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## Effect of landscape on population of common myna in Ludhiana, Punjab

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**Abstract**

Suitable habitat is the foremost requirement of birds to reside in a particular landscape. The present studies aim to observe the effect of landscape on population of Common Myna. Birds were surveyed by using point count method and line transect method in three locations i.e. agricultural landscape (location 1), residential landscape (location 2) and landscape supporting crowded areas having human presence (location 3). Avifaunal diversity was studied and a total of 12 species were observed. These bird species recorded belongs to 7 orders and 11 families. The most dominant order was Passeriformes (41.63%), followed by Columbiformes (16.6%). Based on the status of birds, 91.6% of the bird species observed were resident and 8.4% were resident migrant. Species richness was observed to be 11, 7 and 6 at location 1, 2 and 3 respectively. A total of 19 nest were recorded during the study. Common Myna was found associated with House Crow, Ring Dove, Rose Ringed Parakeet, Common Babbler, Blue Rock Pigeon at all locations i.e. location-1,2 and 3, Red Vented Bulbul, White Breasted Kingfisher and Asian Koel were not found associated with Common Myna at any of the three locations i.e. location 1,2 and 3. The population of Common Myna was maximum at location 3 (38.72%) followed by location 1 (27.36%) and location 3 (24.74%) proving that the feeding opportunities were more in landscape having higher human presence due to their anthropogenic activities which resulted in higher annual abundance of Common Myna and highest number of nest were observed at location 1 which is having least human disturbance.

**Keywords:** avifauna, seasonal abundance, common myna, landscape, species richness

**Introduction**

Punjab has rich bird fauna of 328 species of birds <sup>[1]</sup>. Birds constitute an important biotic component of our ecosystem as various complex relationships exist between birds and their environment <sup>[2,3]</sup>. In Punjab, during the past few decades, the intensive agriculture with its mechanization, use of chemical fertilizers, pesticides etc has resulted in habitat loss and degradation in the extent of diversity which has caused marked reduction in abundance and range of several bird species in the ecosystem <sup>[3-5]</sup>. The bird species taken for study was Common myna, *Acridotheres tristis* is one of the most common birds in our ecosystem and is distributed throughout the country <sup>[6]</sup>. As per systematic position, the Common myna is a representative member of family Sturnidae; order Passeriformes of class Aves <sup>[7, 8]</sup>. Common myna is cavity nester and live in the holes of the tree (Ali and Ripley 1983). Common myna is medium sized, chocolate brown bird with yellow beak, eye patch, feet and legs <sup>[9, 10, 11]</sup>. Though common myna has been described as pest of some agricultural and horticultural crops under some situations <sup>[12]</sup>, but is largely considered as “farm friendly bird” owing to its insectivorous nature <sup>[13]</sup>. It is believed to be natural predator of some serious crop insect pests like *Helicoverpa* spp, *Holotrichia* spp, *Agortis* spp and *Hieroglyphus* spp. <sup>[14-16]</sup>. It is also considered as carrier and transmitter of Nuclear Polyhedrosis virus causing natural mortality in *Helicoverpa* sp. <sup>[13]</sup>. Common Myna *Acridotheres tristis* considered to be the most frequently seen, familiar, typically well known bird in India and many other parts of world. Common Mynas are often seen in huge number for roosting in public places, backyards etc. Common Myna is an omnivore and found mostly feeding on solid surface of earth. It has been reported to feed on insects, domestic waste and/or grains. Holes of trees (either naturally occurring or artificial) and residential hollow areas are occupied for nesting. The present studies was undertaken with an aim to observe the effect of landscape on abundance of Common Myna and its association with other bird species.

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## Material and Methods

The study was carried out at three selected locations in district Ludhiana of Punjab state from January 2019 to December 2019.

