



Avifaunal and floral diversity assesment within core area of Gevra coal mine in Katghora forest division

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ABSTRACT

The State holds a major share of Coal deposits in India, which has led to the State being a major power producer and being one of the power surplus State in the country. The environmental impact is caused by processing, transporting and mining of coal and it's by products. Study of the relationship between life forms and their atmosphere of coal mining area is essential as it directly, indirectly effects the wildlife population. Mining activities leads to a dusty environment which is responsible for deposition of dust on existing floral population in the core area due to excess mining activity due to that the ecological diversity in this area, that causes stressed condition, result of this there is displacement of Avifauna populations from the core zone to another adoptable sites e.g. buffer zone. As mining proceeds on a site, Avifauna migrates to adjacent areas and establishes their nest on host trees. These studies include detailed, systematic and scientific processes of identifying, predicting, evaluating and analyzing the potential impacts on floral and faunal diversity of core zone on OCP Gevra of Katghora Forest Division. Field observation recorded around the core area shows presence of 280 individual birds belonging to 35 different species in the study site a total of 144 individual trees are recorded which belong to 17 different types of species. Trees provide basic needs for living e.g. sap, buds, nuts, fruit as a food for survival, as well as they also host insects in bark and leaves as shelter, the trees provide local residence for birds in all seasons in core zone of OCP Gevra.

Keywords: Avifauna, Coal, Reclamation, Diversity, Floral Species.

INTRODUCTION

India is the third largest coal producer in the world and has substantial coal reserves. Opencast mining accounts for 74% of the total coal output and the remaining 26% is met by underground mining.

Chhattisgarh, a State in central India is one of the richest Indian States in terms of mineral wealth with 28 varieties of major minerals, including diamonds and ranks second in the country in mineral production. Mining is one of the important industries of India, next only to agriculture. Large areas are subjected to mining of minerals like coal, the State holds a major share of coal deposits in India, which has led to the State also being a major power producer and power surplus. Chhattisgarh has 55,674 Sq Km of forests, which is 41.18 percent of its geographical area. It has the third largest area under forest cover after Madhya Pradesh and Arunachal Pradesh. Chhattisgarh State is identified as having one of the richest biodiversity habitats in the country. It has one of the densest forests in India inhabiting rich flora and fauna and several species of exotic flora and fauna. The impacts of coal mining on avifauna populations occur at primary levels on immediate, direct effects of mining in terms of direct mortality, disturbance and displacement of birds populations during mining activities, and changes in Avifauna populations associated with long-term changes.

Avifauna is the birds of a particular region or period, they migrate from the core zone to buffer zone which indicate the living condition being unsustainable for floral and faunal diversity. Birds are generally one of the first types of wildlife to visit a mine site following reclamation due to their mobility and active search for suitable habitat, so that the negative impacts on forest bird populations have to be weighed against positive gains in early succession on bird populations. Many species associated with early successional habitats, such as the Henslows Sparrow (*Ammodramus henslowii*) and the Golden-Winged Warbler (*Vermivora chrysoptera*) are also of high conservation priority

(Hunter et al. 2001, Buehler et al. 2007). Coal mining results in large landscape changes as soils and vegetation are removed. As per MoEF & CC clearance rules and conditions, the user agency in consultation with the state government shall create and maintain alternate habitat for avifauna, if their nesting trees are to be cleared under this Project. Birds' nests will be artificially made out of eco-friendly material, placed in the area including the forest area and human settlements adjoining the forest area being diverted for the project. To overcome the impact of mining activities on avifauna and wildlife found in Gevra Range, Katghora Forest Division, Chhattisgarh SECL, Gevra had proposed the project to SFRTI, Raipur to prepare a wildlife conservation plan including alternative habitat development plan for affected Avifauna.

