhandi forest.
The area is required to be stopped appropriately to check the illegal hunting to prevent further population loss of birds. We have to strengthen enforcement of existing restrictions on the hunting of migratory birds.

Anthropogenic factors are the root causes for wetland degradation and habitat destruction of water birds. Therefore, conservation education and awareness programmes are essential for local farmers, students and fishing community to the pond. Studies on vegetation have revealed that intensive biomass extraction (mainly through grazing and fuel wood collection) is leading to changes in vegetation structure and composition of the forest. These changes in forest structure are leading to changes in bird species composition.

Corporation (GMIDC) has been launched by the Government of Maharashtra. This may be beneficial to the farmers and birds, but the existing grassland avifauna is under great threat. The area still provides some potential habitats for the declining population of the threatened birds. It is the need of the hour to monitor these areas systematically in the rapidly changing environment with a focused study on status, distribution and conservation of the avifauna of the region. This can be achieved only through strengthening public participation in the study of status, distribution and conservation of birds of Marathwada region, Maharashtra.

Agricultural areas in India probably experience the most heavy and indiscriminate use of pesticides leading to direct and indirect mortality of predatory and frugivorous birds.

Despite the above studies, the state of our knowledge on bird control is preliminary. In fact, this area is still developing even in the developed countries and there is a lot of scope for innovative work. Nature awareness programmes regarding birds, mangrove forests and importance of wetland ecosystem for daily sustenance of life to be given to the local people for the conservation of this avian diversity.
Active patrolling should be carried out by the forest department, at least five groups with four forest guards are recommended for patrolling at different parts of this area to stop poaching and deforestation.

In-depth studies on the avifauna, especially endangered birds, should be undertaken. Hence urgent conservation measures have to be implemented and a protected area has to be evolved for preserving the remaining tract of mangroves and faunal heritage of this unique region.

Local people should be made aware of the importance of wetlands, waterfowl and other common birds. Without the involvement of common people of this region conservation of the wetlands will not be successful.

As grasslands are preclimax they are maintained by annual burning, grazing and floods. Grasslands are managed by the annual prescribed burning at the beginning of the dry season and this is the most important and crucial management activity. However, burning may be harmful to grassland birds, especially if it is carried out too frequently or too intensively.

Control and management of accidental fires in the forest, during early summer has some adverse affect on the forest dwelling species.

Measurement of water chemistry should be done on a regular basis to allow long-term monitoring of changes in nutrient levels and other parameters. Thus the site is an ideal place for conservation of endemic and globally threatened birds and also to a large number of important flora and fauna. Due to the increase in human population the forest is presently facing disturbance in the edges which will increase in due course of time if proper conservation measures are not taken up immediately. Conservation awareness programmes among the local people is required to sensitize the people about the sustainable use of the forest resources to conserve it for future generations.
This suggests that the providing natural habitat, availability of food, water, climatic conditions and surrounding vegetation are favorable for avian fauna.

REFERENCES:

Diversity And Population of Avifauna of Sangvikati Percolation Tank, Tal.Tuljapur Dist.Osmanabad (M.S.)

P. V. Darekar and A.C. Kumbhar
Dept. of Zoology and Research Center,
Shankarrao Mohite Mahavidyalaya, Akluj, Solapur

ABSTRACT:

Sangvikati percolation tank is an artificial earthen water reservoir located close to the village Magar Sangvi, Tuljapur, Dist. Osmanabad. Its total storage capacity is 1.26 MCM. This reservoir conquers the length of 706m making the site suitable for the birds. Most of the land near the reservoir is used for agriculture. Water level in this reservoir showed less seasonal changes. The water from Sangvikati percolation tank is currently used for irrigation. Variety of resident and migratory birds, aquatic and terrestrial birds visits the reservoir.

The present study is endeavored to prepare a checklist of diversity and abundance of birds from the Sangvikati percolation tank over the period of 12 months. i.e. from July 2014 to June 2015. Near about 71 species of birds belonging to 34 families have been recorded in this reservoir. Most of the wetland birds observed during the present study were resident. These resident birds were observed in almost all months of investigation period but the migratory birds were the winter visitors. This data suggests that the freshwater reservoir sites are more suitable habitat than the other. The birds found near the reservoir are categorized as resident, local and migratory. Furthermore, the birds which are noticed in the study period are classified as aquatic and terrestrial.
Keywords: Avifauna, diversity, Percolation tank, Resident, Migratory, Aquatic, Terrestrial, MCM

INTRODUCTION:

Birds are found throughout the world, at approximately all altitudes and in nearly every climate. Diversity of avifauna is one of the most important ecological indicators to evaluate the quality of habitats. Birds have great economic importance. They play an important role in controlling population of different pests. They are scavengers and pollinating agents and also help in dispersal of seeds. The present research paper reports the checklist of Avifauna of Sangvikati percolation tank, Tuljapur, Dist. Osmanabad (M.S.). The Sangvikati percolation tank is located near the village Magar Sangvi, located 12km away from Tuljapur. Sangvikati percolation tank has a total storage capacity of 1.26 MCM. This reservoir commands a gross length of 706m. Sangvikati percolation tank is mainly constructed for the purpose of irrigation. Water level in this reservoir showed less seasonal changes making available the food and water in every season. As a result, the water body has a diversity of resident and migratory birds. Till now, different researchers have studied avifauna of surrounding regions.


MATERIALS AND METHODS:

The study site is located at 17°54′58.6″N 75°59′39.4″E near the village Magar Sangvi, Tuljapur, Dist. Osmanabad. This reservoir is constructed on local nala in the Basin of Krishna River. The site has less human disturbances. Apart from the expected functions of irrigation, this reservoir is providing the suitable site for birds.
Monthly bio monitoring surveys were held at morning and evening time at study site, scheduled from July 2014 to June 2015 to find out diversity and abundance of the flying biped. Observation of the birds was done by Celestron G2 Upclose (10 X 50) binocular. Photography was done with the help of CANON EOS 1100D and zoom lenses (110-255 mm). The observed birds were identified with the help of field guides and pictorial literature, the book of Indian birds Salim Ali, 1912. The record of observed birds is maintained by basic bird count and point count method. Checklist of birds was prepared family wise.

**DISCUSSION AND RESULT:**

In the present investigation, totally 71 bird species belonging to 34 families have been recorded at Sangvikati Percolation tank for the period of 12 months i.e. from July 2014 to June 2015. As the study period includes monsoon, winter and summer season, the variability in the climate and the water level of the reservoir influenced the bird count at the study site. More number of species is recorded from family Anatidae. The majority of the surrounding land is used for agriculture. The reservoir and the surrounding area have adequate food material that attracts the different types of birds. The number of birds was remarkable in winter season. The water in the reservoir is less polluted. All these factors contribute for making the site suitable
for birds. The recorded birds are categorized into resident, local and migratory birds, and furthermore, aquatic and terrestrial.

Key to abbreviations:
First suffix: (Status)    Second suffix: (Occurrence)
R: Resident
A : Aquatic
M : Migrant
T : Terrestrial
LM : Local Migrant