**Location 1 and Location 3: Punjab Agricultural University:** The university is situated in the outskirts of Ludhiana city towards west, 189 m above the mean sea level. The campus covers an area of 1600 acres in north-west of Ludhiana along the Ferozepur Road. In addition, to various teaching departments and research laboratories of the constituent collages, playgrounds and grassy lawns, the campus has a large stretch of agricultural fields. The fields was comprised of seasonal crops such as wheat, rice, maize and cotton, along with vegetables and fodder. The area was divided into two study sites i.e. Location-1 comprises of agricultural landscape and Location-3 landscape supporting crowded areas having higher human presence.

**Location 2: Eldeco Estate Colony, Ludhiana,** is a residential colony located at along side of the G.T. road. The colony is widespread in the area of 1200 acres. Colony consists of various parks, lawns, schools, bank and many residential buildings. Colony is few kilometers away from Satluj river.

**Population dynamics:** Population dynamics of birds was studied by employing two different methods i.e. line transect

method and point count method [17]. Three transects were selected at each locations and the data was presented as overall mean of these transects. Line transects, each of 300 m length and 50 m wide at both locations were marked in agricultural and residential landscape respectively for making bird count. All the birds recorded in transects were identified [11]. For point count method an areas was taken in a fixed radius of 40 m and observations on the bird count were made at fortnightly intervals spending 30 minutes during each observation in transects two hours after sunrise in morning and two hours before the sunset in the evening. Relative abundance of Common Myna in relation to other bird species in different locations were recorded. Population characteristics i.e. Specie richness and Relative abundance were calculated. Observations pertaining to population and vegetations of selected locations were recorded.

## Results and Discussions

The observation in regard to vegetation revealed the presence of 17 tree species at location 1 and seven tree species at location 2 and 3 respectively (Table 1). The presence of higher species richness at location 1 (11) as compared to other locations were due to the presence of higher tree diversity at location 1 (Table 1).

**Table 1:** Observations of the vegetation recorded at selected locations.

Location	Common Name	Botanical Name	Origin	Type
Location-1	Arjun	<i>Terminalia arjuna</i>	Native	Evergreen and Deciduous
	Eucalyptus	<i>Eucalyptus tereticornis</i>	Introduced	Evergreen
	Jamun	<i>Syzyium cumini</i>	Native	Evergreen
	Mango	<i>Mangifera indica</i>	Native	Deciduous
	Poplar	<i>Populus deltoides</i>	Introduced	Deciduous
	Silver Oak	<i>Grevillea robusta</i>	Introduced	Evergreen
	Sirris	<i>Albizia lebbek</i>	Introduced	Deciduous
	Banyan tree	<i>Ficus benghalensis</i>	Native	Deciduous
	Dhrek	<i>Melia azedarach</i>	Native	Deciduous
	Peepal	<i>Ficus religiosa</i>	Native	Deciduous
	Shisham	<i>Dalbergia latifolia</i>	Native	Deciduous
	Amaltas	<i>Cassia fistula</i>	Native	Deciduous or evergreen
	Tun	<i>Toona eiliata</i>	Introduced	Deciduous
	Gulmohar	<i>Delonix regia</i>	Native	Evergreen Deciduous
Black board tree	<i>Alstonia scholaris</i>	Native	Evergreen	
Bottle brush	<i>Collistemon lanceolatus</i>	Introduced	Evergreen	
Kadam	<i>Anthocephalus indicus</i>	Native	Evergreen	
Location-2	Silver Oak	<i>Grevillea robusta</i>	Introduced	Evergreen
	Peepal	<i>Ficus religiosa</i>	Native	Deciduous
	Amaltas	<i>Cassia fistula</i>	Native	Deciduous and Evergreen
	Gulmohar	<i>Delonix regia</i>	Native	Deciduous and Evergreen
	Banyan tree	<i>Ficus benghalensis</i>	Native	Deciduous
	Royal Palm	<i>Roystonea regia</i>	Introduced	Evergreen
Location-3	Aamla	<i>Phyllanthus emblica</i>	Native	Deciduous
	Kachnar	<i>Bauhinia variegata</i>	Native	Evergreen
	Sukhchain	<i>Millettia pinnata</i>	Native	Evergreen
	Dhrek	<i>Melia azedarach</i>	Native	Deciduous
	Amaltas	<i>Cassia fistula</i>	Native	Deciduous or Evergreen
	Gulmohar	<i>Alstonia scholaris</i>	Native	Evergreen Deciduous
	Peepal	<i>Ficus religiosa</i>	Native	Deciduous
Silver Oak	<i>Grevillea robusta</i>	Introduced	Evergreen	
<b>Bushes and Weeds</b>				
Location-1	<b>Common Name</b>	<b>Botanical Names</b>		
	Bougun villia	<i>Bougainvillea glabra</i>		
	Gajar Gha	<i>Parthenium hyserophorous</i>		
	Annual blue grass	<i>Poa annua</i>		
	Khabbal grass	<i>Cynodon dactylon</i>		
	Gha	<i>Acrachnera cemosia</i>		
Bathu	<i>Chenopodium alba</i>			

