

**FAUNAL RESOURCES AND ASSESSMENT OF THE
IMPACT OF MINING ACTIVITIES ON FAUNA OF
CHHOTONAGPUR COALFIELD AREAS
JHARKHAND, INDIA**

**A.K. SANYAL, S.K. CHATTAPADHYAY
T.K. PAL AND A.K. KARMAKAR**

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**Records of the
Zoological Survey of India
Faunal Resources and assessment of the
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INTRODUCTION

The studies on the possible impact of habitat changes on the biodiversity assemblage in a fragile ecosystem or in an area of ecological importance essentially need baseline data of recent past, which in most of the cases are lacking. Considering the fact and immense importance of data to the future workers, the results of the study which was completed in 1994 and not yet published are analysed and the present report is prepared for publication.

The present study of terrestrial, avi and aqua fauna commonly found in Chhotonagpur region in Central Coalfields Limited Command areas was undertaken by the scientists of Zoological Survey of India during January to June, 1994. The study was entrusted to the Zoological Survey of India by the Central Mine Planning and Design Institute Limited, Regional Institute - III, Central Coalfield Limited, Ranchi, Bihar, as desired by the Ministry of Environment and Forests, Government of India. The Director, Zoological Survey of India agreed to undertake the work and assigned the job to Dr. A. K. Sanyal, Scientist- E (Leader), Shri Srikumar Chattapadhyay, Scientist- E, Dr. T. K. Pal, Scientist- E and Dr. A. K. Karmakar, Assistant Zoologist.

The objective of the study was to provide base line data on the faunal composition, assemblage and probable impact of mining projects on fauna. An attempt was also made to provide recommendations for reclamation along with better management of the ecological process and wildlife conservation in the study areas. Before the present study was done, no such study to prepare faunal inventories of Chhotonagpur coal field areas was undertaken. The present work is supposed to be the first consolidated faunal inventory of the areas. The publications like Roychaudhury (1957-1966), Ahmad (1965), Anonymous (1992-2001 and 2004) were consulted for the study.

MATERIAL AND METHODS

For preparation of an inventory of 'species of terrestrial' and 'aqua fauna' commonly found in Chhotonagpur region of Jharkhand State in CCL Command areas, the scientists of Zoological Survey of India, Kolkata undertook two extensive faunistic surveys, each of 12 days duration during January and June, 1994. The party collected/observed various groups of animals from/in almost all possible habitats available in both terrestrial and aquatic biotopes. Special emphasis was made to record wild animals in forest areas during night.

The entire study area comprising three blocks *viz.*, North and South Karanpura Block, East and West Bokaro Block and Ramgarh Block, each block measuring approximately 50 sq. km. is spread in Ranchi, Hazaribagh, Chatra, Bokaro and Ramgarh districts.

Standard operational procedures (S.O.P.) were followed for recording of fauna either by physical observations of wildlife from dusk to dawn and even in the night in all the sites mentioned above or by collecting materials. Likewise birds were observed visually with the help of telescope and binocular, for critical identification specimens were collected by using mist net and released them after identification. The small mammals which were not included in the list of Scheduled animals were collected by using traps. Insects and other terrestrial animals were collected by using insect-net, hand picking method and by light traps. Aquatic animals were collected by using water-net, caste-net and plankton-net. Soil and litter inhabiting animals were extracted by using modified tullgren funnels in the laboratory.

During the course of the surveys, a total of 35 different localities were ear-marked. The block-wise list of the localities is given below:

LIST OF LOCALITIES SURVEYED

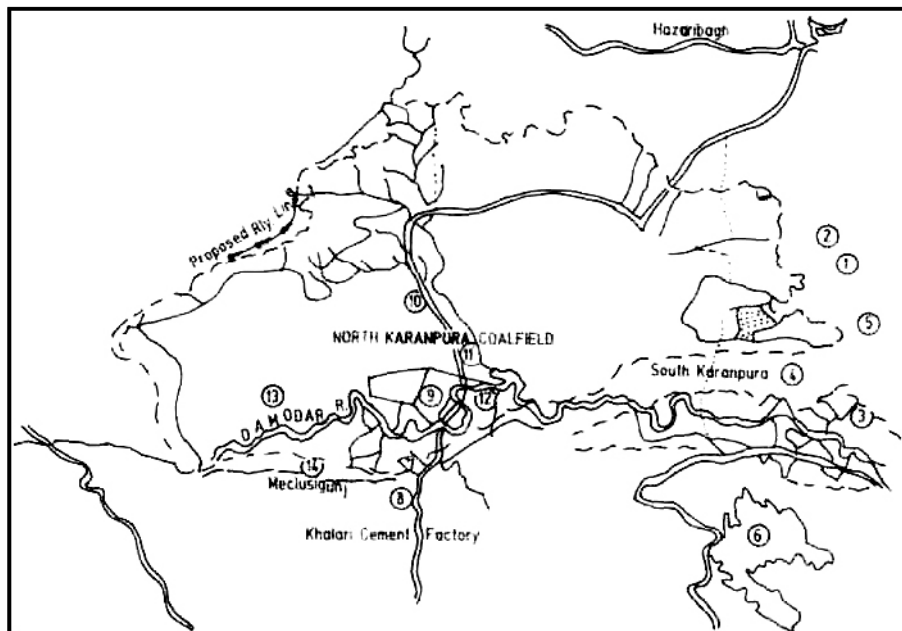
Block - I (North and South Karanpura areas : Map - 1)

1. Gidi-CCL Rest House Campus, Hazaribagh district - 13.i.1994
2. Gidi-1/2 km south west of CCL Rest House Campus, Hazaribagh district - 13.i.1994
3. Argada Reservoir Site, Hazaribagh district - 14.i.1994
4. Gidi-Damodar River surroundings, Hazaribagh district - 14.i.1994
5. Gidi-Pit No.4 and surroundings, Hazaribagh district - 15.i.1994
6. Nalkari Dam-Patratu Reservoir and surroundings - 16.i.1994
7. Dakra, North Karanpura Transit House surroundings - 18.i.1994
8. Kheari, Near Railway Station, Palamou District - 18.i.1994
9. Mangardaha-Piparwa Pilot Mine surroundings, Hazaribagh district - 19.i.1994
10. Laranga Village, Sadabaha Nadi, 15 kms. North of Bachra - 19.i.1994
11. Tandwa Village, Chatra District - 19.i.1994
12. Bachara - 11 kms. West of Bachara, Chatra District - 20.i.1994
13. Mandar - 24 kms. West of Bachara, Chatra District - 20.i.1994
14. Deka Deki River, 25 kms., form Bachra, Palamau Dist. - 20.i.1994

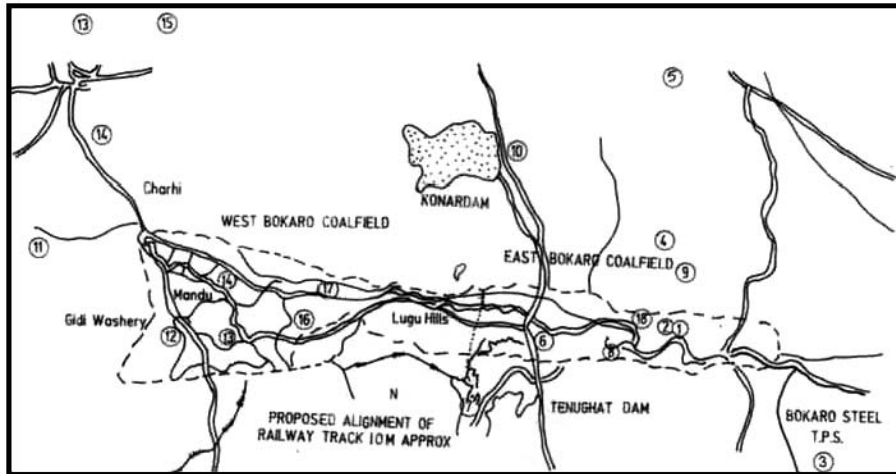
Block - II (East and West Bokaro areas : Map - 2)

1. Kargali, Bokaro District - 7.i.1994
2. Karo, special Phase II, 12 kms. East of Kargali, Bokaro Dist. - 8.vi.1994
3. Khasmabal, surroundings of Bokaro Thermal Power Station; East of Kargali, Bokaro District. - 8.iv.1994

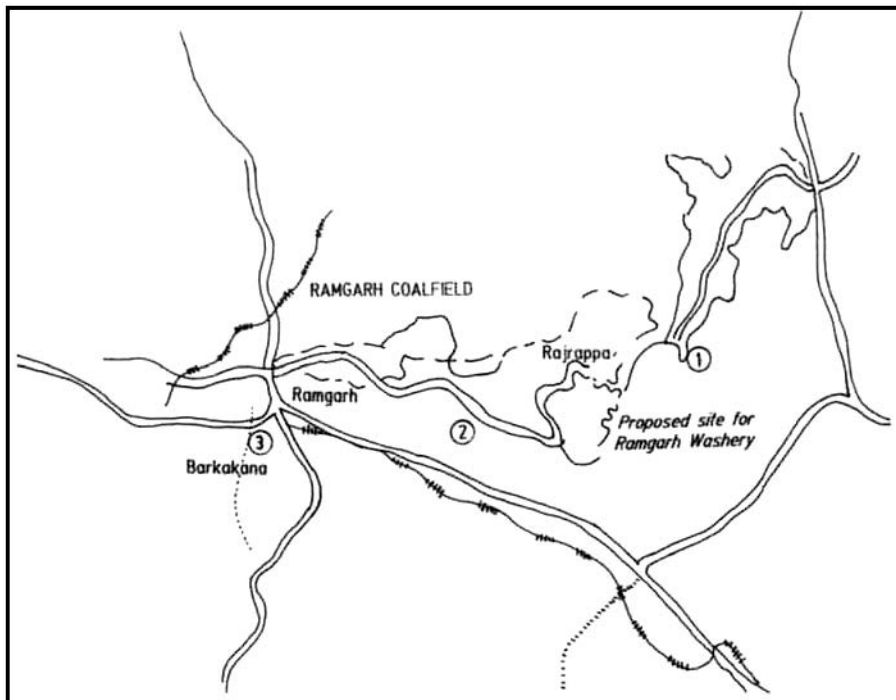
4. Palamou Village, 15 kms. North of Kargali, Bokaro district - 9.vi.1994
5. Nawadi Village, surroundings of Joria River, 30 kms. North of Kargali, Bokaro district - 9.vi.1994
6. Kathara Village, 12 kms. South of Kargali, Bokaro district - 10.vi.1994
7. Tenughat Dam site, 22 kms. South of Kargali, Bokaro district - 10.vi.1994
8. Gaddu Nala, 2 kms. West of Kargali, Bokaro district - 10.vi.1994
9. Fusro, 3 kms North of Kargali on the way to Nawadi Village (Night collection) Bokaro district - 10.vi.1994
10. Konar Dam site, 45 kms. North of Kargali, Bokaro district - 11.vi.1994
11. Jorakat Village, 12 kms. West of Charhi, Hazaribagh district - 12.vi.1994
12. Mandu Forest, 15 kms. South of Charhi, Hazaribagh district t - 12.vi.1994
13. Chamti forest, Hazaribagh district - 13.vi.1994
14. Konar Nala surrounding forest, 12 kms. North of Charhi towards Hazaribagh district - 13.vi.1994
15. Hazaribagh Lake surroundings, Hazaribagh district - 13.vi.1994
16. Bokaro Coalfield (TISCO) surroundings, 24 kms. East Charhi, Hazaribagh district - 14.vi.1994
17. Laiyo Coalfields, 32 kms. East of Charhi, Hazaribagh district - 14.vi.1994
18. Karo Village, Hazaribagh district - 19.vi.1994



Map. 1 : Collection sites at South & North Karanpura Coalfields



Map. 2 : Collection sites at East & West Bokaro Coalfields



Map. 3 : Collection sites at Ramgarh Coalfield

Block - III (Ramgarh Coalfield areas : Map - 3)

1. Rajrappa forest, 3-8 kms. East of Rajrappa CCL office,
Hazaribagh district -16.vi.1994
2. Kothar Villalge 19 kms. West of Rajrappa CCL, Office,
Hazaribagh district - 6.vi.1994
3. Barkakhana Wetland and its surroundings, Hazaribagh district - 15.vi.1994

All the collection sites were extensively surveyed and random collection and observation of fauna were made in compliance with the Wildlife (Protection) Act, 1972 and its subsequent amendments till 1992. The collection of animals was restricted to certain species/groups only.

