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ZONAL VARIATION IN FLORA AND FAUNA AND ITS IMPACT ON BIODIVERSITY IN PONG LAKE SANCTUARY IN H.P.

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ABSTRACT
The second-largest sanctuary in Himachal Pradesh, Pong Lake Wetland has a significant influx of migratory birds. The conservation zone and the rehabilitation zone both helped to identify the research area. The findings point to significant decreased diversity of floral and faunal species at the Dadasida site, indicative of significant human interference in the Rehabilitation zone, and rich diversity and profound interdependence between floral and faunal species at the Nagrota Surian and Maleta sites within the Conservation zone. Suggestion made that there is an urgent need to conserve the floral biodiversity if we want to see the faunal diversity in these regions as both the floral and faunal diversities have symbiotic relations with each other.

Keywords*: Flora, Fauna, Pong Lake, Nagrota Surian site, Maleta site and Dadasida site*

INTRODUCTION
Biodiversity, also called "biological diversity," refers to the variety and variability of life on Earth at all levels of organization, including the genetic, species, and ecosystem levels. It includes the full range of living organisms, their interactions, and the ecological processes they are part of. Biodiversity is a measure of the richness and complexity of the natural world. This is the real significance of it. Because of biodiversity whose actual base is chemical that includes DNA or products derived from it indirectly, we have several useful chemicals such as taxol, an anticancer medication derived from the bark of the yew tree (*Taxus brevifolia, T. baccata*), quinine, which is used to treat malaria, and *Papaver sominiferum,* which is used as an analgesic. Biodiversity also offers excellent aesthetic value, such as ecotourism, wildlife viewing, and so forth. Green plants remove carbon dioxide and release oxygen into the atmosphere, which helps keep the environment healthy and fit for human life (Dickson *et al.,* 2019).
Wetlands and other ecological systems, such as ecosystems, are crucial for the breakdown and absorption of many contaminants. Utilizing both natural and man-made wetlands, effluents are filtered to remove nutrients, heavy metals, and suspended sediments, lower the biochemical oxygen requirements, kill potentially dangerous microbes, and generally assist control the climate.
Numerous studies have been conducted to examine the biodiversity of the 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 areas of Himachal. Since 1983, the Pong wetland in India's Himachal Pradesh region's Dehra and Nurpur forest division has been designated and protected as a wildlifesanctuary for birds. With a 307 sq km size and an elevation range of 450 m, it is the seventh largest sanctuary in Himachal Pradesh. Its latitude ranges from 31049'50" to 32014'36" N to 76053'31" to 76017'53" E. This is the first significant wetland that might provide migratory birds traveling from the Trans-Himalayan region with a temporary resting reserve during the winter months due to the freezing of wetlands in Europe, North and Central Asia.
The goal of the current study is to examine the distribution of flora and fauna and how it interacts with biodiversity in the area around Pong Lake, namely in the Nagrota Surian and Dehra division of the district Kangra in Himachal Pradesh.

MATERIALS AND METHODS

Analysis of the vegetation: The zonal variation in flora and fauna, as well as its effects on biodiversity, were investigated. Three locations, namely Dadasida, Maleta, and Nagrota Surian, were chosen for this purpose. The Nested Quadrate technique was used to conduct the investigation. The frequency, density, and abundance of the data were then quantitatively examined (Curtis and McIntosh, 1950).

Importance Value Index has been designed in order to indicate the dominance and ecological success of a species with a single value. Relative frequency, relative density, and relative dominance were used to calculate the Importance Value of the Index (Curtis, 1959).

RESULTS AND DISCUSSION

The Pong wetland and its surroundings were separated into two zones: the Dadasida site was in the rehabilitation zone, while the Nagrota Surian and Maleta sites were in the conservation zone. The Pong Lake experiences yearly rainfall ranging from 10 mm in November to 750 mm in August, with temperatures ranging from 440C in June to 2.50C in January.

Both anthropogenically driven activities and natural calamities have a significant impact on Pong Lake and the area around it. Small alterations in the eco-balance can endanger environmental systems and have far-reaching effects. A thorough field study was done at each location to find the huge range of flora and wildlife for a better indicator of biodiversity.

