

## Report on a least trodden trail: Backyard Biodiversity

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### Abstract

*Biodiversity or biological diversity includes the variability and variation present in the ecosystem and backyard biodiversity is the ground level diversity around our house which usually gets a huge ignorance leading to fast destruction. Present study was conducted in the residential area of Mines Rescue Station, Asansol, West Bengal within an area of 43933.29 m<sup>2</sup>. The study was done from December 2019 till December 2022 which included the pandemic lockdown in order to understand the variation caused by the same. Interaction between birds and plants, butterflies and dragonflies with their host, and nectarine plants and most importantly changes caused due to lockdown is the major aspect of the study. A graph representing plant and its interaction with the number of bird species showed that *Caesalpinia pulcherrima* supports maximum number of bird species. Subsequently, it is well understood that for birds, the source of food, shelter and protection tops the density of the plant. Different kinds of butterflies and dragonflies prefer distinct nectar and larval host plants. The diversity of butterflies is restricted to three families whereas dragonflies to one. Two nests of *Oecophylla smaragdina*, commonly known as the weaver ant, was spotted weaving nest with the leaves of *Psidium guajava* and *Ixora coccinia*. Banded Peacock, was only spotted during the lockdown including few changes in the community of butterflies. Study mainly emphasized the variety of species residing next to us that we tend to ignore and was a preliminary survey based on visual observation supported by pictorial evidence.*

**Keywords:** Asansol, Backyard Biodiversity, Birds, Butterflies, Dragonflies, Weaver ant.

### Introduction

With increasing trend of urbanization, the green area is decreasing proportionally. In this fast-moving world with increasing technology, we often tend to miss the happiness that is present in and around us. Nature is incomparable when it comes to beauty and variety. The study of the surroundings not only helps us in refreshing our minds but also develops an aesthetic sense of living. Especially in this difficult situation, nature has always been warming. Backyard Biodiversity has gained its popularity in very recent times. A study in urban diversity noted an increase in the plant species richness, whereas a decline in the animal species richness. On the other hand, birds and arthropods are often seen to increase in urban areas in spite of decrease in species richness (Faeth *et al*, 2011). Brakey (2003) described the importance of

backyard biodiversity and its role in conservation. A study in south Coquitlam and south Port Moody, British Columbia clearly stated the importance of understanding the backyard biodiversity in the urban green space. The introduction of backyard study could be a potent strategy to conserve the green spaces (Rudd *et al*, 2002). The value of biodiversity was studied in New Zealand and concluded that to conserve native biodiversity, local areas need to be studied and analyzed. This would also help in understanding the economic value of diversity and thus the indigenous plants would be conserved for the sake of finances (Kaval *et al*, 2007). During a project of BIOSCAN in California, few new species were discovered in the urban space which created an urge in understanding their life style. Backyard biodiversity played the key role in sustaining those unknown species in an urban landscape (Hartop *et al*, 2018). A study in UK concluded that the contribution of domestic gardens in residential areas needs to be conserved. The reduction of such green spaces will impact biodiversity, ecosystem services, and the well-being of the human population (Davies *et al*, 2008).

India, though a mega diversity country, lacks the concept of backyard biodiversity as a strategy for conservation. The current study aims at understanding the diversity of the surroundings of a residential area, with an aim to bridge the of idea urbanization with biodiversity. The present work mainly focuses at identifying the biodiversity at the core area of industries with heavy traffic and air pollution.

## Materials and Methods

**Study Site:** The study was conducted in Mines Rescue Station, a residential complex, with an area of 43 km<sup>2</sup> area, situated in the outskirts of Asansol, West Bengal (Fig 1). The study site resides in 23.7073<sup>0</sup> N and 86.9093<sup>0</sup> E with an elevation of 137m from sea level. The area is located in the midst of coal mines, steel plants and many other small factories as documented in the State 32 Industrial Profile of West Bengal, 2018–2019 (SIP, 2019).



**Fig 1: Satellite map of study site**

The study was carried for a period of three years namely 2018-2019, 2019-2020 and 2020-2021, to understand the faunal diversity and its comparison over years. The major instrument used in the study was a Nikon D3500 DSLR camera for pictorial documentation of the flora and fauna available. The birds, butterflies, dragonflies and damsel flies were spotted and identified using recognised field guide books (Subramanian, 2005; Grimmett *et al*, 2016; Kehimkar, 2016). The diversity of trees was identified and noted using line transects method. The interaction between the flora and fauna was studied closely to understand the relation among them.