The inventory and locality lists of mammals, birds, reptiles and amphibia were prepared on the basis of field sighting and identification in the field itself. In all the sites attempts were made to collect/observe the specimens from the places of all direction as well as from all possible ecological niche available.

The fauna collected during the above surveys was brought to the laboratory and was duly studied and identified by various specialists in Zoological Survey of India. These species are marked as 'S' (sighted) in the list. The list is further supplemented by information on the occurrence of animal groups in the Chhotonagpur Coalfield areas from the published records. These animals are recorded in the list as 'R' (recorded).

The maps indicating the major collection sites in the study area have been enclosed (Maps 1 - 3). In addition, the faunal analysis for all the groups studied has been made.

PHYSIOGRAPHY OF THE STUDY AREAS

The Chhotonagpur Coalfield areas surveyed in the present study fall under Chhotonagpur plateau. The plateau is composed of Precambrian rocks (more than 570,000,000 years old). Chhotonagpur is the collective name for the Ranchi, Hazaribagh and Kodarma plateaus, which have an area of 65,509 sq. km. Its largest division is the Ranchi plateau which has an average elevation of 2,300 feet. The northern side of the plateau lies between the basins of the Ganges and Son Rivers; the south is bounded by Mahanadi River and through its center, from west to east, runs the coal-bearing, Damodar Valley.

The areas surveyed come within the tropical monsoon climate. The temperature gradient is in extreme with very cold winter and very hot summer. The mean daily maximum and minimum temperature range from 97° - 99° F in May and 45° - 50° F in December respectively.

The mean annual rainfall in the study areas is 53 inches. Rains generally start during June and last till the middle of September. Occasional winter rains between November and middle of February are noticed.

The soil in the areas is rocky producing lateritic soils. Some soils near the river beds are alluvial. The lateritic tracts are usually acidic and poor in mineral nutrients and have a low silica/sesquioxide ratio. Due to grazing of live stocks and wanton destruction of plant cover, the valley was subject to varying degree of soil erosion resulting in numerous deep trenches and gulleys, which are more profound at bases of hills. Such gulleys are often bordered with *Lantana camara* and other bushes.

Floral Resources : According to revised classification of Champion and Seth (1968) the forest type in the valley is principally dry deciduous scrub. While mixed dry deciduous forest is prevalent in hills and hill slopes. The most predominant species of trees in the

areas are, Sal (*Shorea robusta*), Bamboo (*Dendrocalamus strietus*), Khair (*Acacia catechu*), Salai (*Boswellia serrata*), Simul (*Salmalia malabarica*), Mahua (*Madhuca indica*), Palas (*Butes frondosa*), Kusum (*Schleichera trijnga*), Kend (*Diosyros malanoxylon*), Asan (*Terminalia alata*), Piar (*Buchanania lanzan*), Bhelwa (*Semecarpus anacardium*), Jangli Khajur (*Phaenix acaulis*) and Bar (*Ficus bengalensis*).

FAUNAL RESOURCES OF THE AREA

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Phylum : CHORDATA Class : MAMMALIA				
Order : SCANDENTIA				
Family : TUPAIIDAE				
1. <i>Anathana ellioti</i> (Waterhouse)	+	+	+	Common
Order : INSECTIVORA				
Family : SORICIDAE				
2. <i>Suncus murinus</i> (Linnaeus)	+	+	+	Most Common
Order : CHIROPTERA				
Family : PTEROPODIDAE				
3. <i>Pteropus giganteus</i> (Briinnich)	+	+	+	Common
4. <i>Rousethus leschenaulti</i> (Desmarest)	+	+	+	Common
5. <i>Cynopterus sphinx</i> (Bahl)	+	+	+	Most Common
Family : RHINOPOMATIDAE				
6. <i>Rhinopoma microphyllus</i> (Briinnich)	+	+	+	Common
7. <i>Rhinopoma hardwickei</i> (Gray)	+	+	+	Common
Family : EMBALLONURIDAE				
8. <i>Taphozous longimanus</i> Hardwicke	+	+	+	Common
9. <i>T. melanopogon</i> Temmink	+	+	+	Common
Family : MEGADERMATIDAE				
10. <i>Rmegaderma lyra</i> (Geoffroy)	+	+	+	Common
Family : RHINOLOPHIDAE				
11. <i>Rhinolophus lepidus</i> (Blyth)	+	+	+	Common
12. <i>Hipposideros fulvus</i> (Gray)	+	+	+	Common

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : VESPERTILIONIDAE				
13. <i>Pipistrellus mimus</i> Wroughton	+	+	+	Common
14. <i>Pipistrellus coromandra</i> (Gray)	+	+	+	Common
15. <i>Scotozous dormeri</i> Dobson	+	+	+	Common
16. <i>Scotozous kuhli</i> Leach	+	+	+	Common
17. <i>Scotozous heathi</i> (Horsfield)	+	+	+	Common
Order : PRIMATES				
Family : CEROCOPITHECIDAE				
18. <i>Macaca mulatta</i> (Zimmernmann)	+	+	+	Common
19. <i>Presbytis entellus</i> (Dufresne)	+	+	+	Common
Order : PHOLIDOTA				
Family : MANIDAE				
20. <i>Manis crassicaudata</i> Gray	+	+	+	Vulnerable
Order : CARNIVORA				
Family : CANIDAE				
21. <i>Canis lupus</i> Linnaeus	+	+	+	Insufficiently known
22. <i>Canis aureus</i> Linnaeus	+	+	+	Vulnerable
23. <i>Vulpes bengalensis</i> (Shaw)	+	+	+	Vulnerable
24. <i>Cuon alpinus</i> (Pallas)	+	+	+	Vulnerable
Family : URSIDAE				
25. <i>Melursus ursinus</i> (Shaw)	+	+	+	Vulnerable
Family : MUSTELIDAE				
26. <i>Lutra perspicillata</i> Geoffroy	+	+	+	Vulnerable
27. <i>Mellivora capensis</i> (Schreber)	+	+	+	Vulnerable
Family : VIVERRIDAE				
28. <i>Viverricula indica</i> (Desmarest)	+	+	+	Common
29. <i>Viverra zibetha</i> Linnaeus	+	+	+	Moderately Common
30. <i>Herpestes auropunctatus</i> (Hodgson)	+	+	+	Common
31. <i>Herpestes edwardsi</i> (Geoffroy)	+	+	+	Common

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : HYAENIDAE				
32. <i>Hyaena hyaena</i> (Linnaeus)	+	+	+	Vulnerable
Family : FELIDAE				
33. <i>Felis chaus</i> Giildenstaedt	+	+	+	Vulnerable
34. <i>Felis bengalensis</i> Kerr	+	+	+	Vulnerable
35. <i>Panthera pardus</i> (Linnaeus)	+	+	+	Vulnerable
36. <i>Panthera tigris</i> (Linnaeus)	+	+	+	Vulnerable
Order : PROBOSCIDAE				
Family : ELEPHANTIDAE				
37. <i>Elephas maximus</i> (Linnaeus)	+	+	+	Vulnerable
Order : ARTIODACTYLA				
Family : SUIDAE				
38. <i>Sus scrofa</i> Linnaeus	+	+	+	Vulnerable
Family : CERVIDAE				
39. <i>Muntiacus muntjak</i> (Zimmermann)	+	+	+	Common
40. <i>Cervus unicolor</i> Kerr	+	+	+	Vulnerable
41. <i>Axis axis</i> (Erleben)	+	+	+	Common
Family : TRAGULIDAE				
42. <i>Tragulus meminna</i> (Erleben)	+	+	+	Vulnerable
Family : BOVIDAE				
43. <i>Boselaphus tragocamelus</i> (Pallas)	+	+	+	
44. <i>Gazella dorcas</i> (Linnaeus)	+	+	+	Vulnerable
45. <i>Tetracerus quadricornis</i> (Blainville)	+	+	+	
46. <i>Bos gaurus</i> Smith	+	+	+	Vulnerable
Order : LAGOMORPHA				
Family : LEPORIDAE				
47. <i>Lepus nigricollis</i> Cuvier	+	+	+	Common
48. <i>Funambulus palmarum</i> (Linnaeus)	+	+	+	Common
49. <i>Funambulus pennanti</i> Wroughton	+	+	+	Most Common
Family : MURIDAE				
50. <i>Millardia meltada</i> (Gray)	+	+	+	Common

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
51. <i>Rattus blanfordi</i> (Thomas)	+	+	+	Most Common
52. <i>Rattus rattus</i> (Linnaeus)	+	+	+	Most Common
53. <i>Mus musculuta</i> (Linnaeus)	+	+	+	Most Common
54. <i>Mus booduga</i> (Gray)	+	+	+	Most Common
55. <i>Mus platythrix</i> Bennett	+	+	+	Most Common
56. <i>Diomys crumpi</i> (Thomas)	+	+	+	Most Common
57. <i>Bandicoota bengalensis</i> (Gray)	+	+	+	Most Common
58. <i>Bandicoota indica</i> (Bechstein)	+	+	+	Common
59. <i>Vandeleuria oleracea</i> (Bennett)	+	+	+	Common
60. <i>Golunda ellioti</i> Gray	+	+	+	Common
61. <i>Tatera indica</i> (Hardwicke)	+	+	+	Most Common
Family : HYSTRICIDAE				
62. <i>Hystrix indica</i> Kerr	+	+	+	Vulnerable

Class : AVES

Order : PODICIPEDIFORMES Family : PODICIPEDIDAE				
1. <i>Podiceps cristatus cristatus</i>	+	+	+	Rare
2. <i>Podiceps ruficollis capensis</i>	+	+	+	Common
Order : PELECANIFORMES Family : PHALACROCORACIDAE				
3. <i>Phalacrocorax fuscicollis</i>	+	+	+	Common
4. <i>Phalacrocorax niger</i>	+	+	+	Common
5. <i>Anhinga rufa melanogaster</i>	+	+	+	Uncommon
Order : CICONIIFORMES Family : ARDEIDAE				
6. <i>Ardea cinerea</i>	+	+	+	Stragler
7. <i>Ardea purpurea manilensi</i>	+	+	+	Uncommon
8. <i>Ardea alba</i>	+	+	+	Common
9. <i>Ardeola grayii</i>	+	+	+	Very Common
10. <i>Bubulcus ibis coromandus</i>	+	+	+	Common
11. <i>Egretta intermedia</i>	+	+	+	Common

