

**Research Article**

## **BIODIVERSITY AND INTERDEPENDENCE STUDY OF THE PONG WETLAND BIRD SANCTUARY**

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### **ABSTRACT**

Pong lake wetland is the second largest sanctuary in Himachal Pradesh, with a rich inflow of migratory birds. The study area was identified from both Conservation zone and Rehabilitation zone. The results suggest rich diversity and profound interdependence between floral and faunal species in the Nagrota Surian and Maleta sites within the Conservation zone and significant decreased diversity of floral and faunal species at the Dadasida site, indicative of significant human interference in the Rehabilitation zone.

**Key words:** *Flora, Fauna, Pong Lake, Nagrota Surian site, Maleta site and Dadasida site.*

### **INTRODUCTION**

Biodiversity is a rich source of substances with therapeutic properties i.e., (*Papaver somniferum*), used as an analgesic; quinine (*Chinchona officinalis*), used for the treatment of malaria and taxol, as anticancer drug from the bark of the yew tree (*Taxus brevifolia*, *T. baccata*). In addition, it also has great aesthetic value including ecotourism, bird watching, wild life etc.

Ecosystems and ecological processes i.e., the wetlands play an important role in the breakdown and absorption of many pollutants. Natural and artificial wetlands are being used to filter effluents to remove nutrients, heavy metals and suspended solids, reduce the biochemical oxygen demands and destroy potentially harmful microorganisms, overall, help regulate the climate.

Extensive studies has been carried out in exploring the biodiversity of Malabar region (Burkill, 1965; Manilal, 1980), North East Indian region (King and Pantling, 1898; Brandis, 1906; Rao and Murti, 1990; Tiwari et al, 1999; Rao et al, 2000), Uttar Pradesh region (Uriyal and Rao, 1993), Jammu & Kashmir (Srivastava et al, 1995) and some parts of Himachal Pradesh like Shimla, Kullu, Kangra Valley and Churdhar and Rohtang area (Collet, 1921, Sarin, 1979; Chowdhary and Wadhwa, 1984; Desh Raj, 1991; Aswal and Mehrothra, 1994; Sindhi, 1996; Singh and Rawat, 2000; Sharma, 2002).

The Pong wetland, situated in Dehra and Nurpur forest division of District Kangra, Himachal Pradesh, India was declared and protected as Wildlife Sanctuary for birds since 1983. It is the fifth largest sanctuary in Himachal Pradesh, with an area of 307 sq km up to an altitude of 450 m, with latitude ranging from 31°49'50" to 32°14'36" N to 76°53'31" to 76°17'53" E. This is the first major wetland which potentially offers a transitory resting reserve for the migratory birds coming from the Trans-Himalayan zone in the winter season due to freezing of wetlands of Europe and North and Central Asia.

The objective of the present study is to study the floral and faunal distribution and its interaction with biodiversity in the Pong lake and its vicinity i.e., Nagrota Surian and Dehra division of district Kangra, Himachal Pradesh.

### **MATERIALS AND METHODS**

**Vegetation analysis:** The vegetation analysis was carried out to study the zonal variation in flora and fauna and its impact on biodiversity. For this purpose, three sites were selected i.e., Nagrota Surian, Maleta and dadasida.

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The study was carried out by Nested Quadrant method. The data were then quantitatively analysed for frequency, density and abundance (Curtis and McIntosh, 1950).

In order to express the Dominance and Ecological success of a species with a single value i.e., the concept of Importance Value Index has been developed. The Importance Value of Index was determined with the help of relative frequency, relative density and relative dominance (Curtis, 1959).

### **RESULTS AND DISCUSSION**

The Pong wetland and its vicinity was divided into two zones i.e., Conservation zone consisting of Nagrota Surian and Maleta sites and Rehabilitation zone consisting of Dadasida site. The annual rainfall in the Pong lake ranges from 10mm in the month of November to 750 mm in the month of August while the temperature ranges from 44°C in the month of June to 2.5°C during January.

Pong lake and its vicinity are highly sensitive to anthropogenic induced activities and natural disasters. Slight changes in eco-balance can jeopardize environment systems with far reaching ramifications. Extensive field survey was conducted in the different sites to identify the vast richness of floral and faunal wealth for better indication of biodiversity.