Location-2	<i>Aloe vera</i>	<i>Aloe barbadensis</i>
	Tulsi	<i>Ocimum tenuiflorum</i>
	Gajargha	<i>Parthenium hyserophorous</i>
	Gha	<i>Acrachne racemosa</i>
	Bathu	<i>Chenopodium alba</i>
Location-3	Bougun villia	<i>Bougainvillea glabra</i>
	Gajargha	<i>Parthenium hyserophorous</i>
	Bathu	<i>Chenopodium alba</i>
	Khabbal grass	<i>Cynodon dactylon</i>
	Gha	<i>Acrachne racemosa</i>

Observation of the avifaunal diversity revealed a total of 12 species at selected locations (Table 2). These bird species recorded belongs to 7 orders and 11 families. The most dominant order was Passeriformes (41.63%), followed by

Columbiformes (16.6%). Based on the status of birds, 91.6% of the bird species observed was resident and 8.4% were resident migrant (Table 2).

**Table 2:** Avifaunal diversity observed at selected locations

S no	Common name	Scientific name	Order	Family	Annual abundance			Status	Food	IUCN Status
					Location-1	Location-2	Location-3			
1	Asian Koel	<i>Eudynamis scolopacea</i>	Cuculiformes	Cuculidae	-	2.06	-	R	I, F	LC
2	Black Drongo	<i>Dicrurus macrocercus</i>	Passeriformes	Dicruridae	4.33	-	-	R	I	LC
3	Blue Rock Pigeon	<i>Columbia livia</i>	Columbiformes	Columbidae	1.96	30.94	-	R	G	LC
4	Cattle Egret	<i>Bubulcus ibis</i>	Pelecaniformes	Ardeidae	6.69	6.18	-	RM	I, SI	LC
5	Common Babbler	<i>Turdoides caudatus</i>	Passeriformes	Timaliinae	5.7	6.17	14.88	R	I, F	LC
6	Common Myna	<i>Acridotheres tristis</i>	Passeriformes	Sturnidae	27.36	24.74	38.72	R	I, F	LC
7	House Crow	<i>Corvus splendens</i>	Passeriformes	Corvidae	17.32	23.71	14.5	R	O	LC
8	Red Wattled Lapwing	<i>Vanellus indicus</i>	Charadriiformes	Charadriidae	3.34	-	-	R	I, SI	LC
9	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Passeriformes	Pycnonotidae	13.97	-	4.68	R	I/P/F	LC
10	Ring Dove	<i>Streptopelia decaocto</i>	Columbiformes	Columbidae	11.22	6.17	13.61	R	G	LC
11	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittaciformes	Psittacidae	7.87	-	13.61	R	F, P, G	LC
12	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	Coraciiformes	Alcedinidae	0.24	-	-	R	I, SV	LC

Status: R- Resident (bird species which remains on native place throughout the year); RM- Resident Migrant (bird species which migrates temporarily from their native : Foraging guilds habit: I- Insectivorous; G- Granivorous; F- Fruigivourous; P- Phytophagus; SI- Small Invertebrates eating birds; SV- Small vertebrates eating birds; O-Omnivorous; IUCN status: LC- Least Concern [18].