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
12. <i>Egretta garzetta garzetta</i>	+	+	+	Common
13. <i>Nycticorax nycticorax nycticorax</i>	+	+	+	Common
14. <i>Ixobrychus cinnamomeus</i> (Gmelin)	+	+	+	Common Sch. IV
15. <i>Ixobrychus sinensis</i> (Gmelin)	+	+	+	Common "
16. <i>Ixobrychus flavicollis</i> Latham	+	+	+	Rare "
Family : CICONIIDAE				
17. <i>Xenorhynchus asiaticus asiaticus</i> (Latham)	+	-	+	Uncommon "
Family : THRESKIORNITHIDAE				
18. <i>Pseudibis papillosa</i> (Temminck) Glossy Ibis	-	+	+	Common "
Order : ANSERIFORMES				
Family : ANATIDAE				
19. <i>Dendrocygna javanica</i> (Horsifeld) Lesser Whistling Teal	+	-	+	Common "
20. <i>Tadorna ferruginea</i> (Pallas) Ruddy Shelduck	+	-	+	Rare "
21. <i>Anas acuta</i> (Pallas) Pintail	+	+	+	Common "
22. <i>Anas crecca</i> Linnaeus Common Teal	-	+	+	Common "
23. <i>Anas poecilorhyncha</i> J.R.Foster Spotbill Duck	+	+	+	Common "
24. <i>Anas strepera</i> Linnaeus Gadwall	+	+	+	Common "
25. <i>Anas formosa</i> Georgi	-	-	+	Very rare "
26. <i>Anas penelope</i> Georgi Wigeon	+	+	+	Very Common "
27. <i>Anas querquedula</i> Linnaeus Garganey	+	+	+	Common "
28. <i>Anas acuta</i> (Pallas) Shoveler	+	+	+	Common "
29. <i>Netta rufina</i> (Pallas) Red crested Pochard	+	-	+	Common "
30. <i>Aythya ferina</i> (Linnaeus) Common Pochard	+	+	+	Common "
31. <i>Aythya nyroca</i> (Guldensladt) White-eyed Pochard	+	+	+	Very Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
32. <i>Aythya fuligula</i> (Linnaeus) Tufted Duck	+	+	+	Common "
33. <i>Nettapus coromandelianus</i> (Gmelin) Cotton Teal	+	+	+	Very Common "
Order : FALCONIFORMES Family : ACCIPITRIDAE				
34. <i>Elanus caeruleus vociferus</i> (Latham) Blackwinged Kite	+	+	+	Common "
35. <i>Milvus migrans</i> (Boddaert) Black Kite	+	+	+	Common "
36. <i>Haliaster indus Indus</i> (Boddaert) Brahminy Kite	+	+	+	Common "
37. <i>Accipitar badius dussumeri</i> (Temminck) Shikra	+	+	+	Common "
38. <i>Accipitar nissus</i> (Linnaeus) Sparrow Hawk	+	+	+	Common "
39. <i>Gyps bengalensis</i> (Gmelin) White backed Vulture	+	+	+	Common "
40. <i>Neophron paronpterus</i> (Linnaeus) Scavenger Vulture	+	+	+	Common "
41. <i>Circus aerugionsus</i> (Linnaeus) Marsh Harrier	+	+	+	Common "
42. <i>Circus gyanifis</i> (Linnaeus) Hen Harrier	+	-	+	Common "
Family : FALCONIDAE				
43. <i>Falco tinnunculus</i> (Linnaeus)	-	-	+	Common "
Order : GALLIFORMES Family : PHASIANIDAE				
44. <i>Pavo cristatus</i> Linnaeus Common Pea-fowl	+	+	+	Common Sch. I
Order : GSRUIFORMES				
45. <i>Turnix suscitator</i> (Gmelin) Common Bustard-Quail	+	-	+	Common Sch. IV
Family : RALLIDAE				
46. <i>Porzana pusilla</i> (Pallas) Baillon's Crake	+	-	+	Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
47. <i>Amaurornis phoenicurus</i> (Pennant) White breasted Waterhen	+	+	+	Common "
48. <i>Gallinula chloropus</i> (Linnaeus) Moorhen	+	+	+	Common "
49. <i>Porphyrio porphyrio</i> (Linnaeus) Purple Moorhen	-	+	+	Common "
50. <i>Fulica atra atra</i> Linnaeus Coot	+	+	+	Common "
Order : CHARADRIIFORMES Family : JACANIDAE				
51. <i>Hydrophasianus chirurgus</i> (Seopoli) Pheasant tailed Jacana	+	-	+	Common "
52. <i>Metopidius indicus</i> (Latham) Bronzewinged Jacana	+	+	+	Common "
Family : CHARADRIIDAE				
53. <i>Vanellus indicus indicus</i> (Boddaert) Redwattled Lapwing	+	+	+	Common "
54. <i>Vanellus malabaricus</i> (Bddaert) Yellow-wattled Lapwing	+	+	+	Common "
55. <i>Fulica atra atra</i> Linnaeus Coot	+	+	+	Common "
56. <i>Charadrius dubius</i> Scopoli Little Ringed Plover	+	+	+	Common "
57. <i>Tringa totanus</i> (Linnaeus) Red shank	-	+	+	Common "
58. <i>Tringa ochropus</i> Linnaeus Green Sandpiper	-	+	+	Common "
59. <i>Tringa glareola</i> Linnaeus Wood Sandpiper	+	-	+	Common "
60. <i>Tringa hypoleucos</i> Linnaeus Common Sandpiper	+	+	+	Common "
61. <i>Gallinago stenura</i> (Bonaparte) Pintail Snipe	+	-	-	Uncommon "
62. <i>Calidris temminckii</i> (Leister) Temminck's Stint	-	+	+	Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : ROSTRATULIDAE				
63. <i>Rostratula benghalensis benghalensis</i> (Linnaeus)	-	+	+	Uncommon "
Family : LARIDAE				
64. <i>Chlidonias hybrida indica</i> (Stephens) Whiskered Tern.	+	-	+	Very Common "
65. <i>Sterna aurantia</i> Gray Indian River Tern.	-	-	+	Common "
Family : COLUMBIDAE				
66. <i>Streptopelia decaocto decaocto</i> (Scopoli) Collared Dove	+	+	+	Very Common "
66. <i>Streptopelia orientalis</i> (Latham) Indian Ring Dove	+	+	+	Very Common "
Family : PSITTACIDAE				
68. <i>Psittacula krameri</i> (Scopoli) Roseringed Parakeet	+	+	+	Very Common "
69. <i>Psittacula cyanocephala</i> (Linnaeus) Blossomheaded Parakeet	+	+	+	Very Common "
Family : CUCULIDAE				
70. <i>Cuculus varius</i> Vhal. Common Hawk-Cuckoo	+	+	-	Very Common "
71. <i>Cacomantis merulinus</i> (Scopoli) Rutousbellied Plaintive Cuckoo	+	+	+	Very Common "
72. <i>Eudynamys scolopacea</i> (Linnaeus)	+	+	+	Very Common "
73. <i>Taccocua leschenaultii fuscata</i> (Blyth) Sirkeer Cuckoo	+	+	+	Very Common "
Order : STRIGIFORMES				
Family : STRIGIDAE				
74. <i>Athene brama</i> (Temmnick) Spotted Owlet	+	+	+	Very Common "
75. <i>Ninox scutulata</i> Brown Hawk-Owl	+	+	+	Very Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Order : CAPRIMULGIFORMES Family : CAPRIMULGIDAE				
76. <i>Caprimulgus indicus</i> Latham Indian Jungle Nightjar	+	+	+	Very Common "
77. <i>Caprimulgus macrourus albonotus</i> Tickell Longtailed Nightjar	+	+	+	Very Common "
Order : APODIFORMES Family : APODIDAE				
78. <i>Cypsiurus parvus</i> (Lichtenstein) Palm Swift	+	+	+	Very Common "
Order : CORACIFORMES Family : ALCEDENIDAE				
79. <i>Ceryx rudis</i> (Linnaeus) Lesser Pied Kingfisher	+	+	+	Very Common "
80. <i>Alcedo atthis</i> (Linnaeus) Common Kingfisher	+	+	+	Very Common "
81. <i>Pelargopsis capensis</i> (Linnaeus) Storkbilled Kingfisher	+	-	+	Common "
82. <i>Halcyon symrnessis</i> (Linnaeus) White breasted Kingfisher	+	-	+	Common "
Family : MEROPIDAE				
83. <i>Merops orientalis</i> (Latham) Green Bee-eater	+	-	+	Common "
Family : CORACIIDAE				
84. <i>Coracias benghensis</i> (Linnaeus) Indian Roller	+	-	+	Common "
Family : UPUPIDAE				
85. <i>Upupa epops</i> Linnaeus Hoopoe	+	-	+	Common "
Order : PICIFORMES Family : CAPILONIDAE				
86. <i>Megalaima zeylanica</i> Large Green Barbet	+	-	+	Common "
87. <i>Megalaima asiatica</i> Blue throated Barbet	+	+	+	Very Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
88. <i>Megalaima haemacephala</i> (P.L.S. Muller) Coppersmith Barbet Family : PICIDAE	+	-	+	Common "
89. <i>Dinopium benghalense</i> (Linnaeus) Lesser Golden backed Woodpecker	+	+	+	Common "
90. <i>Dendrocopos mahrattensis</i> (Latham) Order : PASSERIFORMES Family : ALAUDIDAE	-	+	-	Common "
91. <i>Mirafra assamica assamica</i> Horsfield Bush Lark	+	-	+	Common "
92. <i>Mirafra erythroptera</i> Blyth Redwinged Bush Lark	+	-	+	Very Common "
93. <i>Eremopterix grisea</i> (Scopoli) Ashycrowned Finch-Lark	+	+	-	Very Common "
94. <i>Alauda gulgula gulgula</i> Franklin Family : HIRUNDINIDAE	+	-	+	Very Common "
95. <i>Hirundo rustica</i> Linnaeus Common Swallow	+	+	+	Common "
96. <i>Hirundo daurica</i> (Linnaeus) Redrumped Swallow Family : LANIDAE	+	-	+	Common "
97. <i>Lanius cristatus</i> Linnaeus Brown Shrike	+	+	+	Common "
98. <i>Lanius scach tricolor</i> (Hodgson) Rufous backed Shrike Family : ORIOLIDAE	-	-	+	Common "
99. <i>Oriolus oriolus kundoo</i> Sykes Golden Oriole	+	+	+	Common "
100. <i>Oriolus xanthornus</i> (Linnaeus) Blackheaded Oriole Family : DIRCURIDAE	+	+	+	Common "
101. <i>Dicrurus adsimilis</i> (Bechstein) Black Drongo	+	-	+	Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
102. <i>Dicrurus caerulescens</i> (Linnaeus)	+	-	+	Common "
103. <i>Dicrurus hottentotus</i> (Linnaeus)	-	+	-	Rare "
104. <i>Dicrurus paradiseus</i> (Linnaeus)	-	-	+	Rare "
Family : ARTAMIDAE				
105. <i>Artamus fuscus</i> (Vicillot)	+	+	+	Common "
Family : STURNIDAE				
106. <i>Sturnus malabaricus</i> (Gmelin)	+	+	+	Very Common "
107. <i>Sturnus pagoderum</i> (Gmelin)	+	+	+	Very Common "
108. <i>Sturns contra</i> Linnaeus	+	+	+	Very Common "
109. <i>Acridotheris tristis</i> (Linnaeus)	+	+	+	Very Common "
110. <i>Acridotheris ginginianus</i> (Latham)	+	+	+	Very Common "
Family : CORVIDAE				
111. <i>Dendrocitta vagabunda</i> (Latham)	+	+	+	Very Common "
112. <i>Corvus splendens</i> Vicillot	+	+	+	Very Common "
113. <i>Corvus macrorhynchos</i> Wagler	+	+	+	Common "
Family : CAMPEPHAGIDAE				
114. <i>Pericrocotus cinnamomeus</i> (Linnaeus)	+	+	+	Common "
115. <i>P. flammaeus</i> (Forster)	+	+	+	Common "
Family : IRENIDAE				
116. <i>Aegithina tiphia</i> (Linnaeus)	+	+	+	Common "
Family : PYCNONOTIDAE				
117. <i>Pycnonotus jocosus</i> (Linnaeus)	+	+	+	Common "
118. <i>Pycnonotus cafer</i> (Linnaeus)	+	+	+	Common "
Family : MUSCICAPIDAE				
119. <i>Turdoides striatus</i> (Dumont)	+	+	+	Common "
120. <i>Muscicapa parva</i> Bechstein	+	+	+	Common "
121. <i>Muscicapa thalassina</i> Swainson	+	+	+	Common "
122. <i>Rhipidura albicollis</i> (Vicillot)	+	+	+	Common "
123. <i>Cisticola juncidis</i> (Rafinesque)	+	+	+	Common "
124. <i>Prinia socialis</i> Sykes	+	+	+	Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
125. <i>Orthotomus sutorius</i> (Pennant)	+	+	+	Common "
126. <i>Locustella certhiola</i> (Pallas)	+	+	+	Common "
127. <i>Acrocephalus stentorius</i> (Hempricu & Ehrenberg)	+	+	+	Common "
128. <i>Acrocephalus dumatorum</i> Blyth	+	+	+	Common "
129. <i>Acrocephalus agricola</i> (Jerdon)	+	+	+	Common "
130. <i>Phylloscopus collybita tristis</i> (Vicillot)	+	+	+	Common "
131. <i>Phylloscopus fuscatus</i> (Blyth)	+	+	+	Common "
132. <i>Phylloscopus inornatus</i> (Blyth)	+	+	+	Common "
133. <i>Phylloscopus trochiloides</i> (Sundevall)	+	+	+	Common "
134. <i>Erithacus svecicus</i> (Linnaeus)	+	+	+	Common "
135. <i>Copsychus saularis</i> (Linnaeus)	+	+	+	Common "
136. <i>Phoenicurus ochrurus</i> (Gmelin)	+	+	+	Common "
137. <i>Saxicola torquata</i> (Linnaeus)	+	+	+	Common "
Family : PARIDAE				
138. <i>Parus major</i> Linnaeus	+	+	+	Common "
Family : SITTIDAE				
139. <i>Sitta castanea</i> Lesson	+	+	+	Common "
Family : MOTACILLIDAE				
140. <i>Anthus hodgsonii</i> Richmond	+	+	+	Common "
141. <i>Anthus novaeseelandiae rufulus</i> Vicillot	+	+	+	Very Common "
142. <i>Anthus novaeseelandiae richardi</i> Vicillot	+	+	+	Very Common "
143. <i>Anthus spilonetta</i>	+	+	+	Common "
144. <i>Motacilla flava</i> Linnaeus	+	+	+	Common "
145. <i>Motacilla citreola</i> Pallas	+	+	+	Common "
146. <i>Motacilla alba</i> Linnaeus	+	+	+	Common "
147. <i>Motacilla madraspatensis</i> Gmelin	+	+	+	Common "
Family : DICAIEIDAE				
148. <i>Dicaeum agile</i> (Tickell)	+	+	+	Common "