The conservation area is located near Jawali in Nagrota Surian. The total number of plant species in this region is 24, of which 17 are tree species. Some of the prominent tree and plant species are *Cassia fistula, Phyllanthus emblica, Ficus palmeta, Dendro calamus strictus, Ficus bengalenses, Aegle marmelos, Syzygium celmmit, Acacia catechu, Lawsonia inermis, Sapindus mukurossi, Dalbergia sisso, Cedralla tuna, Ficus religiosa, Terminalia balerica, Grewia oppositifolia and Terminalia tomentosa*. The identification of 8 shrub species revealed the presence of *Litsaea chinensis, Lantana camara, Carrisu, Adhatoda vasica, Murraya koenigii, Calotropis procera, Murraya exotica,* and *Vitis nigi*, among other notable species. Due to the abundant floral variety in this area, there are many faunal species, including 4 kinds of butterflies, including the Common Sailor, Common Pansy, Common Emigrant, and Tiny Grass Blue Ten different species of birds, a common lizard and a striped keelback snake Red Jungle Fowl, Common Babbler, Common Myna, Grey Partridges, Rose Ringer Parakeet, Collard Dove, Brahmny Starling, Jungle Crow, Rock Pigeon, Green Bee Eater, Red Wattled lapwing, Spotted Dove, Scaly Breasted Munia, Black Kite, and 2 species of mammals, Barking deer and Indian hare, were also identified. More profound interaction between floral and faunal species was discovered *Aegle marmelos, Phoenix sylvestris, Mangifera indica, Azadirachta indica, Dalbergia sissoo, Cedrella tuna, Acacia nilotica, Calotropis procera, Terminalia bellirica, Terminalia arjuna,* and *Saraca indica* are some of the prominent tree species at the Maleta site, which has 21 floral species in total. There were 6 different species of shrubs seen, with *Litsaea chinensis, Cannabis sativa, Adhatoda vasica,* standing out. Common Emigrant, Pioneer, Monitor Lizard, Common Myna, Grey Partridges, *Rufous Treepie*, Plum-headed Parakeet, Brahminy Starling, Jungle Crow, House Crow, Rock Pigeon, Green Bee eater, Red Wattled lapwing, Black kite, Wood pecker, and Indian Hare are among the faunal species identified. There is unmistakable evidence of declining floral diversity, which has led to declining faunal diversity. Monojit and Sandip (2020) carried out ones such survey-based study which involved the qualitative diversity of flora and fauna. They carried out the diversity assessment at two campuses of Barrackpore Rastraguru Surendranath College. They found the presence of 256 floral species and 165 faunal species in and around college campuses. They too concluded that the huge faunal diversity is mainly due to high level of floral diversity, which establishes the area as resource-rich habitat with promising reservoir of species.

As a result of ongoing crop cultivation, tree cutting, and other related activities, the human population's effects may be seen at the Dadasida site, which is located in the Rehabilitation Zone. The land is being overly and haphazardly used by humans for many purposes, which necessitates the immediate conservation of flora and animals for a better representation of biodiversity. Ten different tree species

were recognized out of a total of 15 different species of flora, with the most notable being *Artocarpus lacoocha, Cassia fistula, Dendro calamus strictus, Aegle marmelos, Azadaricta indica, Sapindus mukurossi, Cedralla tuna, Calotropis procera, and Saraca indica*. There were 5 species of shrubs found, with *Litsaea chinensis, Cannabis sativa, Adhatoda vasica, Indigofera, and Moenigii Murray*. Only 3 butterflies, the Common Sailor, Common Emigrant, and Indian Cabbage, as well as 7 bird species, could be recognized in terms of the faunal variety. They are Rose Ringer Parakeets and Red Jungle Fowls. Green Bee Eater, Red Wattled Lapwing, Great Barbet, Jungle Crow, and Wood Pecker. There was no evidence of any mammals or reptiles at this location, which suggests that humans have interfered with the floral diversity and upset the food chain in the conservation zone.

Since much research has been done to discover the floral diversity at the two zones, the current investigation is extremely important. The current study details the relationship between floral and faunal diversity and how it affects the region's overall richness. The study will be crucial in developing a strategy to sustain the biodiversity of Pong Lake and conserve it by providing an optimal environment for their breeding and recovery with minimal human intervention because the area is an outstanding site for migrating birds.

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