Table: 1: Checklist of Avifauna of Sangvikati percolation tank

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Common Name</th>
<th>Scientific Names</th>
<th>Family</th>
<th>Residual Status</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brahminy Kite</td>
<td>Haliastur Indus</td>
<td>Accipitridae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>2</td>
<td>Black kite</td>
<td>Milvus migrans</td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>3</td>
<td>Pallied harrier</td>
<td>Circus macrourus</td>
<td></td>
<td>LM</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>Shikra</td>
<td>Accipiter badius</td>
<td></td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>Ashy crowned sparrow lark</td>
<td>Eremopterix grisea</td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>6</td>
<td>Rufous tailor lark</td>
<td>Ammomanes phoenicurus</td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>7</td>
<td>Pied kingfisher</td>
<td>Cerykerudis</td>
<td>Alcedinidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>8</td>
<td>White breasted Kingfisher</td>
<td>Halcyon smyrnensis</td>
<td></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>9</td>
<td>Comb duck</td>
<td>Sarkidiornis melanotos</td>
<td>Anatidae</td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td>10</td>
<td>Common pochard</td>
<td>Aythya ferina</td>
<td></td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td>11</td>
<td>Common</td>
<td>Anas clypeata</td>
<td></td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Northern pintail</td>
<td>Anas acuta</td>
<td>M</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Northern shoveller</td>
<td>Anas poecilorhyncha</td>
<td>M</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ruddy shelduck</td>
<td>Tadorna ferruginea</td>
<td>M</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Spot-billed duck</td>
<td>Anas poecilorhyncha</td>
<td>M</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>House swift</td>
<td>Apus affinis</td>
<td>Apodidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>17</td>
<td>Cattle egret</td>
<td>Bubulcus ibis</td>
<td>R</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Grey heron</td>
<td>Ardea cinerea</td>
<td>R</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Indian pond heron</td>
<td>Ardeola grayii</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Large egret</td>
<td>Ardea alba</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Little egret</td>
<td>Egret intermedia</td>
<td>LM</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Indian Grey Hornbill</td>
<td>Ocyceros birostris</td>
<td>Bucerotidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>23</td>
<td>Red-vented Bulbul</td>
<td>Pycnonotus cafer</td>
<td>Campephagidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>24</td>
<td>Indian nightjar</td>
<td>Caprimulgus asiaticus</td>
<td>Caprimulgidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>25</td>
<td>Little ringed plover</td>
<td>Charadrius dubius</td>
<td>R</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Red wattled lapwing</td>
<td>Vanellus indicus</td>
<td>Charadridae</td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>27</td>
<td>Yellow wattled lapwing</td>
<td>Vanellus Malabaricus</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Painted stork</td>
<td>Mycteria leucocephala</td>
<td>R</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Wooly necked stork</td>
<td>Ciconia episcopus</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Rock pigeon</td>
<td>Columba livia</td>
<td>Columbidae</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>No.</td>
<td>English Name</td>
<td>Scientific Name</td>
<td>Order</td>
<td>Family</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------</td>
<td>-------------------------------------</td>
<td>-----------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Laughing dove</td>
<td>Streptopelia senegalensis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Indian Roller</td>
<td>Coracias bengalensis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>House crow</td>
<td>Corvus splendens</td>
<td></td>
<td>Corvidae</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Jungle crow</td>
<td>Corvus macrorhynhos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Asian koel</td>
<td>Eudynamys scolopacea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Brain fever bird</td>
<td>Hierococcyx</td>
<td>Cuculidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Crow pheasant</td>
<td>Centropus sinensis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Indian courser</td>
<td>Cursorius coromandelicus</td>
<td>Clareolidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Pratincole</td>
<td>Glareola lacteal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Bay backed shrike</td>
<td>Lanius vittatus</td>
<td>Laniidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Rufous tailed shrike</td>
<td>Lanius isabellinus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>River tern</td>
<td>Sterna aurantia</td>
<td>Laridae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Green bee eater</td>
<td>Merops orientalis</td>
<td>Meropidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Common stone chat</td>
<td>Saxicola torquata</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Indian robin</td>
<td>Saxicoloides fulicata</td>
<td>Muscicapidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Oriental Magpie-Robin</td>
<td>Copsychus saularis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Pied bush chat</td>
<td>Saxicola caprata</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Purple rumped sunbird</td>
<td>Nectarinia ceylonica</td>
<td>Nectarinidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species</td>
<td>Genus</td>
<td>Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>---------------</td>
<td>-------------------------</td>
<td>--------------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>49</td>
<td>House sparrow</td>
<td><em>Passer domesticus</em></td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>50</td>
<td>Baya weaver</td>
<td><em>Ploceus philippinus</em></td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>51</td>
<td>Indian Cormorants</td>
<td><em>Phalacrocorax</em></td>
<td><em>Phalacrocoracidae</em></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>52</td>
<td>Little Cormorants</td>
<td><em>Phalacrocorax</em></td>
<td></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>53</td>
<td>Common quail</td>
<td><em>Coturnix coturnix</em></td>
<td><em>Phasianidae</em></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>54</td>
<td>Indian peafowl</td>
<td><em>Pavo cristatus</em></td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>55</td>
<td>Alexandrine parakeet</td>
<td><em>Psittacula</em></td>
<td><em>Psittacidae</em></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>56</td>
<td>Rose ringed parakeet</td>
<td><em>Psittacula</em></td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>57</td>
<td>Little grebe</td>
<td><em>Tachybaptus ruficollis</em></td>
<td><em>Podicipedidae</em></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>58</td>
<td>Red vented bulbul</td>
<td><em>Pycnonotus cafer</em></td>
<td></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>59</td>
<td>Common coot</td>
<td><em>Fulica atra</em></td>
<td><em>Rallidae</em></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>60</td>
<td>Common moorhen</td>
<td><em>Gallinula chloropus</em></td>
<td></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>61</td>
<td>White breasted water hen</td>
<td><em>Amaurornis phoenicurus</em></td>
<td></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>62</td>
<td>Black winged stilt</td>
<td><em>Himantopus himantopus</em></td>
<td><em>Recurvirostridae</em></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>63</td>
<td>Common sandpiper</td>
<td><em>Actitis hypoleucus</em></td>
<td><em>Recurvirostridae</em></td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>64</td>
<td>Wood sandpiper</td>
<td><em>Actitis hypoleucus</em></td>
<td><em>Scolopacidae</em></td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td>65</td>
<td>Spotted owlet</td>
<td><em>Athene brama</em></td>
<td><em>Strigidae</em></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>66</td>
<td>Brahminy myna</td>
<td><em>Sturnus pagodarum</em></td>
<td><em>Sturnidae</em></td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Month</td>
<td>No. of Aquatic birds</td>
<td>No. of terrestrial birds</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>----------------------</td>
<td>--------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Jul-14</td>
<td>19</td>
<td>8</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aug -14</td>
<td>20</td>
<td>8</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

**Family** | **No. of Species** | **Family** | **No. of Species**
--- | --- | --- | ---
Accipitridae | 4 | Laridae | 1
Alaudidae | 2 | Meropidae | 1
Alcedinidae | 2 | Muscicapidae | 4
Anatidae | 7 | Nectariniidae | 1
Apodidae | 1 | Apodidae | 2
Ardeidae | 5 | Phalacrocoracidae | 2
Bucerotidae | 1 | Phasianidae | 2
Campephagidae | 1 | Psittacidae | 2
Caprimulgidae | 1 | Podicipedidae | 1
Charadriidae | 3 | Pycnonotidae | 1
Ciconiidae | 2 | Rallidae | 3
Columbidae | 2 | Recurvirostridae | 1
Coraciidae | 1 | Scolopacidae | 2
Corvidae | 2 | Strigidae | 1
Cuculidae | 3 | Sturnidae | 3
Glaeolidae | 2 | Threskiornithidae | 2
Laniidae | 2 | Upupidae | 1
**Total** | **41** | **Total** | **30**
CONCLUSION:

Total 71 bird species belonging to 34 families have been recorded at Sangvikati percolation tank during the period of 12 months from July 2014 to June 2015. Out of these species 28 were aquatic and 43 were terrestrial. Among this population, 6 species of birds were local migratory, 12 species were migratory and 53 were resident birds. During the investigation, little egret, Rose ringed parakeet, Common myna, Indian robin, Indian roller, red and yellow and red wattled lapwing were observed in all seasons. Most of the wetland birds observed during the present study were resident birds. The number of bird species was observed maximum during winter season as different migratory birds visit this reservoir. It can be concluded that this reservoir and surroundings has adequate of food that attracts different types of birds. The number of birds was remarkable in winter season. The resident birds were observed in almost all months of investigation period but the migratory birds were the winter visitors. The poaching is not noticed in the study period. Human disturbance is also less. All these factors contribute for making the Sangvikati percolation tank is a suitable water body for the winter visitors and local birds. This data suggests that the freshwater reservoirs sites are more suitable habitat than the
other. In future it must be protected from human interference and to be kept free from effects of pollution.

ACKNOWLEDGMENT:

Author is thankful to the Management, Principal and Head, Department of Zoology, Shankarrao Mohite Mahavidyalaya, Akluj, Dist. Solapur for their persistent encouragement and the moral support. I also express my gratitude to Dr. Arvind C. Kumbhar, Research Guide, Dept. of Zoology, Shankarrao Mohite Mahavidyalaya, Akluj, Dist. Solapur for providing the references papers, ideas and comments and supervising my research work.