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
149. <i>Dicaeum erythrorhynchos</i> (Latham) Family : NECTARINIIDAE	+	+	+	Common "
150. <i>Nectarinia zeylonica sola</i> (Vicillot)	+	+	+	Common "
151. <i>Nectarinia asiatica</i> (Latham) Family : ZOSTEROPIDAE	+	+	+	Common "
152. <i>Zosterops pulpebrosa</i> (Temminck) Family : PLOCEIDAE	+	-	+	Common "
153. <i>Passer domesticus</i> (Linnaeus)	+	+	+	Very Common "
154. <i>Petronia xanthocollis</i> (Burton)	+	+	+	Common "
155. <i>Ploceus philippinus</i> (Linnaeus)	+	+	+	Common "
156. <i>Lonchura malabarica</i> (Linnaeus)	+	+	+	Common "

Class : REPTILIA

Order : TESTUDINES Suborder : CRYPTODIRA Family : EMYDIDAE				
1. <i>Melanochelys tricarinata</i> Blyth Family : TRIONYCHIDAE	+	+	+	(R)
2. <i>Lissemys punctata punctata</i> (Lacepede)	+	+	+	(R)
Order : SQUAMATA Suborder : SAURIA Family : GEKKONIDAE				
3. <i>Hemidactylus brooki</i> Gray	+	+	+	(S)
4. <i>Hemidactylus leschenaultii</i> (Dum. & Bibr.)	+	+	+	(R)
5. <i>Hemidactylus flaviviridis</i> Gray	+	+	+	(S)
6. <i>Eublepharis hardwickii</i> Gray Family : AGAMIDAE	+	+	+	(R)
7. <i>Calotes versicolor</i> (Daudin)	+	+	+	(S)
8. <i>Psammophilus blanfordanus</i> (Stoliczka)	+	+	+	(R)
9. <i>Sitana ponticeriana</i>	+	+	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : SCINCIDAE				
10. <i>Mabuya carinata</i> (Schneider)	+	+	+	(R)
11. <i>M. macularia</i> Blyth	+	+	+	(R)
12. <i>Riopa albopunctata</i> Gray	+	+	+	(R)
Family : LACERLIDAE				
13. <i>Cabrita leschenaulti</i> (Milne Edwards)	+	+	+	(R)
Order : SQUAMATA				
Suborder : SERPENTES				
Family : TYPHLOPIDAE				
14. <i>Ramphotyphlops braminus</i> (Daudin)	+	+	+	(R)
15. <i>Eryx conicus</i> (Schneider)	+	+	+	(R)
Family : COLUBRIDAE				
16. <i>Amphiesma stolata</i> (Linnaeus)	+	+	+	(R)
17. <i>Boiga gokool</i> (Gray)	+	+	+	(R)
18. <i>B. trigonata</i> (Schneider)	+	+	+	(R)
19. <i>Dendrelaphis tristis</i> (Daudin)	+	+	+	(R)
20. <i>Xenochrophis piscator</i> (Schneider)	+	+	+	(R)
21. <i>Oligodon taeniolatus</i> (Jerdon)	+	+	+	(R)
Family : ELAPIDAE				
22. <i>Naja naja</i> (Linnaeus)	+	+	+	(S)

Class : AMPHIBIA

Order : AUNRA				
Family : BUFONIDAE				
1. <i>Duttaphrynus melanostictus</i> Schneider Common India Toad	+	+	+	(R)
2. <i>Duttaphrynus stomaticus</i> Lutken Marbled Toad	+	+	+	(S)
Family : MICROHYLIDAE				
3. <i>Uperodon globulosus</i> Gunther Baloon Frog	+	+	+	(R) Very rare species recorded for the first time from Chhotonagpur areas.

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
4. <i>U. systoma</i> (Schneider) Marbled Baloon Toad	+	+	+	(S)
5. <i>Microhyla ornata</i> (Dumeril & Bileron) Family : RANIDAE	+	+	+	(S)
6. <i>Hoplobatrachus crassa</i> Jerdon Jerdon's Bull Frog	+	+	+	(S)
7. <i>Euphlyctis cyanophlyctis</i> Schneider Skipper Frog	+	+	+	(S)
8. <i>Fejervarya limnocharis</i> Boie Poddy-field Frog	+	+	+	(S)
9. <i>Hoplobatrachus tigerina</i> Daudin Indian Bull Frog	+	+	+	(S)
10. <i>Sphaerotheca breviceps</i> (Schneider) Burrowing Frog Family : RHACOPHORIDAE	+	+	+	(S)
11. <i>Polypedates maculatus</i> (Gray) Tree Frog	+	+	+	(S)

Class : PISCES

Subclass : TELEOSTOMI Order : OSTEOGLOSSIFORMES Family : NOTOPTERIDAE				
1. <i>Notopterus notopterus</i> Pallas	+	+	+	(S) Economically important
Order : CYPRINIFORMES Family : CYPRINIDAE				
2. <i>Amblypharyngodon mola</i> (Hamilton)	+	+	+	(S) Economically important
3. <i>Barilius bendelisis</i> (Hamilton)	+	+	+	(S)
4. <i>Catla catla</i> (Hamilton)	+	+	+	(S)
				Major carps, economically very important
5. <i>Cirrhinus mrigala</i> (Hamilton)	+	+	+	(S) -do-

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
6. <i>C. reba</i> (Hamilton)	+	+	+	(S) Minor carp, economically important
7. <i>Crossochilus latius latius</i> Hamilton	+	+	+	(S)
8. <i>Danio dangila</i> (Hamilton)	+	+	+	(S)
9. <i>D. rerio</i> (Hamilton)	+	+	+	(S)
10. <i>Esomus danricus</i> (Hamilton)	+	+	+	(S)
11. <i>Garra annandalei</i> Hora	+	+	+	(S)
12. <i>G. gotyla</i> (Gray)	+	+	+	(S)
13. <i>G. mullya</i> (Sykes)	+	+	+	(S)
14. <i>G. satyendranathi</i> Ganguly & Datta	+	+	+	(S)
15. <i>Labeo rohita</i> (Hamilton)	+	+	+	(S) Major carp, economically very important
16. <i>L. boggut</i> (Hamilton)	+	+	+	(S) Economically important
17. <i>L. calbasu</i> (Hamilton)	+	+	+	(S) Major carp, economically very important
18. <i>Osteobrama cotio cotio</i> (Hamilton)	+	+	+	(S)
19. <i>Puntius chola</i> (Hamilton)	+	+	+	(S)
20. <i>P. conchoniis</i> (Hamilton)	+	+	+	(S) Economically less important
21. <i>P. guganio</i> (Hamilton)	+	+	+	(S)
22. <i>P. sophare</i> (Hamilton)	+	+	+	(S) Economically important
23. <i>P. ticto</i> (Hamilton)	+	+	+	(S) Economically important
24. <i>Rasbora daniconius</i> (Hamilton)	+	+	+	(R)
25. <i>R. Megarabara elanga</i> (Hamilton)	+	+	+	(S)
26. <i>Salmophasia acinaces</i> (Valenciennes)	+	+	+	(S)
27. <i>Salmophasia bacaila</i> (Hamilton)	+	+	+	(S) Economically less important

