

## **GLOBAL WARMING AND CLIMATE CHANGE IMPACTS ON BIODIVERSITY- CASES FROM LOCAL REGIONS OF MAHARASHTRA**

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### **Abstract**

Climate change and global warming have adverse impact on local biodiversity. Some of the case studies are reported from the rural part of the Maharashtra state to highlight climate change.

**Keywords:** Climate change, global warming, biodiversity change

### **I. INTRODUCTION**

Global warming and climate change are leading to loss of biological resources across the part of globe. The last 400 years are hottest years in last 2000 years. No doubt anthropogenic changes at peak level, increasing serious threats to the atmospheric gaseous change. Change in climate and global warming leads to significant changes in biodiversity. Cyclones, continuous rain spells, consecutive droughts etc. are the leading concerns of the environment. On this background, few of the changes in faunal species have been reported in this investigation.

### **II. RESEARCH METHODOLOGY**

In this research investigation, primary information is collected from local respondents and visits are arranged to specific locations. The behavioral changes and response of each species towards the changing climate have been recorded separately.

### **III. OBJECTIVES**

The overall objective of this study is to report the faunal species with taxonomic classification and impacts of climate change on their habits.

### **IV. RESULTS AND DISCUSSION**

#### **1. Change in Reproductive behavior in *Hoplobatrachus Tigerinus* ( Indian Bullfrog)-**

This species is found throughout most wetland areas of India, Bangladesh and much of northern Pakistan, and is recorded from the southern parts of Nepal, and from upper and northern central Myanmar [1]. The commonly observed frog across the part of Maharashtra is *Hoplobatrachus tigerinus*. The place where the early frog fertilization is reported to Pavaimal village located on

Pandhare – Sangvi road in Baramati block of Pune district of Maharashtra. The DMS latitude  $18^{\circ} 9' 2.3868''$  N and DMS longitude  $74^{\circ} 34' 36.4152''$  E. It is mostly solitary and nocturnal, inhabiting holes and bushes near permanent water courses and pools [2]. The breeding is reported in between the 01 March to 28th May to 02 June 2020 on the background of early signs of Nisarg cyclone. M Gopalakrishnan, M R Rajasekarasetty (1978), studied reproductive behavior of *Rana hexadactyla*, in two climatologically contrasting regions and correlated with the environmental conditions, like temperature, relative humidity and rainfall prevailing there. The impacts of changing environmental conditions were correlated with gonadal activity of this species from two other areas near to Mangalore and Mysore cities of India. The results show that the gametogenic activity is under the marked influence of the range of temperature and relative humidity prevailing in the locality while the pattern of rainfall plays a supplementary role. M Gopalakrishnan, M R Rajasekarasetty (1978) observed, the gametogenesis occurs rapidly around Mangalore where the range of temperature between the monthly mean maximum and the minimum is narrow and stable from April to October but in Mysore city similar environmental conditions are seen from June to October and the gametogenesis becomes active during this period. Thus, ovulation and oviposition take place during June or July at Mangalore whereas the same occur towards the end of August at Mysore city. [3]

In this investigation we found that, *Hoplobatrachus tigerinus* (Indian bullfrog) breed in the month of May 22- 28, 2020. The cyclonic condition i.e Nisarg cyclone leads to change in climatic conditions in drought prone regions of Maharashtra. The overall impact of climate change was reported in the mentioned village. As per the report of Ministry of Earth Science, about development of low pressure area over southeast Arabian Sea was given in the extended range outlook issued on 21st May about 10 days prior to the formation of low pressure area over the southeast & adjoining east-central Arabian Sea and Lakshadweep area on 31st May (Preliminary report of Ministry of Earth Science, Government of India, 05 JUL 2020 4:24PM by PIB Delhi). It may lead to changing reproductive behavior in frog species. The place where the early fertilization reported is the canal area of Pavaimal village near to Baramati town in Maharashtra, India

## **2. Nisarg cyclone slaughters thousands of Fireflies in Bhandardara dam, Maharashtra, India–**

*Abscondita* sp. (close perplexa) is the commonly observed firefly species near to Bhandardara dam (photo-plate No.1.) About 2000 species of fireflies are known to science. Bhandardara vernal pool is a lentic ecosystem offers the great habitat to firefly species. The region was coped with Nisarga cyclone during the year 2020.

The As per the report of Ministry of Earth Science, first bulletin issued at 0330 UTC (0855 hrs IST) of 31st May2020, Which indicating that the system would intensify into a cyclonic storm and reach north Maharashtra and Gujarat coasts by 3rd June 2020, till the bulletins issued on 3rd June, 2020 when actually, the severe cyclonic storm Nisarga crossed north Maharashtra ( Including Thane, Raigad, West part of Pune district and Northern part of Ahmednagar district) coast close to south of Alibagh with a maximum sustained wind speed of 110-120 kmph gusting to 130 kmph between 0700-0900 UTC (Afternoon) of 03rd June 2020, the track, landfall point & time, intensity and associated adverse weather like heavy rainfall, gale wind and storm surge were well predicted by IMD. These cyclonic conditions impacted the Fireflies festival at the Bhandardara dam usually seen in the end of May to beginning of Monsoon (June) in India. Heavy rain, storm surge and wind speed (110 Kmph reported in this area) leads to slaughtering of fireflies in the backwater of Bhandardara dam. The changes in ecosystem functions is under investigation. The villages adjoining to Ratanwadi hamlet ( Backwater of Bhandardara dam), where there is huge loss of fireflies ( insect fauna) have been reported.