STUDY SITE DETAILS

Chhattisgarh State has plenty of energy resources such as Coal, Gevra in Korba District is the largest coal-producing region in State, Gevra Opencast Block is located in the South-Central part of Korba Coalfield in Korba District of Chhattisgarh. Korba - produces 75% coal of the state and 11% of the Country, the main coal producing area is Hasdo-Rampur Colliery, Gevra Opencast Block is located in the South-Central part of Korba Coalfield in Korba District of Chhattisgarh. Study area located in Korba District of Chhattisgarh, in the western part of Korba coalfields, the nearest rail line being Gevra Road station of South East central Railway. The Gevra Mining Block having an area of about 19.03 Sq. Km located in the Central part of Korba Coalfield is bounded by latitudes 22°18'00" and 22°21'42" to longitudes 82°32'00" to 82°39'30". Study area is situated within 10 km radius from the lease boundary of the Project sites.



Fig. 1. Geographical details of study sites

MATERIAL AND METHOD

The field survey technique, to observe the avifauna habitat, nesting pattern & surrounding vegetation in core zone applied seasonally to estimate the status of species diversity of avifauna and wildlife in the mining area. Line transects method had been applied for the bird count and their habitat survey. Line-transect distance sampling methods are used for birds and plant species, including nonliving things. In a line-transect survey method, an observer moves along a transect line and note the location of all birds detected to the line (Bird census and survey techniques, Richard D. Gregory, David W. Gibbons, and Paul F. Donald, 2004). Total 06 line transect was taken within the core on proposed study sites. During the field surveys, made a line transect of 1200 m (mostly used a path followed by the villagers to enter in the forest) in which distance sampling were taken in every 300 m in the transect to estimate the population of avifauna, habitat and nesting pattern of the proposed mining area. A circular sample plot of 10m radius had been taken in each transect at an interval of 300 m i.e. total 5 sample plots made in one transect namely 0m, 300m,

600m, 900m, 1200m for the study of avifauna and floral diversity, data had been taken including comparing with IUCN and ZSI Status.

RESULTS AND DISCUSSION

This study revealed the presence of seasonal variation, which have been observed, recorded and analyze on the basis of baseline study, have been carried out in core area of OCP Gevra. Survey conducted in the winter and summer season, on the basis of the field survey as discussed in prescribed methodology, the data had been observed and analyzed within core zone. 6 sample plots were drawn in the core as per recorded data, in the core area there are 280 individual birds belonging to 35 species of 23 individual families have been observed. The population of avifauna dominated by *Black Drongo*, *Laughing Dove*, *Red Vented Bulbul*, *Sulphur Billed Warbler*, *Black Drongo*, *Green Bee-Eater*, *Indian Roller*, *Red Vented Bulbul*, *Common Myna* respectively within the core zone of OCP Gevra. Mostly the birds found during the survey are endemic and resident.

Table 1: List of reported birds species and IUCN, ZSI status in the Core area

S. No.	Local Name	Scientific Name	Family	Frequency	IUCN Status	ZSI status
1	Ashy Prinia	<i>Prinia socialis</i>	Cisticolidae	2	LC	Presence
2	Asian Pied Starling	<i>Gracupica contra</i>	Sturnidae	1	LC	Presence
3	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	20	LC	Presence
4	Bramhiny Starling	<i>Sturnia pagodarum</i>	Sturnidae	2	LC	Presence
5	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	5	LC	Presence
6	Collar Dove	<i>Streptopelia decaacto</i>	Columbidae	7	LC	Presence
7	Common Hoopoe	<i>Upupa epops</i>	Upupidae	5	LC	Presence
8	Common Kingfisher	<i>Alcedo atthisp</i>	Alcedinidae	1	LC	Presence
9	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	8	LC	Presence
10	Common Tailor Bird	<i>Orthotomus sutorius</i>	Cisticolidae	2	LC	Presence
11	Eurasian Collared Dove	<i>Streptopelia decaacto</i>	Columbidae	3	LC	Presence
12	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	Oriolidae	1	LC	Presence
13	Green Bee-Eater	<i>Merops orientalis</i>	Meropidae	4	LC	Presence
14	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae	1	LC	Absence
15	Hawk Eagle	<i>Nisaetus cirrhatus</i>	Accipitridae	1	LC	Presence
16	House Crow	<i>Corvus splendens splendens Viellot</i>	Sturnidae	8	LC	Presence
17	House Sparrow	<i>Passer domesticus</i>	Passeridae	2	LC	Presence
18	Indian Robin	<i>Copsychus fulicatus</i>	Muscicapidae	9	LC	Presence
19	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	8	LC	Presence
20	Indian Silver Bill	<i>Lonchura malabarica</i>	Estrildidae	11	LC	Absence

Table 1: Continued...