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
28. <i>Tor tor</i> (Hamilton) Family : COBITIDAE	+	+	+	(S) Economically less important
29. <i>Lepidocephalichthys guntea</i> (Hamilton) Family : NEMACHEILIDAE	+	+	+	(S)
30. <i>Acanthocobitis botia</i> (Hamilton)	-	-	+	(S) Small hill stream fishes usually found in rapid running water.
31. <i>Schistura dayi</i> Hora	-	-	+	(R) -do-
32. <i>S. denisonii</i> Day	-	-	+	(R) -do-
33. <i>S. savona</i> (Hamilton)	-	-	+	(R) -do-
34. <i>Nemacheilus subfusca</i> (McClelland)	-	-	+	(S) -do-
35. <i>Schistura zonata</i> (McClelland) Order : SILURIFORMES Family : BAGRIDAE	-	-	+	(R) -do-
36. <i>Spesata aor</i> (Hamilton)	-	-	+	(S) Economically important
37. <i>Mystus cavasius</i> (Hamilton) Family : SCHILBEIDAE	-	-	+	(R) Economically important
38. <i>Pseudeutropius atherinoides</i> Family : AMBLYCIPITIDAE	+	-	-	(S)
39. <i>Amblyceps mangois</i> (Hamilton) Family : SISORIDAE	+	-	-	(R)
40. <i>Gogata cenia</i> (Hamilton)	-	-	+	(R)
41. <i>G. sexualis</i> Tilak	+	-	-	(R)
42. <i>Glyptothorox coheni</i> Ganguli, Datta & Sen	-	-	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : CLARIIDAE 43. <i>Clarias magur</i> (Hamilton)	+	-	+	(S)Economically very important. These are highly esteemed for Their nourishing properties.
Family : HETEROPNEUSTIDAE 44. <i>Heteropneustes fossilis</i> (Bloch)	+	-	-	(S) -do-
Order : CHANNIFORMES Family : CHANNIDAE 45. <i>Channa marulius</i> (Hamilton)	-	-	+	(S) Economically important
46. <i>C. punctatus</i> (Hamilton)	-	+	-	(S) Economically important
47. <i>C. gachua</i> (Hamilton)	-	-	+	(S)
48. <i>C. striatus</i> (Bloch)	-	-	+	(S) Economically important
Order : PERCIFORMES Family : CHANDIDAE 49. <i>Parambassis baculis</i> Hamilton	+	-	-	(S) Economically important
50. <i>Chanda nama</i> Hamilton	+	-	-	(S)
51. <i>Parambassis ranga</i> Hamilton	+	-	-	(S)
Family : NANDIDAE 52. <i>Nandus nandus</i> (Hamilton)	-	-	+	(R) Economically important
Family : CICHLIDAE 53. <i>Oreochromis mossambica</i> (Peters)	+	-	-	(S)Economically important exotic variety
Family : MUGILIDAE 54. <i>Sicamugil cascasia</i> (Hamilton)	+	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : GOBIIDAE 55. <i>Glossogobius giuris</i> (Hamilton)	+	+	+	(S)Economically important
Family : ANABANTIDAE 56. <i>Anabas testudineus</i> (Bloch)	+	+	+	(S)Economically important, hardy & highly esteemed for its restorative value & prolonged freshness.
Family : BELONTIDAE 57. <i>Trichogaster fasciata</i> (Schneider)	+	-	-	(S)
Order : MASTACEMBELIFORMES Family : MASTACEMBELIDAE 58. <i>Mastacembelus armatus</i> (Lacepede)	+	-	+	(S) Economically important
59. <i>Macrornathus panchalus</i> (Hamilton)	+	-	+	(S) Economically less important

