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Disturbances on the living of birds and their population in Wetlands of Kolhapur City, Maharashtra (India)

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ABSTRACT

In the present study, the migratory birds such as Anas acuta, Anas crecca, Anas strepera, Anas penelope, Anas clypetata, Atythga ferina, etc are seen in the Kolhapur city Wetlands. The status of diversity of birds in the, Rajaram Tank, Kalamba, New Palace and Rankala area in the year 2006-07 and 2007-08. The Species Diversity Index (SDI) of the birds in the wetlands is 30, 14, 18, and 9 of year 2006-07 and in the year 2007-08 it is 28, 12, 17, and 7 respectively. The Species count in September, October, November, December, January and February months in the year 2006-07 in Rajaram Tank is 45, 46, 47, 46, 51, 51, in Kalamba wetland is 25, 33, 38, 48, 50, 55, in New Palace wetland is 17, 23, 30, 33, 36, 36, and in Rankala it is 15, 18, 21, 27, 26, 25, respectively. The Species count in September, October, November, December, January and February months in the year 2007-08 in Rajaram Tank is 41, 43, 45, 48, 50, 49, in Kalamba wetland is 22, 31, 37, 45, 48, 51, in New Palace wetland is 15, 20, 27, 31, 33, 33 and in Rankala it is 12, 15, 19, 23, 22, respectively. The Species Diversity Index (SDI) and Species count is less in year 2007-08 because of the disturbances in the living of birds. Such disturbances are natural and man made. The natural disturbances such as Seasonal variations, Rainfall, Snowfall, Disasters, etc and Man made disturbances such as Festivals, Washing, Bathing, Boating, Drainage, Deposition of fill materials, Tilling of crop production, Logging, Mining, Construction, Run-off, Pollution, Eutrophication, Domestic animals etc.

Key Words: Disturbances, Avifauna, SDI, Migration, Wetlands, Kolhapur.

INTRODUCTION

Birds are one of the links of food chain in ecosystem [1]. A large proportion of normal food of bird consists of insect, fishes, including many that are highest degree injurious to naturally or man and his concern. Fly catcher, Green bee eater, and Sparrow etc. are destroyers some insect pests, which are harmful to the agriculture as well as human beings. Some birds are valuable scavengers. These are very useful for to make clean environment. Birds contribute the cross fertilization of flowers and the production of fertile seeds and they also continuance of healthy generation of the trees [2-3].

Ethically and morally we have no authority as human being for our comfort to create unsafe environment to other species of nature that have equal right to live with nature in peace as much as human race. In less than 100 years of scientific and technology advancement a period which is insignificant in the life of universe, the environment has degraded to dangerous level. This was protected for millions of years. Henceforth, we should take a pledge to advocate science and technology through only system that guaranteed safe environment. In recent years great concern has been noticed on the dangers of Environment polluting, arising as side effected rapid industrialization, it should be under stand that today's development should become tomorrow's destruction [4-5].

Birds have been described as feathered biped vertebrate, warm blooded animals. On the sense of sight as well as hearing are most highly developed in birds but taste is comparatively very poor. The total number of bird to species known as science inhabiting the earth today has been estimated to about 8600. If sub species and geographical races are taken into account the figure wood rise to nearby 30,000. Migration of birds is the strongest of all ornithological phenomenon as well as unsolved mystery in the world. Every year twice, in spring as well as autumn millions of birds take to air and set out long journey in order to a definite goal, sometime across ocean and continents [6-7].

There are three types of impacts such as 1) Direct Impact results the disturbances occur within the wetlands. 2) Indirect Impact results the disturbances occur in areas outside of the wetland. 3) Cumulative Impacts are those impacts resulting from combined direct and indirect impacts to the wetland all time [8-9].

Usefulness of Birds to human beings

Birds are the one of the link of food chain in the ecosystem. A large proportion of normal food of bird consists of insect, fishes, including many that are highest degree injurious to man & his concern. Fly catcher, Green bee eater, and Sparrow etc. are destroyers some insect pests, which are harmful to the agriculture as well as human beings. Natures check upon rat and a mouse, Vermin do enormous damage to crops & agriculture product & beside comes directly or indirectly of diseases often fatal to man, owl, hawk, kite etc. kite, crows, vulture are valuable scavengers. These are very useful for to make clean environment. The cross fertilization of flowers, Birds contribute to the production of fertile seed & the continuance of healthy generation of the tree. It is useful for biotechnology for formation or preserves the gene pool. It is Aesthetic beauty of Nation [10-11].