Nagrota Surian in the vicinity of Jawali is the Conservation zone. This area has total 24 species of flora in which 17 species are of trees. Some of the prominent tree species are *Cassia fistula*, *Plylanthus emblica*, *Ficus palmata*, *Dendro calamus strictus*, *Ficus bengalenses*, *Aegle marmelos*, *Syzygium celmmit*, *Acacia catechu*, *Lawsonia inermis*, *Sapindus mukurossi*, *Dalbergia sisso*, *Cedralla tuna*, *Ficus religiosa*, *Calotropis procera*, *Terminalia balerica*, *Grewia oppositifolia* and *Terminalia tomentosa*. 7 shrub species were identified; the prominent species are *Litsaea chinensia*, *Lantana camarana*, *Carrisu*, *Adatoda vesica*, *Murraya koenigii*, *Murraya exotica* and *Vites nigi*. In this zone, due to the richness of the floral diversity, the number of faunal species are more which includes 4 species of butterflies i.e., *Common sailor*, *Common Pansy*, *Common Emmigrant* and *Tiny Grass Blue*, 2 species of reptiles *Striplet keel back snake* and *Common lizard*, 10 species of birds, *Red Jungle Fawl*, *Common babbler*, *Common myna*, *Gray Partridges*, *Rose Ringer Parakeet*, *Collard Dove*, *Brahmny Starling*, *Jungle Myna*, *Ashy Breast Prinia*, *Jungle Crow*, *Rock Pigeon*, *Green Bee eater*, *Red Watlled lopuing*, *Spotted Dove*, *Scaly Breasted Munia* and *Black kite* and 2 species of mammals i.e., *Barking deer* and *Indian hare*, were also identified. It was found that there was more profound interdependence between floral and faunal species.

Maleta site have 21 floral species of with 15 prominent tree species are *Cassia fistula*, *Plylanthus emblica*, *Ficus palmata*, *Dendro calamus strictus*, *Ficus bengalenses*, *Aegle marmelos*, *Phoenix sylvestris*, *Mangifera indica*, *Azadaricta indica*, *Dalbergia sisso*, *Cedralla tuna*, *Acacia nilotia*, *Calotropis procera*, *Terminalia balerica*, *Terminalica arjuna* and *Saraca indica*. 6 shrub species were identified, the prominent species are *Litsaea chinensia*, *Cannabis sativa*, *Carrisu*, *Mnosa hymaljana*, *Adatoda vesica* and *Murraya koenigii*. The faunal species identified are *Common Emmigrant*, *Pioneer*, *Monitor Lizard*, *Common myna*, *Gray Partridges*, *Roufeus Treepie*, *Plum hende Parakeet*, *Brahmny Starling*, *Jungle Crow*, *House Crow*, *Rock Pigeon*, *Green Bee eater*, *Red Watlled lopuing*, *Black kite*, *Wood pecker* and *Indian hare*. There is a clear evidence of decreased floral diversity and subsequent decrease in the faunal diversity.

Dadasida site is a part of the Rehabilitation Zone where the impact of human population is seen due to their continuous use of crop cultivation, cutting of trees and other related activities. The excessive haphazard use of the area for many activities carried out by human, calls for immediate conservation of flora and fauna for better indication of biodiversity.

A total of 15 species of flora of which 10 species of trees were identified, the prominent being *Cassia fistula*, *Dendro calamus strictus*, *Aegle marmelos*, *Azadaricta indica*, *Sapindus mukurossi*, *Cedralla tuna*, *Calotropis procera*, *Saraca indica*, *Grewia oppositifolia* and *Artocarpus lacoocha*. 5 shrub species were identified, the prominent species are *Litsaea chinensia*, *Cannabis sativa*, *Adatoda vesica*, *Indiagofera* and

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**Figure 1:** *Aegle marmelos*

**Figure 2:** *Cassia fistula*

**Figure 3:** *Ficus carica*



**Figure 4:** *Acacia catechu*

**Figure 5:** *Terminalia arjuna*

**Figure 6:** *Delbergia sissoo*



**Figure 7:** *Vitex nigundo*

**Figure 8:** *Lawsonia inermis*

**Figure 9:** *Berberis aristata*

*Murraya koenigii*. As far as the faunal diversity was concerned, 3 butterflies, i.e., *Common Sailor*, *Common Emmigrant* and *Indian Cabbage*, only 7 bird species could be identified. They are *Red Jungle Fawl*, *Rose Ringer Parakeet*, *Greate Barbet*, *Jungle Crow*, *Green Bee eater*, *Rted Watlled lopuing* and *Wood pecker*. There was no evidence of any reptile or mammals in this site, indicating human interference with the floral diversity, thereby disturbing the food chain of the conservation zone.

The present investigation is of significant importance as extensive studies have been carried out to identify the floral diversity at the two zones. The present study enumerates the correlation between the floral and faunal diversity and its impact on the overall richness of the area. As the area is an ideal site for the migratory birds, the study will be important in designing strategy to maintain the biodiversity of Pong lake and conserve the same by providing an ideal site for their breeding and rehabilitation with minimum human interference.

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