Phylum : ARTHROPODA

Class : INSECTA

Order : COLLEMBOLA Family : ISOTOMIDAE 1. <i>Isotomina thermophila</i>	+	+	+	(S)
2. <i>Isotomiella minor</i>	+	+	+	(S)
Family : SMINTHURIDAE 3. <i>Sminthurinus</i> sp.	+	+	+	(S)
Family : HYPOGASTRURIDAE 4. <i>Hypogastura</i> sp.	+	+	+	(S)
5. <i>Xenylla</i> sp.	+	+	+	(S)
Family : ENTOMOBRYIDAE 6. <i>Lepidocyrtus</i> sp.	+	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Order : THYSANURA Family : LEPISMATIDAE				
1. <i>Stylifera</i> sp.	+	+	+	(S)
Order : HEMIPTERA Family : PENTATOMIDAE				
1. <i>Nazara viridula</i> (Linn.)	+	+	+	(S)
2. <i>Halys dentatus</i> (Fabr.)	+	+	+	(S)
3. <i>Eysarcoris ventralis</i> (Westw.)	+	+	+	(S)
4. <i>Placosternum</i> sp.	+	+	+	(S)
5. <i>Agonoscelis nubila</i> (Fabr.)	+	+	+	(S)
6. <i>Mendia</i> sp.	+	+	+	(S)
7. <i>Carpocoris</i> sp.	+	+	+	(S)
Family : SCUTELLERIDAE				
8. <i>Chrysocoris stollii</i> (Wolff.)	+	+	+	(S)
Family : CICADELLIDAE				
9. <i>Cicadella spectra</i> (Dist.)	+	+	+	(S)
10. <i>Exitianus indicus</i> (Dist.)	+	+	+	(S)
11. <i>Parabolocratius albomaculatus</i> (Dist.)	+	+	+	(S)
12. <i>Nephotettix nigropictus</i> Stal	+	+	+	(S)
Family : COREIDAE				
13. <i>Leptocorisa acuta</i> (Thunb.)	+	+	+	(S)
Family : TINGIDAE				
14. <i>Paracopium cingulatus</i> (Walk.)	+	+	+	(S)
Family : MEMBRACIDAE				
15. <i>Tricentrus gibbosulus</i> (Walk.)	+	+	+	(S)
16. <i>Otinotus oneratus</i> (Walk.)	+	-	-	(S)
Family : BELOSTOMATIDAE				
17. <i>Lethocerus indicus</i> (Lep. & Serv.)	-	-	+	(S)
18. <i>Sphaerodema annulatum</i> (Fabr.)	+	-	+	(S)
19. <i>Diplonychus annulatus</i> (Fabr.)	-	-	+	(S)
20. <i>D. molestus</i> (Dufour)	+	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
21. <i>Diplonychus</i> sp. Family : NEPIDAE	+	+	+	(S)
22. <i>Ranatra filiformis</i> Fabr.	+	+	+	(S)
23. <i>Ranatra elongata</i> Fabr.				
24. <i>Ranatra sordidula</i> Dohrn	+	+	+	(S)
25. <i>Ranatra varipes</i> Stal	-	+	+	(S)
26. <i>Ranatra</i> sp.1	-	+	+	(S)
27. <i>Ranatra</i> sp.2 Family : CYDNIDAE	-	+	+	(S)
28. <i>Laccotrephes griseus</i> (Guer)	-	+	+	(S)
29. <i>L. ruber</i> (Linn.)	-	+	+	(S)
30. <i>Geotomus</i> sp. Family : NOTONECTIDAE	-	+	+	(S)
31. <i>Anisops breddini</i> Kirkaldy	-	+	+	(S)
32. <i>Anisops</i> sp. Family : PYRRHOCORIDAE	+	-	-	(S)
33. <i>Dysdercus koenigii</i> (Fabr.) Family : CORIXIDAE	+	-	-	(S)
34. <i>Micronecta (Dichaetonecta) haliploides</i> Harvath. Family : PLEIDAE	-	+	-	(S)
35. <i>Plea frontalis</i> (Fieber) Family : CORIXIDAE	-	+	-	(S)
36. <i>Corixa (Tropocorixa) distora</i> Distant Family : GERRIDAE	-	+	-	(S)
39. <i>Limnogonus (Limnogonus) fossarum</i> (Fabr.) Order : ODONATA Suborder : ZYGOPTERA Family : COENAGRIONIDAE	+	-	-	(S)
1. <i>Pseudagrion malabaricum</i> Fraser	+	+	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
2. <i>Pseudagrion spencei</i> Fraser	-	+	+	(R)
3. <i>Pseudagrion hypermelas</i> Selys	-	+	+	(R)
4. <i>Pseudagrion rubriceps</i> Selys	+	+	+	(R)
5. <i>Ceriagrion coromandelianum</i> (Fabr.)	-	+	+	(S)
6. <i>Ischnura senegalensis</i> (Ramb.)	+	-	+	(S)
7. <i>Ischnura aurora</i> (Brauer)	+	+	+	(S)
8. <i>Agriocnemis splendidissima</i> Laidlaw	-	-	+	(R)
9. <i>Agriocnemis pygmaea</i> (Rambur)	+	+	-	(R)
10. <i>Agriocnemis lacteola</i> (Selys)	-	+	-	(R)
11. <i>Cercion calamoru</i> Ris	+	+	-	(R)
12. <i>Enallagma parvum</i> (Selys)	+	+	+	(S) New record from Chhotonagpur area
13. <i>Coenagrionid</i> sp. Family : LESTIDAE	+	+	+	(S) -do-
14. <i>Lestes viridulus</i> Rambur Suborder : ANISOPTERA Family : GOMPHIDAE	+	-	-	(S)
15. <i>Anisogomphus bivittatus</i> (Selys)	-	+	+	(S) Recorded from the First time from Chhotonagpur areas.
16. <i>Neogomphus modestus</i> (Selys)	+	-	-	(R)
17. <i>Gomphid</i> sp. Family : LIBELLULIDAE	+	-	-	(R)
18. <i>Potamarcha congener</i> (Ramb.)	+	-	+	(S)
19. <i>Orthetrum sabina</i> (Drury)	+	+	+	(S)
20. <i>Orthetrum pruinatum neglectum</i> (Ramb.)	+	-	+	(S)
21. <i>Orthetrum taeniolatum</i> (Schn.)	+	-	+	(S)
22. <i>Orthetrum chandrabali</i> Mehrotra	-	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
23. <i>Orthetrum ganeshi</i> Mehrotra	+	+	+	(S)
24. <i>Palpopleura sexmaculata</i> (Fabr.)	+	+	+	(S)
25. <i>Acisoma panorpoides</i> (Ramb.)	+	+	+	(S)
26. <i>Crocothemis servilia</i> (Drury)	+	+	+	(S)
27. <i>Brachythemis contaminata</i> (Fabr.)	+	+	+	(S)
28. <i>Diplacodes trivialis</i> (Ramb.)	+	+	+	(S)
29. <i>Trithemis festiva</i> (Ramb.)	+	+	+	(S)
30. <i>Trithemis pallidinervis</i> (Kirby)	-	+	+	(S)
31. <i>Pantala flavescens</i> (Fabr.)	-	+	+	(S)
32. <i>Lathrecista asiatica</i> (Fabr.)	+	+	+	(S) New record from Chhotonagpur areas.
33. <i>Brachydiplax sobrina</i> (Ramb.)	-	+	+	(S) -do-
34. <i>Rhyothemis variegata</i> (Linn.)	-	+	+	(S) -do-
35. <i>Libellula</i> sp.	-	+	+	(S) -do-
Family : AESHNIDAE				
36. <i>Aeshna</i> sp.	-	+	+	(S) -do-
Order : HYMENOPTERA				
Family : APIDAE				
1. <i>Xylocopa latipes</i> (Drury)	-	+	+	(S)
2. <i>Xylocopa tenuiscapa</i> Westwood	-	-	+	(S)
3. <i>Apis dorsata</i> (Fabr.)	+	+	-	(S)
4. <i>Apis indica</i> Fabr.	+	+	-	(S)
5. <i>Megachile disjuncta</i> (Fabr.)	+	+	+	(R)
Family : FORMICIDAE				
6. <i>Camponotus compressus</i> (Fabr.)	+	+	+	(R)
7. <i>Oecophylla smaragdina</i> (Fabr.)	+	+	+	(S)
8. <i>Myrmecaria brunnea</i> Saunders	+	+	+	(S)
9. <i>Prenolepis longicornis</i> (Latreille)	+	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : MUTILLIDAE				
10. <i>Trogaspidia sexmaculata</i> (Swederus)	-	+	-	(S)
Family: ICHNEUMONIDAE				
11. <i>Dusona tikari</i> Gupta & Gupta	+	+	+	(R)
12. <i>Dusona similis</i> Gupta & Gupta	+	+	+	(R)
13. <i>Diplazon orientalis</i> (Cameron)	-	-	+	(S)
14. <i>Echthromorpha notulatoria</i> (Fabr.)	+	+	+	(S)
15. <i>Netelia (Netelia) corrugate</i> Kaur & Jonathan	+	+	+	(S)
16. <i>N. (N.) orientalis</i> Cameron	+	+	+	(S)
17. <i>N. (Totochiloides) latro</i> Holm.	+	+	+	(R)
Family: BRACONIDAE				
18. <i>Chelonus heliope</i> Gupta	+	+	+	(S)
19. <i>Diaeretiella rapae</i> (McIntosh)	+	-	-	(S)
20. <i>Bracon</i> sp.	+	+	+	(S)
Family: ENCYRTIDAE				
21. <i>Homalotylus flaminus</i> (Dalman)	+	-	+	(S)
Order : ISOPTERA				
Family: TERMITIDAE				
1. <i>Odontotermes brunneus</i> (Hagen)	+	+	+	(S)
2. <i>Odontotermes feae</i> (Wasmann)	+	+	+	(S)
3. <i>Odontotermes redemanni</i> (Wasmann)	+	+	+	(S)
4. <i>Odontotermes roonwali</i> Bose	+	+	+	(S)
5. <i>Odontotermes obesus</i> (Rambur)	-	+	-	(S)
6. <i>Odontotermes</i> sp	+	+	+	(S)
7. <i>Microtermes</i> sp.	-	+	-	(S)
Order : ORTHOPTERA				
Family: ACRIDIDAE				
1. <i>Trilophida annulata</i> (Thunb.)	+	+	+	(S)
2. <i>Oedaleus abruptus</i> (Thunb.)	+	+	+	(S)
3. <i>Oedaleus senegalensis</i> Krauss	+	+	+	(R)
4. <i>Gastrimargus africanus africanus</i> (Sauss.)	+	+	-	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
5. <i>Gastrimargus africanus</i> var. <i>orientalis</i> Sjostedt.	-	-	+	(R)
6. <i>Acrida exaltata</i> (Walk.)	+	+	+	(S)
7. <i>Acrida</i> sp.	+	+	+	(S)
8. <i>Leva cruciata</i> (Bol.)	-	-	+	(R)
9. <i>Leva indica</i> (Bol.)	+	+	-	(S)
10. <i>Aiolopus thalassinus tamulus</i> (Fabr.)	+	+	+	(S)
11. <i>Acrotylus humbertianus</i> Sauss.	+	+	-	(S)
12. <i>Acrotylus</i> sp.	+	+	+	(S)
13. <i>Dittopternis venusta</i> (Walk.)	-	+	-	(S)
14. <i>Spathosternum prasiniferum prasiniferum</i> (Walk.)	+	+	+	(S)
15. <i>Oxya hyla hyla</i> Serville	+	+	+	(S)
16. <i>Oxya fuscovittata</i> (Marschall)	+	-	-	(S)
17. <i>Hieroglyphus oryzivorus</i> Carl	-	-	+	(S)
18. <i>Eyprepocnemis alacris</i> (Serv.)	+	+	+	(S)
19. <i>Acorypha glaucopsis</i> (Walk.)	-	-	+	(R)
20. <i>Catantops pinguis innotabilis</i> (Walk.)	+	-	+	(R)
21. <i>Anacridium flavescens</i> (Fabr.)	+	+	+	(S)
22. <i>Cyrtacanthacris tatarica</i> (Linn.)	+	+	+	(S)
23. <i>Morphacris citrina</i> Kirby	-	-	+	(R)
24. <i>Pternoscirta bimaculatus</i> Thunberg	+	-	+	(S)
25. <i>Truxalis indica</i> Bolivar	+	-	-	(R)
Family : PYRGOMORPHIDAE				
26. <i>Atractomorpha crenulata</i> (Fabr.)	+	+	+	(S)
27. <i>Chrotogonus trachypterus trachypterus</i> (Blanch.)	+	+	+	(S)
28. <i>Chrotogonus oxypterus</i> (Blanch.)	+	+	+	(S)
29. <i>Poeciloceris pictus</i> (Fabr.)	+	+	+	(S)
Family : GRYLLIDAE				
30. <i>Plebeigryllus guttiventris</i> Walk.	+	+	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
31. <i>Modicogryllus confirmatus</i> (Walk.)	+	+	+	(S)
32. <i>Turanogryllus</i> sp. Family : GRYLLOTALPIDAE	+	+	+	(S)
33. <i>Gryllotalpa</i> sp. Family : TETRIGIDAE	+	+	+	(S)
34. <i>Ergatettix dorsifera</i> (Walk.)	+	+	-	(S)
35. <i>Ergatettix guentheri</i> Steinmann	+	+	+	(S)
36. <i>Euparatettix</i> sp.	+	-	+	(S)
37. <i>Hedotettix gracilis</i> (Haan) Family : TRIDACTYLIDAE	+	+	+	(S)
38. <i>Xya</i> sp. Family : TETTIGONIIDAE	+	+	+	(S)
39. <i>Conocephalus maculatus</i> (Le Guillou) Order : DIPTERA Family : BIBIONIDAE	+	+	+	(S)
1. <i>Penthetria japonica</i> Wied. Family : STRATIOMYIDAE	+	+	+	(S)
2. <i>Oplodontha rubrithorax</i> (Macq.)	+	+	+	(S)
3. <i>Microchrysa calopa</i> Brun. Family : SYRPHIDAE	+	+	+	(S)
4. <i>Melanostoma</i> sp.	+	+	+	(S)
5. <i>Melanostoma univittatum</i> (Wied.)	+	+	+	(S)
6. <i>Paragus (Pandasyophthalmus) rufiventris</i> Brun.	+	+	+	(S)
7. <i>Episyrphus balteatus</i> (De Geer)	+	+	+	(R)
8. <i>Metasyrphus confrater</i> (Wied.)	+	+	+	(R)
9. <i>Ischiodon scutellaris</i> (Fabr.)	+	+	+	(R)
10. <i>Sphaerophoria indiana</i> Bigot	+	+	+	(SR)
11. <i>Eristalinus arvorum</i> (Fabr.)	+	+	+	(R)
12. <i>Phytomia (P.) errans</i> (Fabr.)	+	+	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
13. <i>Phytomia (P.) argyrocephala</i> (Macquart) Family : ASILIDAE	+	+	+	(S)
14. <i>Philodicus femoralis</i> Ric. Family : THEREVIDAE	+	+	+	(S)
15. <i>Psilocephala sequa</i> (Walker) Family : OTTIDAE	-	+	-	(S)
16. <i>Physiophora aenea</i> (Fabr.) Family : MUSCIDAE	-	+	-	(S)
17. <i>Orthellia lauta</i> (Wied.)	-	+	-	(S)
18. <i>Orthellia coerulea</i> (Wied.)	-	+	-	(R)
19. <i>Musca (Musca) domestica</i> Linn.	-	+	-	(R)
20. <i>Musca (Byomya) ventrosa</i> Wied.	-	+	-	(S)
21. <i>Musca (Byomya) sorbens</i> Wied.	-	+	-	(S)
22. <i>Musca (Byomya) conducens</i> Walker	-	+	-	(S)
23. <i>Musca (Byomya) pattoni</i> Austen	-	+	-	(R)
24. <i>Musca (Philaematomyia) crassirostris</i> Stein	-	+	-	(R)
25. <i>Musca (Viviparomusca) bezzii</i> Patton & Cragg	-	+	-	(S)
26. <i>Stomoxys calcitrans</i> (Linn.)	-	+	-	(S)
27. <i>Gymnodia tonitruui</i> (Weid.) Family : CALLIPHORIDAE	-	+	-	(R)
28. <i>Stomorhina discolor</i> Fabr.	-	+	-	(S)
29. <i>Chrysomya megacephala</i> (Fabr.)	-	+	-	(R)
30. <i>Chrysomya rufifacies</i> (Macq.)	-	+	-	(S)
31. <i>Chrysomya nigripes</i> Aubertin	-	+	-	(S)
32. <i>Isomyia fulvicornis</i> (Bigot)	-	+	-	(R)
33. <i>Idiella mandarina</i> (Wied.)	-	+	-	(R)
34. <i>Rhinia luteigaster</i> (Meijere) Family : TIPULIDAE	-	+	-	(R)
35. <i>Conosia irrorata</i> (Wied.)	-	+	-	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : CERATOPOGONIDAE				
36. <i>Calyptopogon albitarsis</i> Kieffer	+	+	+	(S)
37. <i>Sphaeromias distincta</i> (Haliday)	+	-	-	(R)
Family : CULICIDAE				
38. <i>Anopheles (Cellia) philippinensis</i> Ludlow	-	+	-	(R)
Family : BOMBYLIIDAE				
39. <i>Petrorossia albofulva</i> (Walker)	-	+	-	(S)
Family : PIPUNCULIDAE				
40. <i>Tomosvaryella limpidipennis</i> (Brunetti)	-	+	-	(R)
Family : EMPIDIDAE				
41. <i>Cheliopoda (Cheliopoda) flavida</i> Brun.	-	+	-	(S)
Family : TEPHRITIDAE				
42. <i>Dacus (Zeugodacus) tau</i> Walker	-	+	-	(R)
43. <i>Platensina acrostacta</i> (Wied.	-	+	-	(S)
44. <i>Dioxyna sororcula</i> Wied.)	-	+	-	(R)
45. <i>Scedella spilopectera</i> (Bezzi)	-	+	-	(R)
Family : SEPSIDAE				
46. <i>Sepsis himalayensis</i> Brun.	-	+	-	(S)
47. <i>Sepsis rufa</i> Macq.	+	+	-	(S)
Family : SCIOMYZIDAE				
48. <i>Sepedon sphegea</i> (Fabr.)	+	-	-	(R)
49. <i>Sepedon plumbella</i> (Wied.)	+	+	+	(S)
50. <i>Sepedon ferruginosa</i> Wied.	-	+	-	(S)
Family : SARCOPHAGIDAE				
51. <i>Iranihindia futilia</i> (Sr. White)	+	-	-	(R)
52. <i>Sarcophaga martellata</i> (Sr. White)	-	+	-	(S)
53. <i>Parasarcophaga (Parasarcophaga) albiceps</i> Meigen	-	+	-	(S)
54. <i>Parasarcophaga (Parasarcophaga) orchidea</i> (Bottcher)	-	+	-	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
55. <i>Parasarcophaga (Liopygin) ruficornis</i> (Fabr.)	-	+	-	(R)
56. <i>Parasarcophaga (Liosarcophaga) misera</i> (Walker)	-	+	-	(R)
57. <i>Sarcophaga flavinervis</i> (Sr. White)	-	+	-	(S)
58. <i>Sarcosolomonina crinita</i> (Parker)	-	+	-	(R)
59. <i>Seniorwhitea annandali</i> (Sr. White)	-	+	-	(R)
60. <i>Seniorwhitea krameri</i> (Bottcher)	-	+	-	(R)
61. <i>Sarcophaga walayari</i> (Sr. White)	-	+	-	(S)
Family : HIPPOBOSCIDAE				
62. <i>Hippobosca longipennis</i> Fabr.	-	+	+	(R)
Order : COLEOPTERA				
Family : DYTISCIDAE				
1. <i>Hydaticus vittatus</i> (Fabr.)	-	+	-	(S)
2. <i>Cybister tripunctatus asiaticus</i> Sharp	-	+	-	(R)
3. <i>C. confuses</i> Sharp	-	+	-	(R)
4. <i>C. limbatus</i> (Fabr.)	-	+	-	(S)
5. <i>Eretes sticticus</i> Linn.	-	+	-	(S)
6. <i>Canthydrus laetabilis</i> (Walker)	-	+	-	(R)
7. <i>Laccophilus anticatus</i> Sharp	+	-	+	(S)
8. <i>Laccophilus sharpi</i> Regimbart	-	-	+	(S)
9. <i>Hydrovatus acuminatus</i> Motschulsky	+	-	+	(R)
Family : GYRINIDAE				
10. <i>Dineutus indicus</i> Aube	-	+	-	(S)
11. <i>Orectochilus (Patrus) discifer</i> (Walker)	+	-	+	(R)
Family : HYDROPHILIDAE				
12. <i>Sternolophus rufipes</i> (Fabr.)	-	+	-	(S)
13. <i>Regimbertia attenuate</i> Fabr.	-	+	-	(S)
14. <i>Laccobius simulans</i> d' Orchymont	+	-	-	(R)
Family : SCARABAEIDAE				
15. <i>Gymnopleurus gemmatus</i> Horold	-	+	-	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
16. <i>G. cyaneus</i> Fabr.	-	+	-	(S)
17. <i>Orthophagus</i> sp.	-	+	-	(S)
Family : CURCULIONIDAE				
18. <i>Apion</i> sp.	-	+	-	(S)
Family : TENEBRIONIDAE				
19. <i>Gonocephalum</i> sp.	-	+	-	(S)
Family : STAPHYLINIDAE				
20. <i>Leptochirus (Strongylochirus) laevis</i> Castelnaud	-	+	-	(S)
21. <i>Borolinus minutes</i> (Castelnaud)	+	+	-	(S)
22. <i>Priochirus (Cephalomerus) sanguinosus</i> Motsch.	+	+	-	(S)
23. <i>Megathrus birmanus</i> Fauvel	-	-	+	(S)
24. <i>Oxytelopsis pseudopsina</i> Fauvel	+	-	+	(S)
25. <i>Oxytelus (Caccoporus) varipennis</i> Kraatz	+	-	-	(S)
26. <i>Bledius (Pucerus) niloticus</i> Erichson	-	+	-	(S)
Family : CARABIDAE				
27. <i>Gnathophanus lacvistriatus</i> (Strum.)	+	+	-	(S)
28. <i>amprophonus lucens</i> Bates	-	+	+	(S)
29. <i>Harpalus</i> (s.str.) <i>indcola</i> Bates	+	+	-	(S)
30. <i>Dioryche torta</i> Macl.	-	+	-	(S)
31. <i>Ophoniscus iridulus</i> Bates	+	+	-	(S)
32. <i>Platymetopus flavitabris</i> (Fabr.)	+	+	-	(S)
33. <i>Stenolophus (Egadroma) smaragdulus</i> (Fabr.)	+	-	-	(S)
Family : MELOIDAE				
34. <i>Epicauta hirtipes</i> Waterhouse	+	+	-	(S)
35. <i>Psalydolytta wellmani</i> Kaszab	-	+	-	(S)
36. <i>Mylabris thunbergi</i> Billbarg	+	-	-	(S)
37. <i>Lytta cardonii</i> (Fairmaire)	-	+	-	(S)
38. <i>Cyaneolytta acteon</i> (Laporte)	+	-	+	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : CHRYSOMELIDAE				
39. <i>Oulema downesi</i> (Baly)	+	-	+	(S)
40. <i>Lema coromandelina</i> (Fabr.)	-	-	+	(S)
41. <i>Lema suturella</i> Baly	+	-	-	(S)
42. <i>Lilioceris malabarica</i> (Jacoby)	+	-	+	(S)
43. <i>Aspidolopha egregia</i> (Boheman)	-	-	+	(S)
44. <i>Diapromorpha turcica</i> (Fabr.)	-	-	+	(S)
45. <i>Smaragdina divisa</i> (Jacoby)	+	-	+	(S)
46. <i>Cryptocephalus dificiens</i> Suffrina	+	+	-	(S)
47. <i>Pagria signata</i> (Mostchulsky)	-	-	+	(S)
48. <i>Basilepta variabile</i> (Duvivier)	-	-	+	(S)
Family : COCCINELLIDAE				
49. <i>Chilocorus nigrinus</i> (Fabr.)	+	+	-	(S)
50. <i>Cryptogonus bimaculatus</i> Kapur	-	+	-	(S)
51. <i>Cryptogonus quadriguttatus</i> (Weise)	+	-	-	(S)
52. <i>Pseudaspidimerus circumflexa</i> var. <i>testceus</i> (Weise)	+	-	-	(S)
53. <i>Rodolia fumida</i> Mulsant	-	+	-	(S)
54. <i>Coccinella septempunctata</i> Linn.	-	+	+	(S)
55. <i>Coelophora sexareata</i> Mulsant	+	+	+	(S)
56. <i>Oenopia luteopustulata</i> Mulsant	-	+	-	(S)