STUDY AREA

Rajaram tank (Shivaji University) -

It is situated away from city & having good biodiversity, one of them is avifauna. Migratory bird species visit this area and also the other water bodies present in city area. This wetland away from the city so, It is less affected by human interference.

Kalamba -

Kalamba tank was constructed during British rules. It is one of the wetland in kolhapur, which is famous for avian fauna. Various migratory birds visit kalamba tank every year as their winter home and spent two to three month in this wetlands. It provides feeding and roosting site for local and various migratory birds.

Disturbance due to various activities has affected the bird population, present day threat to kalamba tank due to conversion of agriculture field and human settlement. Livestock and vehicle washing activities are increases in this area.

New palace -

New palace is manmade wetland as like Rankala but the direct human interference is less or negligible as compare to other sites. This is highly protected by fence, hence the interference or disturbance do not have direct impact on the ecosystem that prevails near. It is one of the tourist spot and migratory birds also prefer to visit this wetland.

Rankala -

Rankala present in heart of city, now a days it is facing problem of pollution due to various reasons .human activities are more in this area as like washing live stock, cloth washing, and tourism. Once a time it is healthy ecosystem consisting of wide variety of avifauna with significant migratory bird visiting to every year. But today it facing eutrofication problem.

MATERIALS AND METHODS

Selected location -

Mainly four different wetland sites are selected on the base of relative amount of human activity and the bird diversity.

Site No 1 - Rajaram Tank (Shivaji University campus)
Site No 2 - Kalamba
Site No 3 - New Palace
Site No 4 - Rankala

Sampling -

Data is collected from Four Wetlands. It is collected on each site by systematically visited on varying days of the month at varying time.

Time of taking reading -
As activity of birds are usually more during the morning & evening hours the selected time for taking reading was 7.00am to 9.00am or 5.30pm to 7.00pm.

Density estimation –
Density of birds was estimated by Point Count Method and by Counting Flock Method. Point counts will be utilized as the primary sampling method, using visual cues. At least two expert observers, including the principal investigator, will sit quietly from a selected point where all of the selected area can be viewed. Using a standard data sheet, all species and individuals will be counted and recorded by the observers.
Species Diversity Index (SDI) was calculated by using the following formulae-

$$SDI = \frac{N*(N-1)}{N\ (N-1)}$$

Where - N = {n
('n' = total no. of individuals of the species)
(N-1) = {(n-1)
And
N (N-1) = {n (n-1)

RESULTS AND DISCUSSION

In the present study, find out the status of diversity of birds in two years in the, Rajaram Tank, Kalamba, New Palace and Rankala area. The Species Diversity Index (SDI) of the birds in the year 2006-07 of wetlands is 30, 14, 18 and 9, and in the year 2007-08 is 28, 12, 17 and 7 respectively are shown in the Table 1 (fig. 1). The Species count every site at each month of two year is shown in the Table 2. The Species count of year 2006-07 is higher than the year 2007-08, because of the natural and artificial disturbances occurring in their habitat.

Table 1- Species diversity index of bird population in the selected wetlands

Sr. No.	Name of Selected site	Species Diversity Index of Bird 2006-07	Species Diversity Index of Bird 2007-08
1	Rajaram tank	30	28
2	Kalamba	14	12
3	New Palace	18	17
4	Rankala	9	7