REFERENCES:

Deep Sea Fishery Bio Resources – Biodiversity and Stock Assessment

V. S. N Raghava Rao
Anandibai Pradhan Science College Nagothane, Tal-Roha, Dist- Raigad, Maharashtra 402106

ABSTRACT

In India the rapid mechanization has resulted in optimum utilization of the fishery resources in the coastal zone up to 100m depth. Presently, fishing industry is looking for fishery resources in the outer continental shelf (beyond 100m), and, slope and oceanic regions as a possible avenue to increase fish production. The exploratory surveys conducted by Fishery Survey of India and the trends in marine fish production as provided by CMFRI, has enabled to estimate the annual potential yield of the Indian EEZ to about 3.93 million tones [1]. The demersal and pelagic resources in 50-200m depth are assessed to be in the 1.395 million t. This include the high value resources of deep sea crustaceans to the extent of 20400 t in 200 — 500m depth and 0.246 million t of large size and highly migratory oceanic tuna and allied resources. The paper presents the diversity and potential of deep sea demersal, pelagic and oceanic species available in the Indian EEZ for utilization. The deep sea Species identified in these areas are also presented in this paper.

INTRODUCTION

The fisheries all over the world have been matter of discussion as the demand for seafood products is steadily growing both within the country as well as abroad. On the other hand the FAO reports that 70% of the fish stocks in the world oceans have been over-exploited. The decades of fisheries development have witnessed dramatic advancement in the areas of resources assessment. Utilization. This has lead to the development of the new concepts, approaches and policies, which have been applied with varying degrees of success in resources assessment, utilization, conservation and management for the fish stocks. The ever increasing resource utilization and
the complexities of the highly interactive and dynamic marine ecosystems, still continue to generate several new challenges with consequent impact on the biological characteristics of the fish stocks, their habitats and environment. The human interventions while optimizing the utilization of the fishery resources, which is seldom practiced on sustainable basis, in most of the countries contribute little to social and economic aspects of the communities involved in the fisheries activities.

The biological diversity defined as the variability among living organisms from all sources including, inter alia terrestrial, marine and aquatic systems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (United Nations Environment Programme, 1992). As per the FAO Code (1995), for implementing responsible fishing practices to ensure the effective conservation and development of living aquatic resources with due consideration to ecosystem and biodiversity, the studies on identifying diversity and stock assessment are very much essential.

In marine fish production estimated as 3.21 million tones pelagic fin fishes contributed 53% demersal 27%, crustaceans 15% and mollusks 5% of the total west coast contribution was the highest in production. The state of Kerala ranks first in production 21% share of the total landings which is followed by Gujarat and its contribution reported as 19% (CMFRI, 2009). Maximum production is harvested from the sea around the country within 100m depth zone. Since the production level from the present zone of operation has reached to the optimum level of exploitation, the main resources which portend scope for development and harvest are from the deep sea areas between 100 — 500 m and the oceanic regions. The resources from these zones comprising deep sea demersal fin fishes, crustaceans (deep sea shrimps, lobsters and crabs), mid-water-fish, coastal tunas and oceanic tuna and allied resources. Among the oceanic resources large growing tunas (YFT, Big eye, Skipjack, Albacore), bill fish (Sail fish, sword fish and marlins) and oceanic sharks used to be the main coordinate species for increasing fish production.
POTENTIAL YIELD ESTIMATES:
ESTIMATED POTENTIAL OF FISH STOCKS IN THE
INDIAN EEZ DEPTH-WISE (million tonnes)

<table>
<thead>
<tr>
<th>Depth Zone (m)</th>
<th>50 – 200</th>
<th>200 – 500</th>
<th>Oceanic</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demersal</td>
<td>0.625</td>
<td>0.028</td>
<td>-</td>
<td>1.933</td>
</tr>
<tr>
<td>Pelagic</td>
<td>0.742</td>
<td>-</td>
<td>-</td>
<td>1.742</td>
</tr>
<tr>
<td>Oceanic</td>
<td>-</td>
<td>-</td>
<td>0.246</td>
<td>0.246</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.267</td>
<td>0.028</td>
<td>0.246</td>
<td>3.921</td>
</tr>
</tbody>
</table>

REGION – WISE

<table>
<thead>
<tr>
<th>Resources region/depth</th>
<th>Potential yield (m t)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>West coast</td>
<td>2.36</td>
<td>60.2</td>
</tr>
<tr>
<td>East coast</td>
<td>1.09</td>
<td>27.8</td>
</tr>
<tr>
<td>Andaman &amp; Nicobar</td>
<td>0.16</td>
<td>4.1</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>0.06</td>
<td>1.6</td>
</tr>
<tr>
<td>Oceanic</td>
<td>0.25</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Exploitation of Deep sea resources

With the declaration of Indian Exclusive Zone (EEZ) during 1976 marine fisheries from the artisanal to mechanized sector reporting tremendous growth in deep sea fishing has not been progressed in the country. As per the by through MZI Act 1981 and rules enshrined there in enabled to regulate deep sea fishing. During 1990 – 92 the with an objectives to establish abundance of fishery resources in deep sea waters of the Indian EEZ, to assess suitable craft and gear for economic operation, to enlarge far sea fishing fleet and transfer the technology to deep sea fishing. Accordingly deep sea fishing fleet under joint venture agreement was introduced. The principle deep sea shrimps species reported are Heterocarpus woodmasoni, H.gibbosus, Plesionika spinipes, Aristeus alcocki, Solenocera hextii etc. The deepsea lobsters, Puerulus sewelli and spear lobster, Linuparus somnious are reported to be occurring in Indian waters.
Fish stock assessment:
Although fishery resources are renewable are exhaustible. They could turn the magnitude dynamics and resilience of fish stocks pose great challenges to their manage the stocks it is essential to have information on the status of the stocks and assessment studies to be undertaken. These studies would help in understanding decline fish stocks so as to fishing regulatory measures to conserve these resources. The stock assessment studies will help in predicting the size of stock and size of yields with which optimum exploitation levels can be maintained.

Resource Potential:
The earlier estimates of fishery resource potential in the Indian EEZ are mostly based on indirect methods. Resources survey by actual sampling is the most direct approach, though it involves large investment, manpower and repeated sampling. nevertheless, surveys provide information at macro and micro levels on resource components, stock distribution, stock density, standing stock and MSY, which are all vital for rational exploitation and management of resources. Based on the resources survey data collected over a period of two decades and the production figures of component stocks, Sudarsan et al. (1990) estimated the fishery potential of Indian EEZ as 3.92 million t., 1.93 million t demersals, 1.74 m t neritic pelagic and 0.25 million t large oceanic pelagic (Table 1) Region-wise, the continental shelf and slope along the West Coast support 60.25% of the estimated resource potential, followed by East Coast 27.8%, Andaman & Nicobar 4.1%, Lakshadweep 1.6% and the oceanic waters 6.3%. Depth-wise, 58% of the estimated potential is from inner shelf within 50 m, 34.9% from outer shelf (x=50-200 m), 0.7% from continental slope and 6.3% from oceanic waters.

Species Diversity:
In India Fin- Fish diversity is reported to be 2243 species (NBFG, 2008). Among them 1365 species are Marine, 765 species are fresh water, 113 species are Brackish water, besides 291 Exotic species. The aquatic living resources although renewable are not infinite and need to be properly managed with their contribution to the nutritional, economic and social well-
being of the population management and the resource utilization is to be sustained.

CONCLUSION:

Biodiversity is dynamic and its constituent species and their populations are in a constant state of evolutionary change. They vary from year to year in and the ecosystem in which they occur are in a contract state of flux. The pattern of present day diversity of organisms results from the combined effects of speciation (diversification) and extinction in conjunction with the internal competition, habitat health and externalities including short term and long term changes in the environmental parameters. To understand this we have to investigate the underlying (genetic) process involved, estimate the relative past and present rates at which these changes occur and try to distinguish how these rates are being altered by human activities with the advancement in science and technology coupled with ever increasing human population and their needs, and the pressure on biological resources is bound to increase. In view of this the biologists in general and the taxonomists in particular have to set up their research activities to identify the existing diversity and to recognize the diversity so far not reported so as to exploit and explore the diversity and to maintain sustainability.

REFERENCES:

Assessment of Ground Water Quality in Gokunda Taluka Kinwat of Nanded District, Maharashtra (India).

Maqdoom Mohiuddin
Department of Zoology,
Baliram Patil College, Kinwat, Dist- Nanded.

ABSTRACT:
In the present study analysis of ground water quality in Gokunda Taluka Kinwat of Nanded District, this water may be used for drinking water in villages. The assessment of water quality with the standards suggested by the APHA (1992). For the investigation of parameters like temperature, PH, Total dissolved solids, Dissolved Oxygen Chlorides, Salinity, CO₂, Alkanity, Acidity. In the study periods reveals that the chemical parameters of water sources are well within the permissible limit as prescribed by WHO and IS 10:500 but the water it used by the drinking before proper treatment.