Besides these families, specimens of few other families *viz.*, Buprestidae, Elateridae, Melyridae and Bruchidae were collected, but could not be identified due to lack of expertise.

Order : LEPIDOPTERA				
Family : DANAIIDAE				
1. <i>Danaus limniace leopardus</i> (Butler)	-	+	-	(S)
2. <i>D. chrysippus</i> (Linn.)	-	+	-	(S)
3. <i>D. genutia</i> Cramer	-	+	-	(S)
4. <i>Euploea core core</i> Cramer	-	+	-	(S)
Family : NYMPHALIDAE				
5. <i>Acraea violae</i> (Fabr.)	-	+	-	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
6. <i>Precis lemonias</i> (Linn.)	-	+	-	(S)
7. <i>P. orithya swinhoei</i> Butler	-	+	-	(S)
8. <i>P. hierta hierta</i> (Fabr.)	-	+	-	(S)
9. <i>P. almana almana</i> (Linn.)	-	+	-	(S)
10. <i>Euthalia nais</i> Forster	-	+	-	(S)
11. <i>Hypolimas belina belina</i> Linn.	-	+	-	(S)
12. <i>Pliménitis procris procris</i> (Cramer)	-	+	-	(S)
13. <i>Neptis hylas astola</i> Moore	-	+	-	(S)
14. <i>Parathyma perius</i> Linn.	-	+	-	(S)
15. <i>Phalanta phalantha phalantha</i> (Drury)	-	+	-	(S)
Family : PAPILIONIDAE				
16. <i>Papilio demoleus demoleus</i> Linn.	-	+	-	(S)
17. <i>P. polytes romulus f. stichius</i> (Hubn.)	-	+	-	(S)
18. <i>Atrophaneura aristolochiae aristolochiae</i> (Fabr.)	-	+	-	(S)
19. <i>Graphium nomius nomius</i> (Esper)	-	+	-	(S)
Family : LYMANTRIDAE				
20. <i>Somena scintillaus</i> (Walker)	-	+	-	(S)
21. <i>Lymantria obsoleta</i> Walker	-	+	-	(S)
Family : ARCTIIDAE				
22. <i>Utetheisa pulchella</i> (Linn.)	-	+	-	(S)
Family : ERYCINIDAE				
23. <i>Abisara echerius suffuse</i> (Moore)	-	+	-	(S)
Family : LYCAENIDAE				
24. <i>Catochrysops strabo strabo</i> (Fabr.)	-	+	-	(S)
25. <i>Amblypodia amantes amantes</i> (Hewitson)	-	+	-	(S)
26. <i>Chaetoprocta odata</i> (Hewitson)	-	+	-	(S)
27. <i>Lampides boeticus</i> (Linn.)	-	+	-	(S)
28. <i>Narathura atrax</i> (Hewitson)	-	+	-	(S)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : PIERIDAE				
29. <i>Cepora nerissa phryne</i> (Fabr.)	-	+	-	(S)
30. <i>Eurema brigitta rubella</i> (Wallace)	-	+	-	(S)
31. <i>E. hecabe simulata</i> (Moore)	-	+	-	(S)
32. <i>E. laeta laeta</i> (Boisd.)	-	+	-	(S)
33. <i>Leptosia nina nina</i> (Fabr.)	-	+	-	(S)
34. <i>Catopsilia pyranthe pyranthe</i> (Linn.)	-	+	-	(S)
35. <i>Anaphaeis aurota aurota</i> (Fabr.)	-	+	-	(S)
Family : HESPERIIDAE				
36. <i>Suastus minuta aditia</i> Evans	+	-	+	(R)
37. <i>Audaspes folus</i> (Cramer)	-	+	-	(R)
Family : SATYRIDAE				
38. <i>Mycalesis mineus polydecta</i> (Cramer)	+	-	+	(R)
40. <i>Ypthima baldus</i> (Fabr.)	+	-	+	(R)
Family : SPHINGIDAE				
41. <i>Maruba spectabilis</i> (Butler)	+	-	+	(S)
Family : NOTODONTIDAE				
42. <i>Antheus servula</i> (Drwy)	+	-	+	(R)
Family : AGARISTIDAE				
43. <i>Aegocera bimacula</i> Walker	+	-	+	(R)
Family : NOCTUIDAE				
44. <i>Nyctipao macrops</i> (Linn.)	+	-	+	(R)
45. <i>Spodoptera mauritia</i> (Boisduval)	+	-	+	(R)
46. <i>Pandesma quenavadi</i> Guenee	+	-	+	(R)
47. <i>Prodenia litura</i> (Fabr.)	+	-	+	(R)
48. <i>Diachrysa orichalcea</i> (Fabr.)	+	-	+	(R)
49. <i>Agrotis spinifera</i> (Hubner)	+	-	+	(R)
50. <i>Parallelia joviana</i> Stoll	+	-	+	(R)
51. <i>Hypocala deflorata</i> Fabr.	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : GEOMETRIDAE				
52. <i>Scopula remotata</i> (Guen.)	+	-	+	(R)
Family : PHINGIDAE				
53. <i>Pergesa elpenor rivularis</i> (Boisd.)	+	-	+	(R)
54. <i>Hippotion boerhaviae</i> (Fabr.)	+	-	+	(R)

Phylum : ARTHROPODA
Class : Acarina (TICKS & MITES)

Order : CRYPTOSTIGMATA				
Family : EUPHTHIRACARIDAE				
1. <i>Rhysotritia ardu</i> (Koch)	+	-	+	(R)
Family : NOTHRIDAE				
2. <i>Nothrus gracilis</i> Hammer	+	-	+	(R)
Family : TECTOCEPHEIDAE				
3. <i>Tectocephus velatus</i> (Michael)	+	-	+	(R)
Family : OTOCEPHEIDAE				
4. <i>Dolicheremaeus</i> sp.	+	-	+	(R)
Family : OPPIIDAE				
5. <i>Oppia yodai</i> Aoki	+	-	+	(R)
Family : CHAUNOPROCTIDAE				
6. <i>Chaunoproctus abalai</i> Bhaduri, Bhattacharya and Chakrabarti	+	-	+	(R)
Family : SCHELORIBATIDAE				
7. <i>Scheloribates albialatus</i> Hammer	+	-	+	(R)
8. <i>Scheloribates parvas</i> Pletzen	+	-	+	(R)
9. <i>Scheloribates natalensis</i> Pletzen	+	-	+	(R)
Family : XYLOBATIDAE				
10. <i>Xylobates</i> sp.	+	-	+	(R)
Family : ORIBATELLIDAE				
11. <i>Lamellobates palustris</i> Hammer	+	-	+	(R)
Family : GALUMNIDAE				
12. <i>Galumna crenata</i> Deb and Ray Chaudhuri	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Order : MESOSTIGMATA Family : ASCIDAE				
1. <i>Asca</i> sp.	+	-	+	(R)
2. <i>Lasioseius</i> sp.	+	-	+	(R)
3. <i>Proctolaelaps</i> sp.	+	-	+	(R)
Family : LAELAPIDAE				
4. <i>Hypoaspis</i> sp.	+	-	+	(R)
Order : METASTIGMATA Family : IXODIDAE				
1. <i>Boophilus microplus</i> (Canestrini)	+	-	+	(S)
2. <i>Haemaphysalis bispinosa</i> Neumann	+	-	+	(S)
3. <i>Rhipiephalus haemaphysaloides</i> Supino	+	-	+	(S)