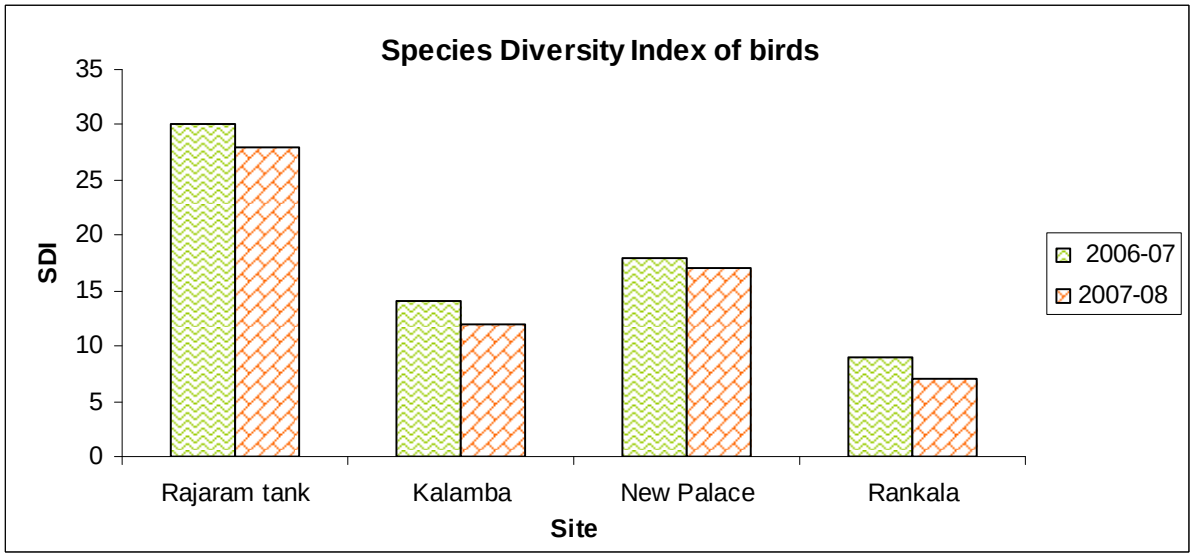

Fig. 1 – Species Diversity Index of Birds in whole Study

Shivaji University (Rajaram Tank) -

The Species migratory birds and residential birds those visited are Spotbill (*Anas poecilorhyncha*), White necked stork, Common teal (*Anas crecca*), Gargeny (*Anas querquedula*), Cormorant, etc. The residential migratory species of bird population like coot (*Fulica atra*) was more. The year 2007-08 the population of little cormorant *(Phalacrocorax niger)*, Spot bill duck (*Anas poecilorhyncha*) and Dapchik is very low. The species count in every site of the wetlands at each month is 45 to 51 species in year 2006-07 and in the year 2007-08 it is 41-50 species (fig.2).

Table 2- Species count every site of wetlands at each month

Month	Rajaram Tank		Kalamba		New Palace		Rankala	
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08
SEP.	45	41	25	22	17	15	15	12
OCT.	46	43	33	31	23	20	18	15
NOV.	47	45	38	37	30	27	21	19
DEC.	46	48	48	45	33	31	27	24
JAN.	51	50	50	48	36	33	26	23
FEB.	51	49	55	51	36	33	25	22