INTRODUCTION:
Interaction between ground water and surface water are complex consequently, ground water pollutions, sometimes referred to as ground water contamination, and is not as easily classified as surface water pollution by its very nature, ground water aquifers are susceptible to contamination from sources that may not directly affect surface water bodies, and the distinction of point vs. Non point source may be irrelevant. Ground water has become the major source of water supply for domestic industrial and agriculture sectors of many countries. It is estimated that approximately one third of worlds populations uses ground water for drinking purpose (UNEP) (1999). Intensive use of natural resources and increased human activities are posing great threat to ground water quality presence of more than 200 chemicals constituents in ground water has been
documented including about 150 organic and 50 inorganic and ratio nucleotides The reported sources of these chemical in ground water are both natural as well as anthropogenic.

The connection between agricultural and ground water pollutions is well established In developing countries, contamination of water supplies by organic chemicals is of lesser concern because most of the health problem are found to be associated with the presence of in organic chemicals and pathogenic organism in drinking water due to variation in the regional geology and water rock. interaction higher concentration of many elements can occur in ground water the chemical compositions of ground water is controlled by many factors that include composition of precipitation. According to in number of cases water resources have been affected in such a way that they are not available for further use without prior treatment contamination of surface water may disappear within a short period of time. In present study the quality of ground water of Gokunda village Tq. Kinwat was focused to analysis the physicochemical properties of water. This assessment is aimed to provide a preliminary view on the current status of water quality for drinking purpose.

MATERIALS AND METHODS

STUDY AREA:
Gokunda village Tq. Kinwat is situated -150- km towards south east Nanded District of Maharashtra state of India. Kinwat is located at North Latitude 19.60 and East Longitude and at 78.20 meters 314 meters (1030 feet) altitude.

A total twenty ground water sample were collected from bore wells of study area Gokunda Tq. Kinwat. Using pre-cleaned sterilized poly propylene plastic bottles with necessary precaution was taken during collection of sample once in a day ,daily from selected sampling site for the period of 2 months i.e. from jan-2015 to Feb-2015 the sampling site selected 2 different sites i.e. East and West Gokunda area where the drinking water frequently used total parameters are PH ,total dissolved salt (TDS),dissolved oxygen ,Carbon dioxide ,temperature , total alkalinity, total acidity , chloride , salinity for the study. All the
experiment was carried out in 5 times. The assessment of water quality was done by following publications.

**SAMPLING SITE 1:**

Bore well of Gokunda village behind B.P college to I.T.I and sidarh Nager it is North site of the village as it is the agricultural area water accumulates around the bore well though rain fall and bring wastage water from village through different nalis waste material dumping of garbage of villagers are observed.

**SAMPLING SITE 2:**

Hand pump around the Iddgah road to ITDP office and Kalyan nager. A thick population area having facilities of bore well and deep well. Improper sanitation and waste water flow deposited around the bore water which causes contamination of chemicals and toxicants.

**RESULTS AND DISCUSSION:**

In the present investigation the physic-chemical parameters are represented in table no 1 and 2 and standard deviation are represented in table no. 3 & 4 and graphically represented in figure no.1 and 2. In the present investigation in the North side of B.P college to I.T.I and Sidharth Nager area TDS ranges in between 310 to 500 mg/lit, dissolved oxygen in the 2.4 to 3.2 mg/lit, CO\textsubscript{2} 0.20 to 0.81 mg/lit, chloride 0.02 to 0.06 mg/lit, pH 7.1 to 7.4 temperature 26.8 to 27.9\textdegree C, alkalinity 0.1 to mg/lit and acidity is nil recorded in the first sampling station. The first sampling station water quality is within the prescribed limit of WHO but this water is using before proper treatment.

In the second sampling station at south area Iddgah road to ITDP office and Kalyan nager the physic-chemical parameters TDS ranges from 480 to 598 mg/lit, dissolved oxygen 2.6 to 3.2 mg/lit, CO\textsubscript{2} 0.10 to 0.81 mg/lit, chloride 0.02 to 0.07 mg/lit, pH 7 to 7.3 ,Temperature 26.8 to 27.8\textdegree C, alkalinity 0.1 to 0.3mg/lit and acidity was nil. The mean value North side of B.P college to I.T.I and Sidharth Nager area sampling station I statistical analysis the CO\textsubscript{2} Mean (3.7), SD (0.51), SE (0.22) and CV (13.78) the Chloride Mean (14), SD (0.55) , SE (0.24) and CV (3.92) and Dissolved oxygen Mean (2.7), SD (0.13) , SE (0.05) and CV 4.81). For the sampling station second south area Iddgah
road to ITDP office and Kalyan nager statistical analysis the Co₂ Mean (3.4), SD (0.13) , SE (0.05) and CV (3.82) the Chloride Mean (12), SD (0.16) , SE (0.27) and CV (5.08) and Dissolved oxygen Mean (2.9), SD (0.08) , SE (0.03) and CV 2.75).

**Total Dissolved Solids:**

Total dissolved solid denoted the various types, minerals present in water in the dissolved form. The contents of total dissolved solid in ground water stations were in the range of 310 to 500 mg/L at station- I ) 480 to 598 mg /L at station II (Table No. 1&2).

The sample showed the total dissolved solid with maximum of 310 mg /L in month of Jan-Feb.2015 at station I. While the minimum value of 480 mg / L in month of Jan –Feb. 2015 At station –II. The high concentration of T.D.S increase water turbidity these in turn decrease the light penetration and thus affects the photosynthesis the high content elevates the density of water, influence osmoregulation of fresh water organism and reduces solubility of gasses like oxygen and utility of water for drinking irrigation and industrial purpose. During the study of total dissolved solid ranged between 316 mg/L to 574 mg/ L. the present study reveals the total dissolved solid values are high during summer period and low in monsoon period similar result was obtain in the ground water of Kukatpally industrial area in Hyderabad observe total dissolved solid with maximum value of 1531 mg / L. Found the concentration of total dissolved solid in the range of 991.1 to 1276.3 mg/L from ground water of Nacharam industrial complex.

**DISSOLVED OXYGEN:**

At given point parameter like temperature, transparency, nutrient load biomass determines presence of dissolved oxygen, in the present the study the concentration of dissolved oxygen recorded were in the range.2.4 to 3.2 mg/L at station –I .2.6 to 3.2 mg/ L at station –II.( Table No1) The maximum value of dissolved oxygen was recorded as 3.2 mg /L in month Jan – Feb 2015. Dissolved oxygen is one of the important parameters that measure the extent of organic as well as biological pollution load.
to a water body stated by Meenakshi Khajuria and S.P.S. Datta (2010) noted 3.44 to 10.39 mg/L of DO in ground water Christian colony in Jammu and Kashmir. High dissolved oxygen content indicator well aerated nature of water with low organic pollution load in winter season. Reported increase in temperature of water in summer result in decrease of dissolved oxygen in Godavari River. Bobdey (2002) reported maximum DO in winter season and minimum during summer. It is observe that increase in the temperature of river water resulted in to decrease of dissolved oxygen. Dissolved oxygen is an important factor in assessing water quality. Monitoring oxygen concentration also helps to know the ‘Health’ of water body and its one convenient way of ‘Feeling the Pulse’ of an aquatic ecosystem (ODEM 1971).

**CARBON DIOXIDE:**

Carbon dioxide is normal component of all natural water. It is an end product of bacterial decomposition of respiratory process of plant and animal, in the present investigation minimum value of CO$_2$ where recorded during winter and maximum during summer. The minimum value of CO$_2$ during winter months may be due to its utilization through the photosynthetic activity by the aquatic saprophytes and phytoplankton. However the higher value of CO$_2$ can be attributed to the higher rate of decomposition organic matter by microorganism with consequent increased release of free CO$_2$ decrease in utilization in photosynthetic release end high respiratory activity of benthos and microbes. Indicate our result (minimum CO$_2$ contain was observed in station II, 0.12 and highest CO$_2$ contain was observed at station I. 0.81 (Table No 1 and 2).)

**CHLORIDES:-**

Chlorides may be present in ground water due to discharge of sewage water of industrial waste in the present study chloride level minimum 12mg/L to 257 in a area South (Eidgah road to ITDP) to Maximum 14 mg/L to 256 in a area North(B.P college to ITI and Sidharth nager colony) at two different sampling stations (Table N0 3,4). Similar result
obtained by, Tirpude et. al (2015) found a chloride ranges from 16 mg/ L to 256 mg /L at station –I Gokunda and 82mg/ L to 256 mg/ L at station –II Ghoti village. Jadhvar et.al (2010) found the range of 64to 168.5 mg/ L chlorides in ground water of Nagothane region of Maharashtra.