## Results

**The ant nest:** Two nests of *Oecophylla smaragdina*, commonly known as the weaver ant, were spotted weaving their nest on *Psidium guajava* [Fig 2(a)] and on *Ixora coccinea* [Fig 2(b)]. These weaver ants not only play an important role in the ecosystem but are also a source protein and fat when consumed. In India these are also used for medicinal purposes (Rastogi, 2011). These ants are distributed throughout Asia, Australia, New Guinea, and the Solomon Islands as stated by the Köppen-Geiger system having Tropical climates and dry winter subtropical climates. In the west (in India and Pakistan) and much of the south (in Australia), the range of *O. smaragdina* appears to be largely bounded by lands with Arid climates. Therefore, the presence of beaver ants also helps in understanding the climatic condition of the area of appearance (Wetterer, 2017). These ants were found to weave the ends of the leaves in the form of close nest to lay eggs as shown in Fig 2a.



**Fig 2: Nest of Weaver Ant: a) *Psidium guajava* b) *Ixora coccinea***

**The butterflies:** The butterflies were found to be restricted to three families with 13 species in total. The population was highest during monsoon and post-monsoon. Summer had the least number of butterflies. *Papilio crino*, or the common banded peacock of family Papilionoidae (Fig 3) was not a common butterfly in this study area. Banded peacock appeared during 2019-2020 only. The list of butterflies is given in Table 1.

**Table 1: List of butterflies with their presence-absence in three study period**

Common Name	Scientific Name	Family	2018-19	2019-20	2020-21
Common Castor	<i>Ariadne merione</i>	Nymphalidae	+	+	+
Chocolate Pansy	<i>Junonia iphita</i>	Nymphalidae	+	+	+
Common Jay	<i>Graphium doson</i>	Papilionidae	+	+	+
Striped Albatross	<i>Appias libythea</i>	Pieridae	+	+	+
Swallowtail Lime	<i>Papilio demoleus</i>	Papilionidae	+	+	+
Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	+	+	+
Great Eggfly	<i>Hypolimnas bolina</i>	Nymphalidae	+	+	+
Common Sailor	<i>Neptis hylas</i>	Nymphalidae	+	+	+
Common Mormon	<i>Papilio polytes</i>	Papilionidae	+	+	+
Psyche	<i>Leptosia nina</i>	Pieridae	+	+	+
Grass Blue	<i>Zizeeria karsandra</i>	Lycaenidae	-	-	+
Common Banded Peacock	<i>Papilio crino</i>	Papilionidae	-	+	-

**Fig 3: Common Banded Peacock**

**The dragonflies:** The study site witnessed 5 Odonata species under the same family. The dragonflies were seen predominantly during monsoon as shown in Table 2.

**Table 2: List of dragonflies with their presence-absence in three study period**

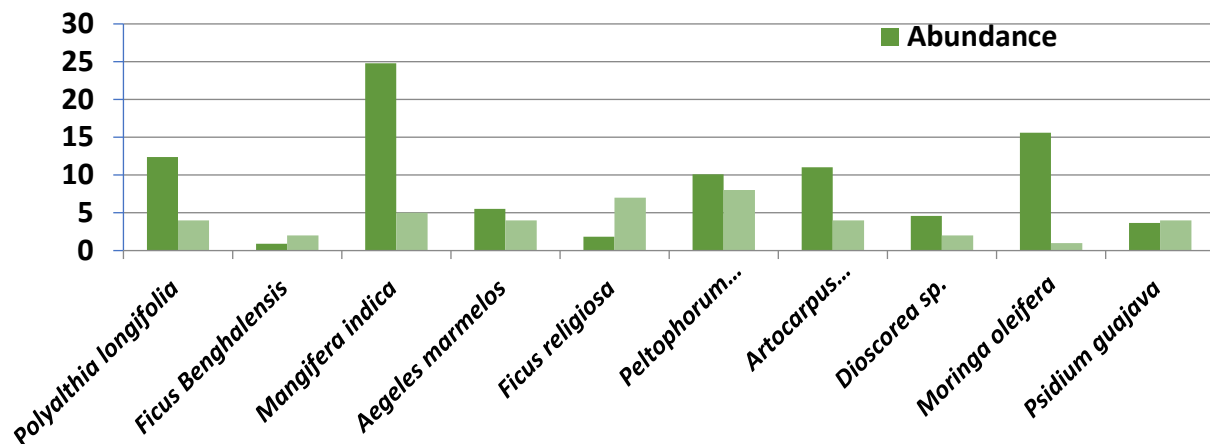
Common Name	Scientific Name	Family	2018-19	2019-20	2020-21
Pied paddy Skimmer	<i>Neurothemis tullia</i>	Libellulidae	+	+	+
Common picture wing	<i>Rhyothemis variegata</i>	Libellulidae	+	+	+
Yellow-tailed Ashy Skimmer	<i>Potamarcha congener</i>	Libellulidae	+	+	+
Green marsh hawk	<i>Orthetrum sabina</i>	Libellulidae	+	+	+
Marsh glider	<i>Rhodothemis rufa</i>	Libellulidae	+	+	+

**The Birds:** A total of 25 species of birds were cited in the study area (Table 3). Out of these most of the birds were residents. The Green Bee-eater and Yellow-footed Green Pigeon were the winter migrants that disappeared with the onset of summer. According to IUCN status Alexandrine Parakeet is listed near threatened but it was widely observed during the study period. Fig 4 represents the number of birds associated with a particular tree. The graph clearly shows that abundance of a particular tree is not the key factor for birds to select the tree. *Mangifera indica* is the most abundant tree in the study site but *Peltophorum pterocarpum*, though less abundant, supported the greatest number of birds.