The population of Common Myna was maximum at location 3 (38.72) followed by location 1 (27.36) and location 3 (24.74) proving that the feeding opportunities were more in landscape having higher human presence due to their anthropogenic activities which resulted in higher annual abundance of Common Myna and highest number of nest were observed at location 1 which is having least human

disturbance. Common Myna is referred as an opportunistic omnivore. It eats berries, fruits, seeds, insects and many other invertebrates. In the location 3, Common Mynas was observed to feed on left over food like breadcrumbs, potato chips. Similar observations were also recorded by other authors [7, 11]. All the bird species falls under least concern (LC) category of IUCN status [18].

### Location-1

Total species recorded at location-1 was 12 out of which dominant order was Passeriformes (41.63%). Dominant feeding guild of the species comprised of insectivorous (63.63%) birds. Predominant bird species recorded included Common Myna and House Crow (Table 3).

**Table 3:** Monthly relative abundance of bird species at location-1

Species	January	February	March	April	May	June	July	August	September	October	November	December
Black Drongo	9.3	14.7	7.69	10.81	0	0	0	0	0	2.85	0	8.33
Blue Rock Pigeon	0	0	3.84	0	3.63	0	0	0	0	0	6.89	5.55
Cattle Egret	0	2.94	0	18.91	0	15.78	11.11	15.78	9.61	0	0	25
Common Babbler	4.65	0	9.61	0	0	0	0	0	11.53	11.42	5.17	13.88
Common Myna	18.6	29.41	32.69	35.13	45.45	21.05	48.14	15.78	34.61	24.28	25.86	13.88
House Crow	13.95	8.82	15.38	8.1	10.9	26.31	0	10.52	23.07	28.57	25.86	8.33
Red Vented Bulbul	9.3	5.88	5.76	0	0	2.63	7.4	0	0	1.42	6.89	0
Red Wattled Lapwing	32.55	29.41	17.3	10.81	7.27	15.78	7.4	15.78	7.69	5.71	6.89	19.44
Ring Dove	11.62	8.82	3.84	2.7	0	15.78	25.92	5.26	13.46	17.14	22.41	0
Rose Ringed Parakeet	0	0	3.84	13.51	32.72	0	0	36.84	0	8.57	0	5.55
White Breasted Kingfisher	0	0	0	0	0	2.63	0	0	0	0	0	0
Specie Richness	7	7	9	7	5	7	5	6	6	8	7	8

White Breasted Kingfisher was least abundant (0.24%) species. Overall, the species diversity recorded in was worked out to be 1.11 and overall species evenness was found to be 1.93.

### Location-II

A total of 6 bird species were observed including Blue Rock Pigeon, Common Myna, and House Crow as dominant bird species (Table 4).

**Table 4:** Monthly relative abundance of bird species at location-2

Species	January	February	March	April	May	June	July	August	September	October	November	December
Asian Koel	0	0	0	0	0	0	0	0	0	16.66	0	0
Blue Rock Pigeon	50.0	62.5	25	33.33	50	0	33.33	50	13.33	16.66	12.5	50
Cattle Egret	0	0	0	0	0	20	22.22	25	0	0	0	0
Common Babbler	0	0	12.5	33.33	0	0	0	0	33.33	0	25	0
Common Myna	25	12.5	41.66	16.66	50	40	11.11	12.5	20	25	37.5	33.33
House Crow	12.5	25	8.33	16.66	0	20.0	33.33	0	33.33	41.66	25	16.66
Ring Dove	12.5	-	12.5	-	-	20.0	-	12.5	-	-	-	-
Specie Richness	4	3	5	4	2	3	4	4	4	4	4	3

Predominant bird species at location-2, includes Blue Rock Pigeon, Common Myna and House Crow. Species evenness was calculated for bird species, which comes out to be 0.13% for Common Myna, 0.03%. Maximum species richness observed was 5 in the month of March, whereas minimum species richness was 2, observed in the month of May (Table 4).

### Location-3

A total of 6 bird species were noted at location-3 including Common Myna, Ring Dove, House Crow, Common Babbler, Red Wattled Lapwing and Rose Ringed Parakeet (Table 5). 3 species belonged to Order Passeriformes, 1 species belonged to order Columbiformes, 1 species belonged to order Ciconiformes and 1 species belonged to order Psittachiformes.