The Cyclone crossed the Maharashtra, South Gujrat and Lakshadweep on 3rd June 2020. According to Indian Meteorological Department (IMD), [4] the severe 'Nisarg' cyclonic storm was centered in east central Arabian Sea at 11.30 a.m., at its very close Raigad district of Maharashtra. (Pls See. Figure No.1). Climatologists concluded that, Arabian Sea is having more cyclones for the cause of climate change. Climatologists foreseen that; the Arabian Sea is emerging as the new foundation for consecutive cyclones. Hiroyuki Murakami (2017) [5] conducted a study of the cyclones originating in the Arabian Sea and concluded that majority (64 per cent) of cyclonic storms in the region is led by climate change. (Article by Prakash Datta, India Today, 02 June 2020). On the background of above discussion, the changes due to Nisarg cycle leads to change in climatic conditions. The Nisarg cyclone

impacted the Firefly festival, which fall in every year at the beginning of June 2020 at Bhandardara dam in Ahmednagar district of Maharashtra. ( Photo-plate No.1).

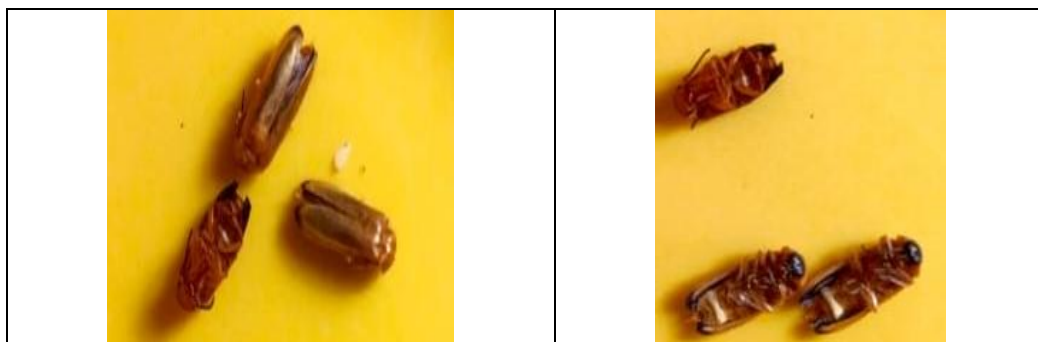
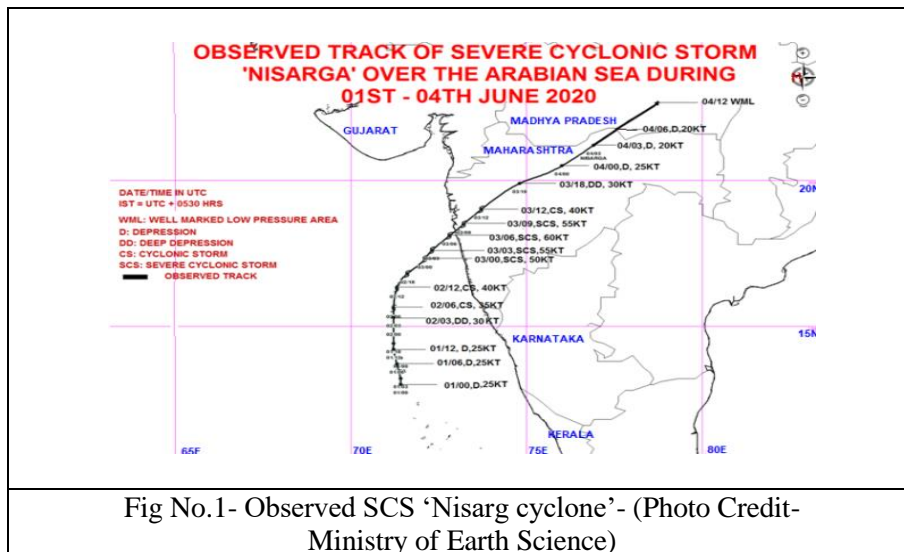


Photo-plate No.1 Dead Specimens of Abscondita species collected from electrified rooms (Attracted by light) during the field work.

**3. Migration of Birds – Hariyal Reported in Sangola block of Solapur distict in Maharashtra.**

Green Pigeon (Local Name- Hariyal, Zoological Name -Treon Phoenicoptera) was found in outskirts of Sangola city in Solapur district on 16th October 2020. The Sangola block is one of the drought prone region described for erratic rainfall and humid climatic conditions. The acute water scarcity was reported every year. The adjoining all the three districts namely Sangli, Satara and Pune districts of Maharashtra have received the total 442.6 mm in excess rainfall (750 mm is the average annual rainfall) at the end of its four months of monsoon, June-September (Indian Meteorological Department). These unfavorable conditions may lead to migration of Hariyal to the nearest driest part of Solapur district. Dr. Vidhin Kamble, Zoology Department and Dr. Madhusudan Bachute, Sangola College, Sanola kept Hariyal in captive and after taking some first aids released in environment.



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