**SALINITY:**

Salinity may be present in ground water due to discharge of sewage of industrial waste, in the present study the salinity is maximum in area of South (Eidgah road to ITDP) area is 28.93 mg/L(table N0.5) and minimum salinity is present in area North (B.P. college to ITI and Sidharth nager colony) is 27.12 mg/L.

**pH:**

The PH was almost similar in both the natural habited (NH) and fragile ecosystem habited (F) during the 2 months. It is an result of interaction of various substances in the water. In the natural habited a lowest pH of 7.1 in area of south side and highest PH of 7.2 in area of Northside (Table No.5) [14] found pH value in mild alkaline range 7.6 to 7.8. From ground water in Tiruchirapalli indicating the presence of very weak basic salts.

**ALKLANITY :**

The alkalinity may be present maximum in area of North area 0.3mg/L and minimum in south area 0.2 mg/L (Table No. 5).

**TEMPRETURE :**

The maximum temperatures are occurring in the month of February 27.2°C and minimum in month of January 26.1°C in north side and 70.1 °C in south side to (Table No.5)

**CONCLUSION:**

Gokunda village having the distance of 2 k.m from Kinwat. Availability of ground water for drinking purpose is the ultimate source for the population of the village. In the present study different parameters are studied and concluded that the water available in different areas bore well as well as deep well are safe for drinking purpose. it is concluded that before using for drinking purpose water should be treated by using R/O to avoide un wanted contamination of inorganic salts.
ACKNOWLEDGMENT:

Author thank full to principal B.P. College Kinwat for providing research facilities and Mirza Tabassum Anjum for providing support during research work.

REFERENCES:
9. Harishkumar (1998) during the study total dissolved solid ranged between 316 to 574 mg/ L
10. Sayani et al … (1998) observed total dissolved solid with maximum value of 1531mg/L.
11. Sultana et al.. (1990) found the concentration of total dissolved solid in the range of 991.1 to 1276.3 mg/L from ground water of Nacharam industrial complex.
Table No.1: North Area (B.P College)

<table>
<thead>
<tr>
<th>Sample No</th>
<th>TDS (ppm)</th>
<th>DO Mean</th>
<th>CO2 (SD)</th>
<th>CHLORIDE (SD)</th>
<th>PH</th>
<th>TEMP RETURE</th>
<th>ALKALINITY</th>
<th>ACIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>316</td>
<td>2.4</td>
<td>0.81</td>
<td>0.02</td>
<td>7.4</td>
<td>27.5</td>
<td>0.1</td>
<td>NILL</td>
</tr>
<tr>
<td>2</td>
<td>310</td>
<td>3.0</td>
<td>0.62</td>
<td>0.05</td>
<td>7.3</td>
<td>27.6</td>
<td>0.1</td>
<td>NILL</td>
</tr>
<tr>
<td>3</td>
<td>450</td>
<td>2.4</td>
<td>0.52</td>
<td>0.06</td>
<td>7.1</td>
<td>26.9</td>
<td>0.1</td>
<td>NILL</td>
</tr>
<tr>
<td>4</td>
<td>480</td>
<td>3.2</td>
<td>0.20</td>
<td>0.05</td>
<td>7.2</td>
<td>26.8</td>
<td>0.1</td>
<td>NILL</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
<td>2.9</td>
<td>0.44</td>
<td>0.03</td>
<td>7.2</td>
<td>27</td>
<td>0.1</td>
<td>NILL</td>
</tr>
</tbody>
</table>

Table No.2: South Area (Eidgah Road)

<table>
<thead>
<tr>
<th>Sample No</th>
<th>TDS (ppm)</th>
<th>DO Mean</th>
<th>CO2 (SD)</th>
<th>CHLORIDE (SD)</th>
<th>PH</th>
<th>TEMPERATURE</th>
<th>ALKALINITY</th>
<th>ACIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>574</td>
<td>3.2</td>
<td>0.18</td>
<td>0.02</td>
<td>7</td>
<td>26.6</td>
<td>0.3</td>
<td>NILL</td>
</tr>
<tr>
<td>2</td>
<td>480</td>
<td>3.0</td>
<td>0.12</td>
<td>0.03</td>
<td>7.2</td>
<td>27.5</td>
<td>0.2</td>
<td>NILL</td>
</tr>
<tr>
<td>3</td>
<td>544</td>
<td>2.6</td>
<td>0.10</td>
<td>0.05</td>
<td>7.1</td>
<td>27.8</td>
<td>0.2</td>
<td>NILL</td>
</tr>
<tr>
<td>4</td>
<td>574</td>
<td>2.9</td>
<td>0.12</td>
<td>0.06</td>
<td>7.3</td>
<td>26.8</td>
<td>0.2</td>
<td>NILL</td>
</tr>
<tr>
<td>5</td>
<td>598</td>
<td>3.2</td>
<td>0.16</td>
<td>0.07</td>
<td>7.1</td>
<td>26.9</td>
<td>0.1</td>
<td>NILL</td>
</tr>
</tbody>
</table>

Table No-3: North Area Showing The Mean, SD, SE, CV Values

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>PARAMETER</th>
<th>MEAN</th>
<th>SD</th>
<th>SE</th>
<th>CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CO2</td>
<td>3.7</td>
<td>0.51</td>
<td>0.22</td>
<td>13.78</td>
</tr>
<tr>
<td>2</td>
<td>CHLORIDE</td>
<td>14</td>
<td>0.55</td>
<td>0.24</td>
<td>3.92</td>
</tr>
<tr>
<td>3</td>
<td>DO</td>
<td>2.7</td>
<td>0.13</td>
<td>0.05</td>
<td>4.81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>PARAMETER</th>
<th>MEAN</th>
<th>SD</th>
<th>SE</th>
<th>CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CO2</td>
<td>3.4</td>
<td>0.13</td>
<td>0.05</td>
<td>3.82</td>
</tr>
<tr>
<td>2</td>
<td>CHLORIDE</td>
<td>12</td>
<td>0.61</td>
<td>0.27</td>
<td>5.08</td>
</tr>
<tr>
<td>3</td>
<td>DO</td>
<td>2.9</td>
<td>0.08</td>
<td>0.03</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Table No.5: Different Parameters Observed In Two Sampling Stations

<table>
<thead>
<tr>
<th>AREA</th>
<th>CO2</th>
<th>CHLORIDE</th>
<th>SALINITY</th>
<th>DO</th>
<th>PH</th>
<th>ALKALINITY</th>
<th>TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>3.7</td>
<td>14</td>
<td>27.12</td>
<td>2.7</td>
<td>7.2</td>
<td>0.3</td>
<td>26.1</td>
</tr>
<tr>
<td>South</td>
<td>3.4</td>
<td>12</td>
<td>28.93</td>
<td>2.9</td>
<td>7.1</td>
<td>0.2</td>
<td>27.2</td>
</tr>
</tbody>
</table>

Selected Papers on Avian Diversity and Hydrobiology I 42
Life Becomes Measurable Due To Excess Fluoride in Ground Water nearby Nanded City District Nanded.

J. U. Deshmukh
Department of Zoology,
Pratibha Niketan Mahavidyala, Nanded 431 601

ABSTRACT:
The fluoride contents in water more than 3 mg/lit is dangerous it causes fluorosis. It is found in the border area of Maharashtra towards Andhra Pradesh & Melghat the ground water contains about 10 to 13 mg/lit of fluoride and as a result, the school children in this area show dental fluorosis and elderly persons show bent bones. Fluoride is found to affect calcium and phosphate contents in bones making the bones brittle. The preliminary survey shows several cases of arthritis in this area. The similar condition is observed beside Nanded city in Asarjan, Brahmanwada and Punegaon Villages. Hence it is suggested to take immediate measures to defluoridify the drinking water from this area.

Key Words: Fluoride, Ground water quality, contamination drinking water, health hazards.