S. No.	Local Name	Scientific Name	Family	Frequency	IUCN Status	ZSI status
21	Jungle Babbler	Turdoides striata	Lieoethrichidae	5	LC	Presence
22	Laughing Dove	Streptopelia senegalensis	Columbidae	19	LC	Presence
23	Lesser Pied Kingfisher	Ceryle rudis	Alcedinidae	1	LC	Presence
24	Little Cormorant	Microcarbo niger	Phalacrocoracidae	1	LC	Presence
25	Little Swift	Apus affinis	Apodidae	5	LC	Presence
26	Paddy Field Pipit	Anthus rufulus	Motacillidae	1	LC	Presence
27	Plain Prinia	Prinia inornata	Cisticolidae	1	LC	Presence
28	Purple Sunbird	Cinnyris asiaticus	Nectariniidae	8	LC	Presence
29	Red Vented Bulbul	Pycnonotus cafer	Pycnonotidae	13	LC	Presence
30	Rose Ringed Parakeet	Psittacula krameri	Psittaculidae	1	LC	Presence
31	Scaly Breasted Munia	Lonchura punctulata	Estrildidae	2	LC	Presence
32	Spotted Dove	Streptopelia chinensis	Columbidae	11	LC	Presence
33	Sulphur Billed Warbler	Phylloscopus griseolus	Phylloscopidae	9	LC	Absence
34	Variable Wheatear	Oenanthe picata	Saxicolini	1	LC	Absence
35	White Rumped Munia	Lonchura striata	Estrildidae	1	LC	Presence