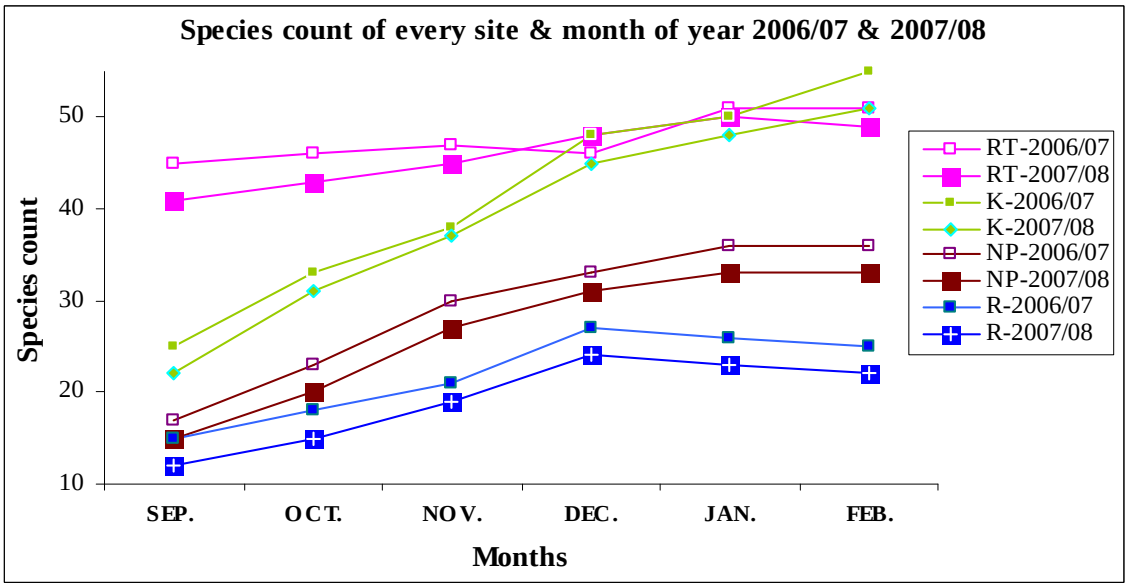

Fig. 2 – Species count of every site of wetland at each month

Kalamba -

The Species of true migratory birds was visited the Kalamba are Pintail (*Anas acuta*), common teal (*Anas crecca*), Gadwal (*Anas strepera*), Wigeon (*Anas penelope*), Showeller (*Anas clypetata*), common Pochard (*Atythga ferina*), Carmorant, White Ibis, Cotton teal (*Nettapus coromandelianus*) etc.

Many local and residential migratory birds were observed. In the year 2006-07 four Wigeans are observed in kalamba Wetland. The coot (*Fulica atra*), Spot bill (*Anas poecilorhyncha*) population is also high. The year 2007-08 the Cotton teal (*Nettapus coromandelianus*), Pintail duck, Northern shoveller (*Anas clypeata*) and Comb duck species are not seen. The species count in every site of the wetlands at each month in the year 2006-07 is 25 to 55 species and in the year 2007-08 it is 22-51species of birds.

New Palace Wetland -

In this wetland, the Species of migratory birds and residential birds those visited are Paintaied stork, Open billed stork, White necked stork, Pintail (*Anas acuta*), Common teal (*Anas crecca*), Gadwal (*Anas strepera*), Duck, Carmorant etc. The Number of pain tailed stork is high it is true migratory bird. They visit for roosting but now a days it is observed that they also nesting here. The number of carmorant is also observable. The year 2006-07 painted stork number is increased. The year2007-08 White nacked stork is not seen. The species count in every site of the wetlands at each month of year 2006-07 is 17 to 36 species and in the year 2007-08 it is 15-33 species of birds.

Rankala Wetland -

In this wetland, the Species of migratory birds and residential birds was visited such as Pintail (*Anas acuta*), Spot bill duck, Purple heron, Common teal (*Anas crecca*) etc. The coot population was higher in this wetland. Due to Eutrohication the bird which terrestrial but now a day they saw on the wetland inside the wetlands due to available of food like insect on Water hyacinth (*Echornia crassipus*). The number of these birds are high those are crows and common myna.

The year 2006-07 diving duck is not observed on this wetland due to the growth of Water hyacinth and Eutrophication. The year 2007-08 Carmorant and Dapchik are seen and the species like Pheasent Tail Jaccana, Black winged stilt, White breseted kingfisher and Indian myna are not seen. The species count in every site of the wetlands at each month of year 2006-07 is 15 to 27 species and in the year 2007-08 it is 12 to 24 of the birds.

CONCLUSION

By the definition, higher the SDI the ecosystem is more stable and the lower SDI, the ecosystem is under stressful conditions. Rajaram Tank and New Palace wetland is stable ecosystem as compared to Rankala and Kalamba wetlands. This is under stressful conditions due to increasing human activities. Anthropogenic activities like washing of cloths, vehicles, live stock, bathing and dumping Nirmalya and Ganpati idols in the tank has increased the pollution. Human encroachment i.e. settlement in catchments area is increased and this give adverse effect of the bird population. Paddy fields are replaced by the Sugar cane and soybean in side of Kalamba wetland and these increases the food problem in the birds. In year 2006-07 the rainfall is higher than the year 2007-08, because of this the water level of the wetlands are decreased and the aquatic plants increased. In the year 2007-08, the visited migratory bird species and population is less because of the natural phenomena like seasonal variations, rainfall pattern, natural disasters, etc.

Recommendation

Tree cutting in the catchments area should be prohibited. Washing of live stocks and vehicle in the tank should be banned. Jalkund should be used for Ganpati visergen during Ganpati festival. Local fast growing species and fruit bearing trees suitable to the local environment should be planted, they attract the birds. Unwanted, unneeded human activities should be banned in the wetland catchments area. Avoid road construction in the catchments area which more affect bird habitat. Old wire fencing around the wetlands should be repaired. For all the wetlands Eco-tourism concept is used [8].

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