INTRODUCTION:
Underground water plays an important role in the over all water balance of the environment. As a reservoir, it has an enormous capacity to store water in rainy periods which can be utilized in dry periods. Ground water is primary source of fresh water in several towns and rural areas. It is widely used as a source of water for drinking, irrigation and other purposes. The industrial wastes have the greatest potential for polluting the water. Affected ground water quality, which is not useful for drinking purpose. Ground water pollution causes irreparable damage to soil, plants and animals including Humanbeings.
Polluted ground water is the cause for the spread of epidemics and chronic diseases in man. Nanded is the one of the most important district of Maharashtra, because Sikh's tenth Guru Guru Gobindsinghji's tomb is located at Nanded. Nanded is also declared as Holy City. In the year 2008 in Nanded there is Guru-ta-Gaddi procession. For this procession sikh bandhus came in crores. They should live in Nanded as well as beside Nanded. As well as regularly local persons beside Nanded city suffer from health hazards like flurosis due to excess quantity of fluorine in drinking water. So defloridity of drinking water from this area is necessary. Because of the poor economic conditions and illiteracy, people of this area are not at all conscious about the pollution of water and its control. The water contains excess fluoride more than 3 mg/lit. Therefore in this area dental flurosis is of frequent occurrence in elderly persons. They also show bent bones. Keeping the above facts in mind the present investigation was undertaken to study the fluoride contents in water. The quality of drinking water is analysed by analyzing about five parameters.

**MATERIALS AND METHODS:**

Seven water samples were collected in two liters polythene cans each in the year 2003-2004. In Jalswaraj Project of Dept of Water Supply and Sanitation Govt. of Maharshtra already detected excess fluoride from these Bore-wells. We have selected seven sampling stations from which maximum use of water was taken by the villagers for drinking purposes, because there is no alternate source of drinking water supply system available in these villages.

Seven Bore-wells were chosen from Asarjan, Asarjan Camp, New Hasapur, Old Hasapur, Brahmanwada, Trikutwadi & Punegaon. The water samples for analysis were collected during the period of June 2012 to Oct. 2012. The Polythene cans brought to the laboratory and analyzed. Fluoride is determined by fluoride meter, TDS by Water Analyser kit and Iron, Nitrate, Chloride by the standard methods of APHA.
Table 1: Values of Fluoride in Ground Water During 2012

<table>
<thead>
<tr>
<th>Village Name</th>
<th>Fluoride mg/lit (F)</th>
<th>Iron mg/lit (Fe)</th>
<th>Nitrate mg/lit NO₃</th>
<th>TDS mg/lit</th>
<th>Chlo-ride mg/lit Cl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trikutwadi</td>
<td>8.3</td>
<td>0.10</td>
<td>92.82</td>
<td>520</td>
<td>82</td>
</tr>
<tr>
<td>Pune-Gaon</td>
<td>13.5</td>
<td>0.08</td>
<td>5.44</td>
<td>478</td>
<td>120</td>
</tr>
<tr>
<td>Brahman-Wada</td>
<td>9.19</td>
<td>0.12</td>
<td>38.12</td>
<td>540</td>
<td>125</td>
</tr>
<tr>
<td>Old Hassapur</td>
<td>4.5</td>
<td>0.20</td>
<td>48.25</td>
<td>1050</td>
<td>470</td>
</tr>
<tr>
<td>New Hassapur</td>
<td>5.5</td>
<td>0.34</td>
<td>315.09</td>
<td>3000</td>
<td>280</td>
</tr>
<tr>
<td>Asarjan Camp</td>
<td>19.3</td>
<td>0.10</td>
<td>40.20</td>
<td>430</td>
<td>72</td>
</tr>
<tr>
<td>Asarjan</td>
<td>10.2</td>
<td>0.08</td>
<td>5.62</td>
<td>614</td>
<td>122</td>
</tr>
</tbody>
</table>

RESULTS:

The appearance of all water samples were pale yellow on visual observation. They exhibit no odor no taste. The observations of physico-chemical parameters are summerised in Table No.1. The average values of different parameters at different locations are different but the general trend observed about higher levels of fluoride at all locations as well as nitrates and T.D.S. are excess at some sampling stations.

In present investigation the average fluoride values are at Trikutwadi 8.3 mg/lit, at Puneagaon 13.5 mg/lit, at Brahmanwada 9.19 at Old Hasapur 4.5 mg/lit, New Hasapur 5.5 mg/lit, Asarjan Camp 19.3 mg/lit, and at Asarjan – 10.2 mg/lit, other parameters are well within permissible limit.

DISCUSSION:

The increasing industrialization, urbanization, and developmental activities to cope up with the population explosion have brought inevitable water crisis. Water, the universal solvent, serves as an unavoidable medium for the livelihood of the human beings, plants and animals. The
available fresh water is hardly 0.3 to 0.5 % of the total water on the earth. The factors namely T.D.S.is excess quantity responsible for wide spread gastric disorders in this area including frequent outbreak of water borne disease. In the present investigation the fluoride in bore-well is excess at all sampling stations. Fluoride in the range of 0.5 to 1.5 mg./lit, is beneficial to human being, but consumption of fluoride in higher quantity i.e. more than 1.5 mg/lit for long time through drinking water load of fluoride, which is a chronic disease characterized by mottling of teeth and softening of bones, ossification of tendons and ligaments. Also Iron is found to be higher in some samples.

In present investigation nitrates are also higher at some sampling stations. Vegetation growth in nitrate rich soil may cause Eutrophication. Vegetation growth causes toxic effect in cattles. Thus the quality of drinking water beside Nanded city in these seven villages is not safe for drinking purpose.

REFERENCES :
5. Shailesh, K.Singh and Amarjeet, K.Singh (2002). Assessment of physico-chemical characteristics of surface and subsurface waters in fire and non-fire zones of Jharia coal field in District Dhanbad, India. Jr.of Env.And Pollution 8(4) pp; 335-359
Studies of Dissolved Oxygen in Purna River, District Parbhani

V. K. Kadam
Department of Zoology,
Shri Guru Buddhswami College, Purna (Jn.)

ABSTRACT:
Dissolved oxygen is one of the most important parameters of the water whose quality directly affecting the survival and distribution of flora and fauna in an ecosystem. In present study, dissolved oxygen of Purna river was tested at spot A, B and C for year 2004 and 2005. The present study showed that the maximum concentration of dissolved oxygen recorded was 6.8 mg/L in the month of December 2004, at spot A site. The minimum concentration of dissolved oxygen recorded was 1.4 mg/L in the month of May 2004, at spot C site.

INTRODUCTION:
The two main sources of DO are diffusion (from air) & photosynthesis, while major factors responsible for its depletion are biochemical oxidation & respiration by Flora and Fauna. Dissolve oxygen is essential to maintain the higher forms of biological life in the water. Effect of a waste discharge in water body is largely determined by the oxygen. Oxygen is important to life in water because all living organism are dependent on oxygen in one form or the other to maintain the metabolic processes that produce energy for growth and the reproduction. Nearly all organisms, including green plants, needs O₂ for respiration. Although oxygen is plenty full in the atmosphere, it is not abundant in the water. The ability of oxygen to dissolve in water depends upon the temperature of the water. The fast moving river will contain significantly more dissolved oxygen than a warm, slow moving lake. O₂ is also added, by photosynthesis as a waste by product. In natural water bodies with sufficient oxygen concentration, aerobic organisms can maintain good water quality. DO is more in surface and depletes sharply with the depth. Dissolved O₂ is essential to maintain
variety of biological forms in the water and the effects of water discharge in water is largely determined by the oxygen balance of the ecosystem.

The solubility of atmospheric oxygen in fresh water ranges from 14.6 mg/lit at 0 degree Celsius to about 7 mg/lit at 85 degree Celsius under 1 atmospheric pressure. Its solubility directly varies with temperature. The dissolved O$_2$ content plays a vital role in supporting aquatic life in running water and is susceptible to environmental changes. According to Koshy and Nayar (1999), Hymavathi et al., (1999), Mishra and Tripathi (2001), Dutta et al., (2001), the low dissolved O$_2$ in river may due to receiving sewage and high organic load which leads to oxygen depletion. The amount of oxygen consumed by the fish is a function of its size, feeding rate, activity level and temperature. The importance of dissolved oxygen in aquatic ecosystem in bringing out various biochemical changes and its effect on metabolic activities of organisms was discussed by many ecologists. Smel Evans (1972) Han cock (1973); Patter et al. (1975). Mishra and Yadav (1978), Verma et.al. (1979) Adebisi (1981) and Mitra (1982) have discussed seasonal averages and fluctuations in dissolved oxygen. The report its maximum in winter and minimum in summer. The winter maxima can be attributed to the higher solubility of oxygen gas at low temperature. The minimum quantities of dissolved oxygen required in water depend upon the individual organism. Most of fishes required at least 5 mg/l dissolved oxygen for at least 16 hours/day never less than 3 mg/l for 8 hours. In most natural waters containing 8 to 10 mg/l oxygen (Nimbarg 1978).