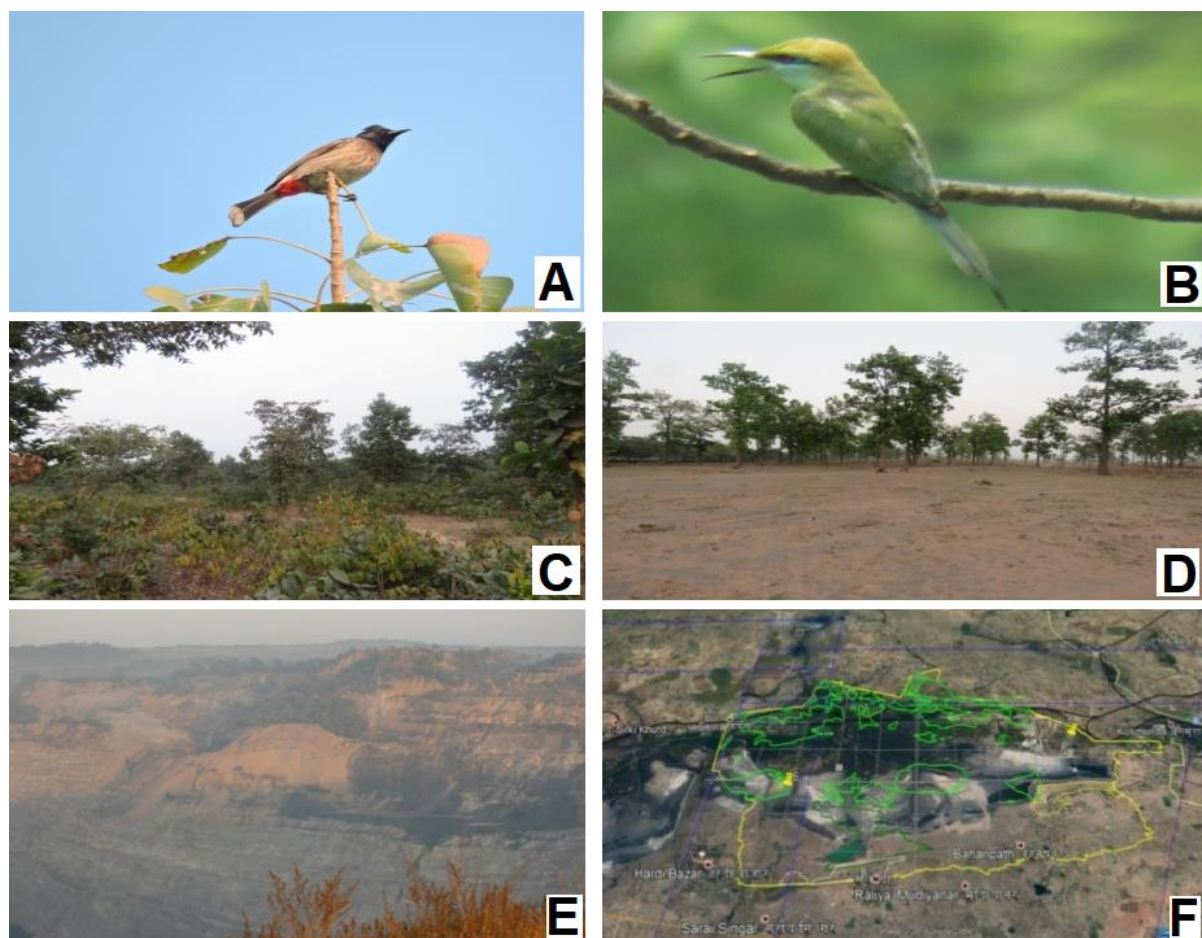


Figure 1: Glimpses of study site : A: d Vented Bulbul, B: Green Bee Eater, C & D: Vegetation on Core area of OCP Gevra, E: Core area of minig site, F: Location of study sites