**Table 5:** Monthly avian abundance at location 3

Species	January	February	March	April	May	June	July	August	September	October	November	December
Common Babbler	16.66	26.31	10.76	7.24	21.81	12.5	16.04	13.86	15.15	15.62	8.77	16.66
Common Myna	33.33	36.84	53.84	60.86	30.9	48.43	49.38	36.61	22.72	26.56	26.31	27.77
House Crow	18.33	15.78	10.76	20.28	23.63	12.5	6.17	11.88	10.6	20.31	15.78	12.96
Red Wattled Lapwing	6.66	4.83	4.61	0	10.9	7.81	2.46	6.93	4.54	4.68	1.75	8.67
Ring Dove	16.66	15.78	10.76	7.24	5.45	12.5	13.58	13.86	25.75	14.06	21.05	-
Rose Ringed Parakeet	8.33	-	3.5	4.34	7.27	6.25	12.34	14.85	21.21	18.75	26.31	33.33
Specie Richness	6	5	6	5	6	6	6	6	6	6	6	5

Dominant bird species at location-3 included Common Myna and Common Babbler. Species richness of 6 was observed in all months except February, March and December with species richness of 5. Most abundant species at location-3 was Common Myna with abundance of 38.72% whereas least abundant species was Red Wattled Lapwing with abundance of 4.68%. Species evenness at location-3 was also observed, where value comes out to be 0.14 for Common Myna. Over all observation revealed that Common Myna was found most abundant at Location-3 (38.72%) followed by Location-1 (27.36%) followed by location-2 (24.74%) (Table 2).

**Table 6:** Nests recorded in selected Locations and Association of Common Myna with other bird species at selected locations

Species	Location-1	Location-2	Location-3
<b>Nests Recorded</b>			
Common Myna	5	1	0
House Crow	1	1	0
Blue Rock Pigeon	1	10	0
<b>Association of Common Myna with other bird species</b>			
House Crow	✓	✓	✓
Black Drongo	✓		
Red Wattled Lapwing	✓		
Ring Dove	✓	✓	✓
Rose Ringed Parakeet	✓	✓	✓
Common Babbler	✓	✓	✓
Cattle Egret	✓		
Blue Rock Pigeon	✓	✓	✓
Green Bee Eater	✓		
Asian Koel	✓		✓

A total of 19 nest were recorded during the study (Table 6). A total of 19 nest were recorded from which 6 nests were of Common Myna i.e. 5 nests at Location-1 and 1 nest at Location-2. No nests were located at location-3. The nest found at location-2 was, abandon nest occupied by Common Myna. The nest found was on Gulmohar and Silver Ook tree. 11 nests recorded were of Blue Rock Pigeon i.e. 1 at location-1 and 10 at location-2 and 2 nests were of House Crow, one nest at location-1 and one at location-2. Common Myna was found associated with House Crow, Ring Dove, Rose Ringed Parakeet, Common Babbler, Blue Rock Pigeon at all locations i.e. location-1,2 and 3, Red Vented Bulbul, White Breasted Kingfisher and Asian Koel were not found associated with Common Myna at any of the three locations. Similar findings were also reported by other authors<sup>[19-23]</sup>.

To sum up we observed that Common Myna was the dominant species in all selected areas except area-2 where Blue Rock Pigeon was most abundant. Compared to the three locations, Common Myna was found the largest in the densely populated location-3. Agricultural landscape was found most preferred for nest building whereas populated sites were preferred for feeding purposes. The present study has provided baseline data of population and abundance pattern of Common Myna in relation to type of landscape pattern. The population of Common Myna was maximum at location 3 followed by location 1 and location 3, emphasizing that the feeding opportunities available will determine higher annual abundance of Common Myna at a particular landscape and during breeding season landscape with least human disturbance was selected by the Common Myna. In the light

of these finding future studies will be needed to establish the importance of different landscapes for the conservation and management of bird species.

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