If dissolved oxygen becomes low due to an increase in temperature, fish density or plant respiration, may cause fish mortality (Kindseti et al. 1989). A positive correlation between primary productivity and dissolved oxygen content was observed. Dissolved oxygen has positive correlation with pH, temperature, carbonate alkalinity and gross primary productivity (Srisumantach et al. 1992). An inverse relationship between zooplankton number and dissolved oxygen was reported by Asif Khan et al. (1986). There is direct correlation between BOD & COD on one hand and DO on the other.
MATERIAL AND METHODS:

Dissolved oxygen was estimated by following method 100 ml of water sample taken in 250 ml bottle to which 2 ml MnSo4 & 2 ml of alkaline iodide solution was added. Shake the content well. Bottle contains brown coloured precipitate. Now add few ml of concentrated H₂ So₄ to dissolve the precipitate, slow add starch indicator content acquires dark blue colour. Titrate the content with sodium thiosulphate. End point is disappearance of blue colour. Let reading be ‘A’

**Calculation:**

\[
\text{Do mg/l} = \frac{A \times 0.025 \times 8 \times 1000}{V}
\]

Here V is the volumes of sample taken

RESULT AND DISCUSSION:

The monthly concentration of DO are shown in table No. 7.1, 7.2 and depicted in the Figure No. 7.3 and 7.4. The present study showed that the maximum concentration of dissolved oxygen recorded was 6.8 mg/L in the month of December 2004, at spot A site. The minimum concentration of dissolved oxygen recorded was 1.4 mg/L in the month of May 2004, at spot C site.

The spot A site showed maximum concentration of dissolved oxygen recorded was 6.8 mg/L in the month of December 2004, while the minimum concentration of dissolved oxygen recorded was 2.4 mg/L in the month of May 2004. The spot B site showed maximum concentration of dissolved oxygen recorded was 6.2 mg/L in the month of December 2004 while in the minimum concentration of dissolved oxygen recorded was 2.0 mg/L in the month of May 2004. The spot C site showed maximum concentration of dissolved oxygen recorded was 6.1 mg/L in the month of December 2004. While the minimum concentration of dissolved oxygen recorded was 1.4 mg/L in the month of May 2004. In the year 2005 the maximum concentration of dissolved oxygen recorded was 3.4 mg/L in the month of December and January 2005. While the minimum concentration of dissolved oxygen recorded was 1.8 mg/L in the month of April and May 2005. The spot A site showed maximum concentration of dissolved oxygen recorded was 3.4 mg/L in the month of December 2005. While the minimum
concentration of dissolved oxygen recorded was 2.2 mg/L in the month of May 2005. The spot B site showed maximum concentration of dissolved oxygen recorded was 3.4 mg/L in the month of January 2005, while the minimum concentration of dissolved oxygen recorded was 2.0 mg/L in the month of May 2005. The spot C site showed maximum concentration of dissolved oxygen recorded was 3.1 mg/l in the month of November 2005. While the minimum concentration of dissolved oxygen recorded was 1.8 mg/L in the month of April and May 2005.

Determination of dissolved oxygen served as the basis of the biochemical oxygen demand test. Thus they are the foundation of the most important determination use to evaluate the pollution strength of the domestic and industrial waste. In river Subarnarekha at Ranchi, the dissolved oxygen was noted form nil to 11.4 mg/lit. It was found that the variation of quality and the quantity of the domestic discharge and the industrial effluent at different sites (Singh and Singh, 1990). From reservoir and a lake in the vicinity of Aurangabad and Godavari at Paithan. Dissolved oxygen was recorded from 13.2 to 27 mg/L (Zafar Javed 1991). Datar et al., (1992) recorded dissolved oxygen from 3.2 to 11.8 mg/lit in river Betwa. In river Yammuna at Agra, the dissolved oxygen recorded was in the range of 2 to 7.5 mg/lit (Saxena and Chauhan, 1993). In river Gellabil at Assam dissolved oxygen was recorded in the range of 2.5 to 9.6 mg/lit (Baruach et al. 1993).

Kaza et al. (1993) observed dissolved O2 in river Godavari at Rajmundry during pushkaram and reported from 3.8 to 7.4 mg/l (before pushkaram and 5.6 to 4.4 mg/lit after pushkarm (Reddy et al. 1994). In river Munneru at Andhra Pradesh, the DO₂ level was found from 7 to 8.9 mg/l (Jayeraju et al. 1994). In western Ganga cannall at Haridwar, the maxima value of DO₂ was 11 mg/l (Joshi 1995). Kulkarni. (1995) recorded dissolved O₂ value in the range of 5.0 to 8.6 mg/l in a reservoir at Sadatpur. The DO₂ value was noted from river Ganga at Varanasi in between 1.9 to 8.2 mg/l. The minimal and maximal values were found in summer and winter respectively. The maximum value was observed during summer possibly due
to warmer temperature and the greater oxygen consumption by secondary producer and decomposition (Singh and Singh, 1995). Sharma and Rajput, (1996) recorded DO$_2$ in the range from 5.8 to 9.2 mg/l in river Narmada at Jabalpur. The low value of DO$_2$ in the river might be due to high organic load in river which leads oxygen depletion (Jamson & Rana 1996). In Ramganga river, DO$_2$ was recorded from 5 to 6.5 mg/l during snan period. In Wuler lake at Kashmir, DO$_2$ was recorded in between 9.8 to 10.4 mg/l. The maximal value was observed in winter and a minimal in summer. Lower DO$_2$ content in summer might be due to the microbial activity, respiration of plants and animals (Sawar and Majid, 1997). Singh (1997) noted the DO$_2$ content from 4.1 to 12.6 mg/L in river Ganga at Patna. It was noted low solubility of oxygen in water limit it self- purification capacity (Pande & Sharma, 1998). The variations in the level of DO$_2$ might be cause of algal bloom (Rao et al., 1999).

The concentration of DO2 was noted in the range of 5.8 to 7.1 mg/l in Damodar river at Calcutta. The oxygen depleting substances were found less assimilated by the rive water. This might be due to inter mitten release of well oxygenated fresh water from different dams (Ganguly et al., 1999). Sharma (1999) noted dissolved O2 from 2.8 to 9.3 mg/L in Yamuna river. The lowest dissolved oxygen in summer might be due to high temperature and low solubility of oxygen in water. The amount of DO$_2$ in river Adyar at Chennai was reported in the range of 1.29 to 7.26 ppm. The lower DO$_2$ values observed indicate high pollutional load in the river. The depletion of oxygen might be due to chemical impurities, stagnant condition of the river and microbial growth in the water (Bhuvaneswaram et al.1999). Singh and Singh (1999) observed the concentration of DO$_2$ from 5.7 to 8.2 mg/l in Damodar river. The minimal and maximal were found in the month of February and April respectively. High value of oxygen during summer was associated with rise in phytoplanktonic Population (Sharma and Jain, 2000). In river Vallapattam at Kerala dissolved oxygen was recorded in the range of 6.53 to 8.86 ppm comparatively high value was reported during monsoon period. This might be due to rain water rich in oxygen.
In other season the fluctuation of DO$_2$ level might be due to fluctuation in water temperature and addition sewage wastes demanding oxygen. Jha and Verma, (2000) reported the concentration of DO2 in between 3.2 to 8.4 mg/l from drinking water in Dodda district. The DO2 fluctuated in between 1.6 to 13.5 mg/l in Morna river at Akola. The low value dissolved oxygen was observed due to discharge of waste water body into the river (Musadiq, 2000). The concentration of DO$_2$ fluctuated between 5.46 to 16.19 mg/l in Inanner river at Jalgoan. The direct relationship between DO$_2$ and phytoplanktons (Bhave and Bhorse, 2001). In river Basantar at Jammu, the dissolved O$_2$ was observed from 2.5 to 15.4 mg/l in winter rise in oxygen might be due to low temperature (Dutta et al. 2001). The concentration of DO$_2$ Calculated between 3.0 to 8.5 mg/l in Ganga river at Moradabad. The low value of DO$_2$ showed presence of high organic matter which leads to the consumption of oxygen during its decomposition by the heterotrophys in water (Mishra and Tripathi 2001).

The present study revealed that the low value of DO$_2$ was observed during summer season at spot C site, followed by rainy season and max. during winter season at spot A site and spot B sites. Low value observed during summer season might be due to higher temperature and low solubility of oxygen in water consequently affecting BOD. The present findings are in co-relation with Pande and Sharma, (1998), Rao et.al., (1999), Sharma (1999), singh, (1999), Pande et al., (2001), Jha and Verma, (2000) and Mishra and Tripathi (2001). The minimum permissible level of dissolved oxygen is 4 to 6 mg/l for domestic uses. In Purna river, the concentration of dissolved oxygen was found below the minimum permissible limit at spot B site and spot C sites. This might be due to discharge of sewage into the river water.