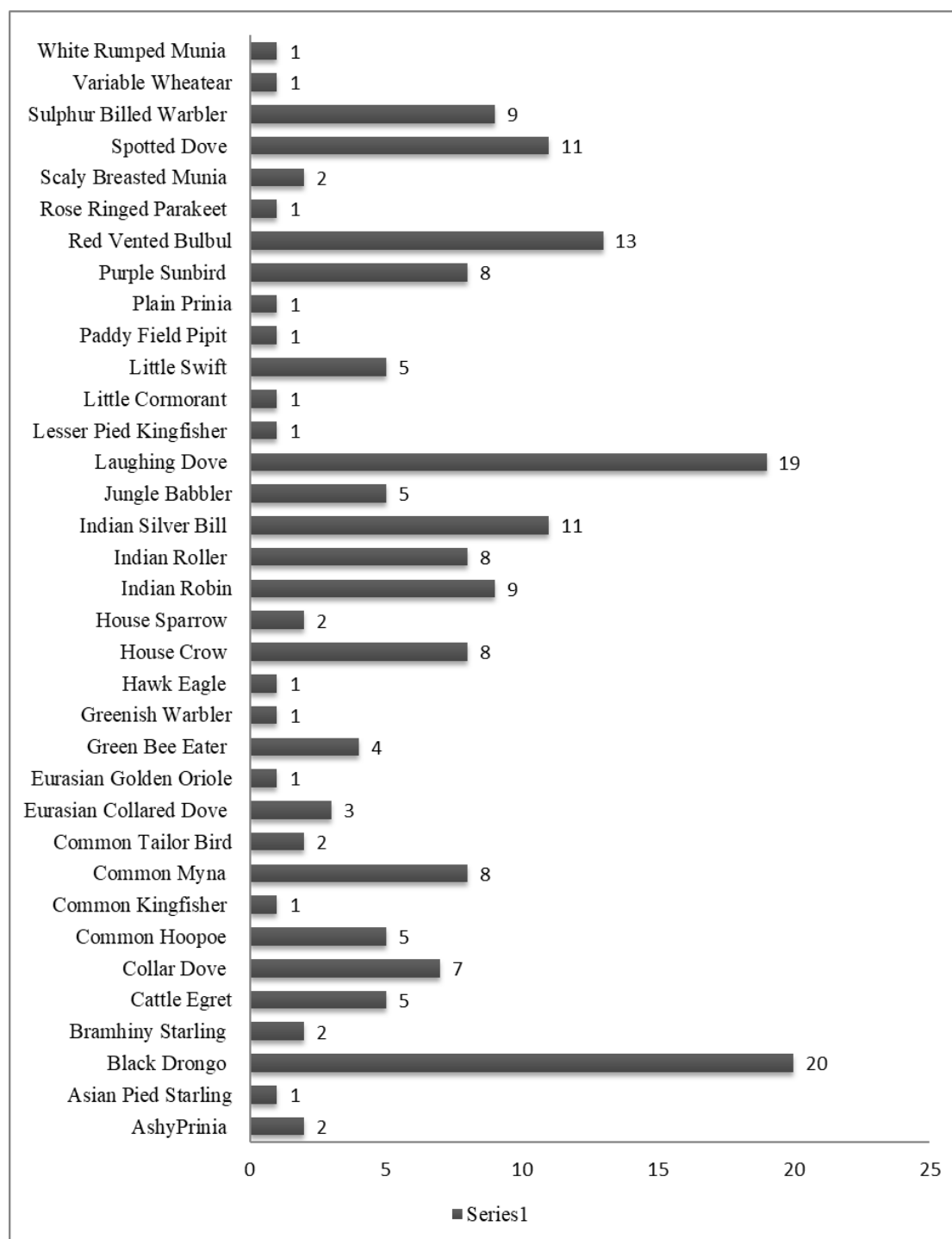


Figure 2: No. of birds species observed on mining sites

The Floral diversity in core zone of the proposed mining area for excavation is mainly surrounded by 17 different types of Species i.e. Sal (*Shorea robusta*), Saja (*Terminalia tomentosa*), Khamhar (*Gmelina arborea*), Mahua (*Madhuca indica*), Char (*Buchanania lanzan*), Neem (*Azadirachta indica*), Kala Siris (*Albezzia*

lebbeck), Karanj (*Pongamia pinnata*), Senha (*Lagerstroemia parviflora*), Tendu (*Diospyros melanoxylon*) etc. Girth class structure was categorised for all the available tree species within core area of OCP Gevra.