**Table 3: List of birds with their presence-absence in three study period**

List of Birds	Scientific Name	IUCN status	2018-19	2019-20	2020-21
Purple Sunbird	<i>Cinnyris asiaticus</i>	LC	+	+	+
Jungle babbler	<i>Turdoides striata</i>	LC	+	+	+
Red Vented Bulbul	<i>Pycnonotus cafer</i>	LC	+	+	+
Red Whiskered Bulbul	<i>Pycnonotus jocosus</i>	LC	+	+	+
Bronze Drongo	<i>Dicrurus aeneus</i>	LC	+	+	+
Lesser Flame Back Woodpecker	<i>Dinopium benghalense</i>	LC	+	+	+
Alexandrine Parakeet	<i>Palaeornis eupatria</i>	NT	+	+	+
Common Pigeon	<i>Columba livia</i>	LC	+	+	+
Black-Hooded Oriole	<i>Oriolus xanthornus</i>	LC	+	+	+
Indian Golden Oriole	<i>Oriolus kundoo</i>	LC	+	+	+
Oriental Magpie Robin	<i>Copsychus saularis</i>	LC	+	+	+
Rufous Treepie	<i>Dendrocitta vagabunda</i>	LC	+	+	+
Coppersmith Barbet	<i>Megalaima haemacephala</i>	LC	+	+	+
Lineated Barbet	<i>Megalaima lineata</i>	LC	+	+	+
Collar dove	<i>Streptopelia decaocto</i>	LC	+	+	+
Common Myna	<i>Acridothera tristis</i>	LC	+	+	+
Asiatic Koel	<i>Eudynamis scolopaceus</i>	LC	+	+	+
Shikra	<i>Accipiter badius</i>	LC	+	-	-
Stork billed Kingfisher	<i>Pelargopsis capensis</i>	LC	+	+	+
White Breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC	+	+	+
Green Bee-eater	<i>Merops orientalis</i>	LC	+	+	+
Yellow footed green pigeon	<i>Treron phoenicoptera</i>	LC	+	+	+
Common Iora	<i>Aegithina tiphia</i>	LC	-	+	-
Scaly Breasted Munia	<i>Lonchura punctulata</i>	LC	-	+	-

LC- Least Concern NT- Near Threatened



**Fig 4: Bird-tree association**

### Discussion

The study was focused to identify and understand the interaction of the faunal diversity in a residential area situated in an industrial belt. The study showed enormous checklist of birds, odonates and lepidopterans. The lockdown during 2020 witnessed few new species that was not present before or after the particular year. The appearance of the Common Iora and Scaly Breasted Munia only during the year 2020 showed a marked significance of lockdown. The association of the birds with the tree was independent of the abundance of the tree. The canopy cover, food and protection are the primary requirement for the birds to associate to a particular tree species. The type of Odonata remained the same throughout the study. Alexandrine parakeet, a bird that is near-threatened, is a resident of the study area. Every place has its own kind of flora and fauna diversity. Few studies in Durgapur, another industrial belt (SIP, 2019) in the same district of Pashchim Bardhaman like the study site, have observed a diversity of Odonata (Nayak & Roy, 2016). A total of nine families of beetles are studied in the Durgapur Steel City (Banerjee, 2014) only of a single order Coleoptera. Above 100 species of birds were found in the Durgapur Government College Campus situated in an industrial belt (Adhurya *et al*, 2022). A small residential area in the industrial belt like Asansol also has a considerable amount of species population. A study of the whole of Asansol may provide us with a rather good number of diversity like Durgapur.

### Conclusion

The current study attempts to conclude that a backyard of any residential area could be a great site of biodiversity. Species that needs special attention globally and decreasing in trend could be a resident dweller of our surrounding. A little attention to our surrounding can save biodiversity from decreasing and ultimately going extinct. A pre-occupied notion that polluted regions or industrial areas do not

support biodiversity is not a vague concept, which is very clear from the particular study. This study also gives the opportunity for future study of life cycle of butterflies and dragonflies along with the nesting behaviour of birds present. Also, this study could be used as a framework to understand ecosystem services of the flora and fauna and various ecological interactions within nature seen easily in our gardens. This also in a way is a sustainable method of conserving the nature.

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