Table 7.1: Monthly variation for dissolved oxygen (DO) mg/lit

<table>
<thead>
<tr>
<th>Month</th>
<th>Spot A</th>
<th>Spot B</th>
<th>Spot C</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 04</td>
<td>3.6</td>
<td>3.4</td>
<td>2.8</td>
</tr>
<tr>
<td>February 04</td>
<td>3.4</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>March 04</td>
<td>2.8</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>April 04</td>
<td>2.6</td>
<td>2.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>
Table 7.2: Monthly variation for dissolved oxygen (DO) mg/lit.

<table>
<thead>
<tr>
<th>Month</th>
<th>Spot A</th>
<th>Spot B</th>
<th>Spot C</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 05</td>
<td>3.2</td>
<td>3.4</td>
<td>2.8</td>
</tr>
<tr>
<td>February 05</td>
<td>2.8</td>
<td>2.6</td>
<td>2.2</td>
</tr>
<tr>
<td>March 05</td>
<td>2.6</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>April 05</td>
<td>2.4</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>May 05</td>
<td>2.2</td>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>June 05</td>
<td>2.8</td>
<td>2.4</td>
<td>2.2</td>
</tr>
<tr>
<td>July 05</td>
<td>3.0</td>
<td>2.8</td>
<td>2.4</td>
</tr>
<tr>
<td>August 05</td>
<td>3.2</td>
<td>3.2</td>
<td>2.8</td>
</tr>
<tr>
<td>September 05</td>
<td>3.2</td>
<td>3.0</td>
<td>2.8</td>
</tr>
<tr>
<td>October 05</td>
<td>3.3</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>November 05</td>
<td>3.3</td>
<td>3.2</td>
<td>3.1</td>
</tr>
<tr>
<td>December 05</td>
<td>3.4</td>
<td>3.3</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Figure 7.2: Monthly variation for dissolved oxygen (DO) mg/lit

REFERENCE:
Determination of Fluoride Content in River Water of Purna City

Masarrath Unnisa Sabri and A. B. Bhosle
School of Earth Sciences,
SRTM University, Nanded.

ABSTRACT:
Water is the common name applied to the liquid form (state) of the hydrogen and oxygen compound H\textsubscript{2}O. Pure water is an odorless, tasteless, clear liquid. Water is one of nature’s most important gifts to mankind. Essential to life, a person’s survival depends on drinking water. Water is one of the most essential elements to good health, it is necessary for the digestion and absorption of food; Helps maintain proper muscle tone; supplies oxygen and nutrients to the cells; rids the body of wastes; and serves as a natural air conditioning system. Health officials emphasize the importance of drinking at least eight glasses of clean water each and every day to maintain good health. The investigation of fluoride element percentage was clearly done in the river water. Its experimental analysis was carried out by their respective standard methods widely applicable. While making a preliminary observation it was observed that the water samples from Purna River contained fluoride along with other trace elements. Out of all sampling stations studied in all most 1 sample, fluoride concentration remained within the permissible limits for drinking water. On the water hand in the remaining 11 samples the fluoride content is below the permissible limits prescribed by standards.

KEY WORDS: Environment, Fluoride, Water, Pollution, etc.

INTRODUCTION:
As far as we know, the earth is the only place in the entire universe where liquid water is found in considerable quantities[1], (Hickman et al., 1993; [2]Cunningham and Saigo, 1997). In general it is believed that most of the earth’s water has been formed from oxygen and hydrogen released from rocks through volcanic activity.

Selected Papers on Avian Diversity and Hydrobiology I 56
In the international agreements, water was implicitly considered to be a fundamental resource. Moreover, several of the explicit rights especially those guaranteeing the rights to food, health and development cannot be attained without guaranteeing access to clean water (Gleick, 1999). Water of good drinking quality is of fundamental importance to human physiology as existence of life depends on its availability. Since river is a major source of water their water quality needs to be maintained. The water content of human embryo is nearly 90 percent which gradually reduces with physical growth and comes to about two third of the body weight in old age through the process of dehydration much alike the process by which a grape becomes a raisin (Rajvaidya and Markandey, 1998).

Good quality drinking water may be consumed in any desired amount without adverse effect on health. Such water is called ‘potable’. It is free from harmful levels of impurities: bacteria, viruses, minerals, and organic substances. It is also aesthetically acceptable, is free of unpleasant impurities, such as objectionable taste, color, turbidity, and odor (Tallahassee, 1982).

Potable water is one that is safe to drink, pleasant in taste and suitable for domestic purpose. Drinking water must be free from major type of water pollutants which can be classified into microorganisms, organic wastes, plant nutrients, sediments or silts, inorganic chemicals, acids and bases, heat, radioactivity, heavy metals, pesticides and other industrial chemicals (Saini, 2006).

The requirement of potable water is essential to both the rural and urban population in order to prevent the health hazards. For water to be described as potable, it has to comply with certain physic-chemical standards which are designed to ensure that water is safe drinking (ISI, 1983 and WHO, 1984).

2. Study Area

Purna is a town with a municipal council in Parbhani district in the Indian state of Maharashtra. Purna is located at 19.18°N 77.05°E. It has an average elevation of 386metres (1266 feet). Purna is one of eight Talukas in Parbhani District the Indian state of Maharashtra. It is a town in the Marathwada region of Maharashtra.
3. Methodology

In the present investigation, for Fluoride content in the Municipal and River water we have selected the Purna city of Parbhani district. Purna Taluka is situated in Parbhani district of Marathwada region of Maharashtra. Population of this region is mainly dependent on the Municipal and River water to sustain. Therefore any major alteration in the physico-chemical characteristics of Municipal and River water of this region affects the day to day activities of peoples in this region adversely.

There are Municipal water sample and River water sample sites selected as per the Fluoride Water is nature’s most wonderful, abundant and useful compound and it is the basis of all lives-ecological resources for the flora and fauna of our earth and a fundamental necessity for all lives. From the Purna River F concentration observed minimum in winter season, was found 0.37 mg/litre. In summer season, maximum pollution sources and total 12 times on monthly basis i.e. April, 2014 to March, 2015 water samples were collected from the study of fluoride content in the collected Municipal water and River water. Samples are collected in the pre cleaned polythene container. The collected samples are transfer to the laboratory for further analysis. The fluoride is estimated by SPANDS method.

4. Result and Discussion

Fluoride exists fairly abundantly in the earth’s crust and can enter ground water by natural processes; the soil at the foot of mountains is particularly likely to be high in fluoride from the weathering and leaching of bedrock with high fluoride content. Fluoride compounds are salts that form when the element, fluorine, combines with minerals in soil or rock. Since some fluoride compounds in the earth’s upper crust are soluble in water, fluoride is found in both surface water and ground water. In the surface fresh water, however, fluoride concentrations are usually low (0.01 ppm to 0.3 ppm). In the present work the fluoride content was noted during three different seasons i.e. summer, monsoon and winter respectively.

Seasonal variations of fluoride for about 1 year in the three different seasons i.e. summer, monsoon, winter has been shown in various tables and figure. When average fluoride
values were calculated for three seasons it has been seen that fluoride in monsoon remains low and it gradually increases during summer and winter. concentration of fluoride was found 0.73 mg/litre (Fig.1) .

5. CONCLUSION

The systematic investigation of fluoride element percentage was clearly done in the river water. Its experimental analysis was carried out by their respective standard methods widely applicable. While making a preliminary observation it was observed that the water samples from Purna River contained fluoride along with other trace elements.

Rainfall, the chief source for surface water, includes ponds, rivers, dam, lakes and streams. The present work is done to investigate the occurrence of fluoride in Purna River. Purna River is surrounded by hilly region, various types of dense plants and agricultural lands, different types of soil forms. The surface run off contains various organic and traces elements which enter into Purna River itself. The sources of trace elements are agricultural activity, soil erosion and geology of surrounding region revealed. Excess fluoride consumption affects plants and animals.

Out of all sampling stations studied in all most 1 sample, fluoride concentration remained within the permissible limits for drinking water. On the water hand in the remaining 11 samples the fluoride content is below the permissible limits prescribed by standards. It is observed from the above study that fluoride content in certain areas was below the levels than required. Since drinking water is a basic need, the people in those areas should consume protected water containing fluoride within the prescribed limits in order to prevent dental fluorosis for the future generation.
REFERENCES