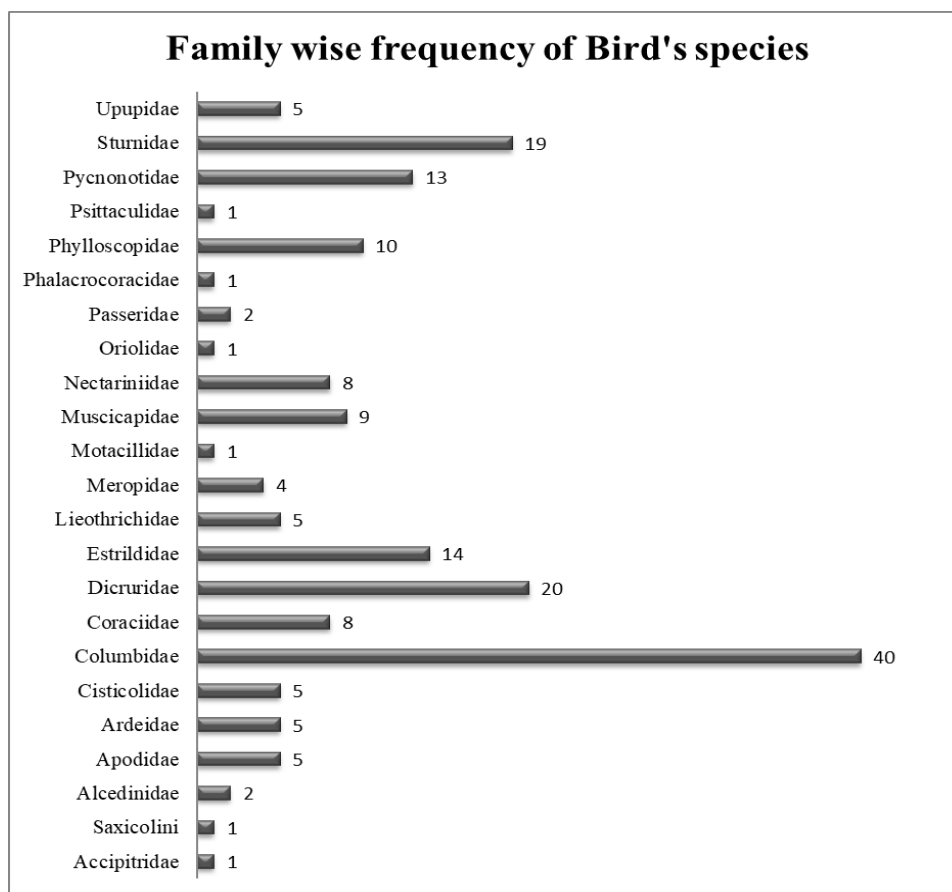


Figure 3: Family wise frequency of bird's species

Table 2 : Tree species surrounding the Core zone

Girth class structure of available tree species in cm. (Core zone)								
S. No.	Tree	Botanical name	A= Above 201	B = 151-200	C = 101-150	D = 51 - 100	E = Below 50	No. of tree spices
1	Sal	<i>Shorea robusta</i>			34	22		56
2	Sheesham	<i>Dalbergia sissoo</i>				1	19	20
3	Saja	<i>Terminalia tomentosa</i>			4	10	1	15
4	Khamhar	<i>Gmelina arborea</i>			10		1	11
5	Mahua	<i>Madhuca indica</i>			3	4	5	12
6	Char	<i>Buchanania lanzan</i>					6	6
7	Neem	<i>Azadirachta indica</i>				1	3	4
8	Kala Siris	<i>Albezzia lebbeck</i>				3		3
9	Karanj	<i>Pongamia pinnata</i>				1	2	3
10	Senha	<i>Lagerstroemia parviflora</i>					3	3
11	Tendu	<i>Diospyros melanoxylon</i>					3	3
12	Baheda	<i>Terminalia bellerica</i>	1		1			2
13	Jamun	<i>Syzygium cumini</i>				2		2
14	Koriya	<i>Holarrhena antidysentterica</i>				1	2	3
15	Kusum	<i>Carthamus tinctorius</i>		2				2
16	Bamboo	<i>Dendrocalamus strictus</i>				1	1	2
17	Ber	<i>Zizyphus jujuba</i>				1		1

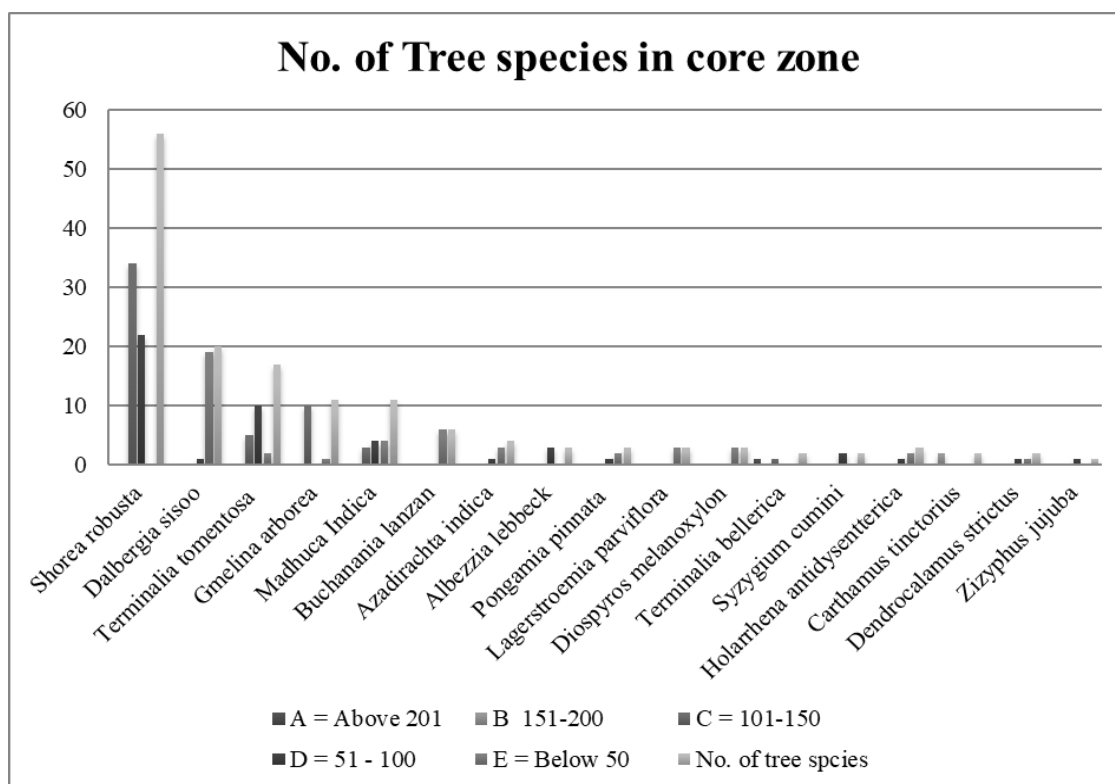


Figure 3: Girth class structure of tree species in core area

The recorded avifaunal population in the core zone is compared within local and global presence, it has compared with IUCN list and ZSI status of Korba district. Study revealed that N= 144 birds was listed on least concern (LC) category by IUCN. The report by Zoological survey of India (ZSI) on “Faunal diversity of Korba District” has been drawn upon. The present study, when compared to ZSI report, has found 4 more bird species in the area. These are Greenish Warbler, Indian Silver Bill, Sulphur Bellied Warbler and Variable Wheatear. During the field survey, it has observed that most of the bird nests were found in Sal (*Shorea robusta*) species followed by Char (*Buchanania lanzan*), Mahua (*Madhuca indica*), Baheda (*Terminalia bellerica*), Senha (*Lagerstroemia parviflora*) and Saja (*Terminalia tomentosa*). Moreover they also fulfilled basic needs for living e.g. sap, buds, nuts, fruit as a food for survival, as well as they host insects in bark and leaves as shelter, it has provided shelter for birds in all weathers in core zone of OCP Gevra.

DISCUSSION

Coal mining causes enormous damage on flora and fauna relations. Destruction of the herbs, shrubs, climbers, and trees cover during the mining activity is

invariably accompanied by an extensive damage and loss of the avifaunal ecosystem. Saxena (1979) has provided a list of plant species for re-vegetation of gypsum, bentonite and fuller’s earth mined areas in Rajasthan. The discussion includes the field survey methodology, collected data observation and analysis, status of avifauna in core zone and alternative habitat and artificial nesting pattern of avifauna.⁸ Study sites of core area 112.385 hectare surrounded by forest, agriculture land and tenancy land. As per the field survey methodology i.e. 6 X 5 transect line surveys adopted during seasonal visit in OCP Gevra, a total number of 280 individuals belongs to 35 species and 144 individual tree belongs to 17 different species were recorded in core area. Re-vegetation of iron-ore mine areas of Madhya Pradesh was studied by Prasad in 1989 who observed better growth performance of *Dalbergia sissoo*, *Albizzia procera*, *Pongamia pinnata* etc in the manured pits. These study concluded with floral diversity on core zone of the proposed mining area for excavation is mainly surrounded by 17 different types of species i.e. *Shorea robusta*, *Dalbergia sissoo*, *Terminalia tomentosa*, *Gmelina arborea*, *Madhuca indica*, *Buchanania lanzan*, *Azadirachta indica*, *Albezzia lebbeck*, *Pongamia pinnata*, *Lagerstroemia parviflora*, *Diospyros melanoxylon* etc.

CONCLUSION

The study revealed the existence of rich floral and faunal abundance in the OCP Gevra. The floral diversity in core zone, which has hosted and sustained for all important activates like food for all, shelter, place for nesting as well as protective barrier. Physiological and biological factors like heat, cold, light and darkness circumstance sensitive flora or faunal, which needed breeding, nesting, foraging, resting, over wintering and migration condition. Core area always interrupted with low abundant vegetation, loud noise and hectic atmospheric condition, therefore the relationship between flora and fauna population in the core zone is not appreciable at OCP Gevra. Wildlife population and bird's species needed to conserve through the reclamation practices like established local habitat, plantation of fruit bearing and native species, creation of Water bodies, establishment of eco friendly nest and another positive behavioural change should be developed out of the core area.

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Conflict of Interest

The author declares that there is no conflict of interest.

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