Class : ARACHNIDA
Order : ARANEAE (Spiders)

Family : LYCOSIDAE				
1. <i>Lycosa kempfi</i> Gravely	+	+	+	(S)
2. <i>L. birmanica</i> Thor.	+	+	+	(R)
3. <i>Perdosa</i> sp.	+	-	+	(R)
4. <i>Neoscona</i> sp.	+	-	+	(R)
Family : TETRAGNATHIDAE				
5. <i>Tetragnatha</i> sp.	+	-	+	(R)
Family : OXYOPIDAE				
6. <i>Oxyopes</i> sp.	+	-	+	(R)
Family : THOMISIDAE				
7. <i>Thomisus cherapunjeus</i> Tikader	+	-	+	(R)
8. <i>Thomisus</i> sp.	+	-	+	(R)
9. <i>Xysticus</i> sp.	+	-	+	(R)
10. <i>Tharpyma</i> sp.	+	-	+	(R)
Family : SALTICIDAE				
11. <i>Rhene</i> sp.	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
12. <i>Zygoballus</i> sp.	+	-	+	(R)
13. <i>Marpissa decorate</i> Tikader	+	-	+	(R)
14. <i>Marpissa</i> sp. Family : GNAPHOSIDAE	+	-	+	(R)
15. <i>Gnaphosa</i> sp. Family : SPARASSIDAE	+	-	+	(R)
16. <i>Spararsus</i> sp. Family : THERIDIIDAE	+	-	+	(R)
17. <i>Theridion</i> sp. Family : HERSILIDAE	+	-	+	(R)
18. <i>Hersilia</i> sp. Family : ARGIOPIDAE	+	-	+	(R)
19. <i>Cyclosa moonduensis</i> Tikader	+	-	+	(R)
20. <i>Leucauge decotiata</i> (Walckenaer) Order : SCORPIONIDA (Scorpiones) Family : BUTHIDAE	+	-	+	(R)
1. <i>Mesobuthus tamulus gangeticus</i> (Pocock)	+	-	+	(R)
Besides these, few specimens of Millipede, Centipede and Scutigera were collected but could not be identified due to lack of expertise.				
Subphylum : CRUSTACEA				
Order : DECAPODA Family : PALAEMONIDAE (Prawn)				
1. <i>Macrobrachium lamarrei</i> (H.M. Edwards)	+	-	+	(R)
2. <i>Macrobrachium dayanum</i> (Henderson)	+	-	+	(R)
3. <i>Macrobrachium choprai</i> (Tiwari)	+	-	+	(R)
4. <i>Macrobrachium assamensis assamensis</i> (Tiwari)	+	-	+	(R)
5. <i>Macrobrachium hendersoni platyrostris</i> (Tiwari) Family : ATYIDAE	+	-	+	(R)
6. <i>Caridina</i> sp.	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Family : GECARCINUCIDAE				
7. <i>Barytelphusa cuniculari</i> (Westwood)	+	-	+	(R)
Order : ISOPODA				
Family : SPHAEROMATIDAE				
8. <i>Exosphaeroma parva</i> Chilton	+	-	+	(R)
Order : CTENOPODA				
Family : SIDIDAE				
9. <i>Latanopsis australis</i> (Sars)	+	-	+	(R)
10. <i>Diphanosoma excisum</i> Sars	+	-	+	(R)
Order : ANOMOPODA				
Family : DAPHNIDAE				
11. <i>Daphnia lumholtzi</i> Sars	+	-	+	(R)
12. <i>Ceriodaphnia cornuta</i> Sars	+	-	+	(R)
13. <i>Simocephalus vetulus</i> (O.F. Muller)	+	-	+	(R)
Family : MOINIDAE				
14. <i>Moina micrura</i> Kurz	+	-	+	(R)
Family : Bosminidae				
15. <i>Bosmina longirostris</i> (O. F. Muller)	+	-	+	(R)
16. <i>Bosmina deitersi</i> Richard	+	-	+	(R)
Family : Macrothricidae				
17. <i>Macrothrix triserialis</i> (Brady)	+	-	+	(R)
18. <i>Macrothrix spinosa</i> King	+	-	+	(R)
Family : Chydoridae				
19. <i>Chydorus ventricosus</i> Daday	+	-	+	(R)
20. <i>Chydorus reticulatus</i> Daday	+	-	+	(R)
21. <i>Chydorus sphaericus</i> (O. F. Muller)	+	-	+	(R)
22. <i>Picripleuroxus similes</i> Vavra	+	-	+	(R)
23. <i>Alona rectangular richardi</i> (Stingelin)	+	-	+	(R)
24. <i>Biapertura verrucosa</i> (Sars)	+	-	+	(R)
25. <i>Leydigia acanthocercoides</i> (Fischer)	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
Order : CALANOIDA				
Family : Diaptomidae				
26. <i>Neodiaptomus schmackeri</i> (Poppe and Richard)	+	-	+	(R)
27. <i>Diaptomus</i> sp.	+	-	+	(R)
Family : Cyclopidae				
28. <i>Mesocyclops hyalinus</i> (Rehberg)	+	-	+	(R)
29. <i>Mesocyclops leuckarti</i> (Claus)	+	-	+	(R)
30. <i>Nauplias</i> larvae	+	-	+	(R)
Order : PODOCOPIDA				
Family : CYPRIDIDAE				
31. <i>Stenocypris</i> sp.	+	-	+	(R)
Phylum : ROTIFERA				
1. <i>Branchionus calciflorus</i> (Pallas)	+	-	+	(R)
2. <i>B. falcatus</i> Koste and Shiel	+	-	+	(R)
3. <i>Branchionus</i> sp.	+	-	+	(R)
4. <i>Asplanchna</i> sp.	+	-	+	(R)
5. <i>Filinia</i> sp.	+	-	+	(R)
Phylum : COELENTERATA				
1. <i>Hydra vulgaris</i> Pallas	+	-	+	(R)

Phylum : MOLLUSCA
Class : GASTROPODA

Order : MESOGASTROPODA				
Family : VIVIPARIDAE				
1. <i>Bellamyia bengalensis f. typica</i> (Lamarck)	+	-	+	(R)
2. <i>B. bengalensis f. anandalei</i> (Kobelt)	+	-	+	(R)
3. <i>B. dissimilis</i> (Mueller)	+	-	+	(R)
Family : BITHYNIIDAE				
4. <i>Gabbia orcula</i> Frauenfeld	+	-	+	(R)
Family : THIARIDAE				
5. <i>Tarebia lineata</i> (Gray)	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
6. <i>Melanoides tuberculata</i> (Mueller)	+	-	+	(R)
7. <i>Thiara (Thiara) scabra</i> (Mueller)	+	-	+	(R)

Subclass : PULMONATA

Order : BASOMMATOPHORA Family : LYMNÆIDAE				
8. <i>Lymnaea (Pseudosuccinea) acuminata</i> Lamarck	+	-	+	(R)
9. <i>L. (P.) acuminata form typica</i> Lamarck	+	-	+	(R)
10. <i>L. (P.) acuminata form rufescens</i> Gray	+	-	+	(R)
11. <i>L. (P.) acuminata form chlamys</i> Benson	+	-	+	(R)
12. <i>L. (P.) acuminata form australis</i> Annandale & Rao	+	-	+	(R)
13. <i>L. (P.) acuminata form succinea</i> Deashayes	+	-	+	(R)
14. <i>L. (P.) luteola</i> Lamarck	+	-	+	(R)
Family : PLANORBIDAE				
15. <i>Gyraulus convexiusculus</i> (Hutton)	+	-	+	(R)
Family : BULLINIDAE				
16. <i>Indoplanorbis exustus</i> (Deshayes)	+	-	+	(R)
Order : STYLOMMATOPHORA Family : ACHATINIDAE				
17. <i>Achatina fulica fulica</i> (Bowdich)	+	-	+	(R)

Class : BIVALVIA

Order : UNIONOIDA Family : AMBLOMIDAE				
18. <i>Parreysia (Radiatula) caerulea</i> (Lea)	+	-	+	(R)

Phylum : ANNELIDA
Class : OLIGOCHAETA

Order : HAPLOTAXIDA Family : MEGASCOLECIDAE				
1. <i>Amyntas alexandri</i> (Beddard)	+	-	+	(R)

Name of the species	BLOCKS			Remarks
	I	II	III	
1	2	3	4	5
2. <i>Lampito mauritii</i> (Kingberg)	+	-	+	(R)
3. <i>Perionyx sansibaricus</i> (Perrier)	+	-	+	(S)The species is not common in Jharkhand

Family : OCTOCHAETIDAE

4. <i>Eutyphoeus orientalis</i> (Beddard)	+	-	+	(R)
5. <i>Lenogaster pusillus</i> (Stephenson)	+	-	+	(R)
6. <i>Octochaetona beatrix</i> (Beddard)	+	-	+	(R)
7. <i>Pellogaster bengalensis</i> (Michaelsen)	+	-	+	(R)The specie is recorded for the first time from Jharkhand

RESULTS AND DISCUSSION

During the present study, a total of 736 species of animals, including 312 species under 224 genera and 101 families of vertebrates and 424 species under 283 genera and 137 families of invertebrates have been inventorised from the study areas which include 35 localities. The species have been recorded from terrestrial and aquatic habitats and also from soil and litter. However, the current inventory may only be a fragment of the actual fauna that may be occurring in the area.

Any type of mining activity especially related to open cast mining, inevitably resulting in destructive change in surface ecology. During the course of this study wanton ecological destruction was noticed almost everywhere. Even though, a large assemblage of faunal elements was recorded. Special emphases were laid on such major animal groups like Mammals, Aves, Reptiles, Amphibians, Pisces, Molluscs, Annelids and Arthropods. Among vertebrates Aves constitute major part while among invertebrate, Insects are most dominant and omni-present and is represented by 10 orders, 90 families, 204 genera and 321 species. Following is the analysis of such major faunal assemblage which is likely to be affected by the enhanced mining operation in the study areas.

MAMMALS

In all 62 species belonging to 48 genera, 24 families and 10 orders of mammals have been recorded from the study areas. Of these, 11 species are listed in Schedule I, 5 species in Schedule II, 6 species in Schedule III, 5 species in Schedule IV, and 8 species in Schedule V of Wildlife (Protection) Act, 1972 as amended in 1992. The list also includes 12 species which are included in the Appendix of CITES. None of the species is endemic for the area. Comparatively less number of mammalian species in the area may be attributed to mining activities and massive deforestation for years together.

AVES

Altogether 158 species belonging to 119 genera and 47 families and 18 orders of birds have been observed and recorded from the areas surveyed. One species of these birds is listed in Schedule I, 150 species under Schedule IV while 2 species are in Schedule V of the IWL. Only one species of bird recorded during the study, the rose ringed Parakeet is included in the Appendix II of the CITES.

The birds recorded from the reclaimed sites are mainly aquatic forms and those are only aquatic ducks. Incidentally the other hitherto known abundant species like cranes and storks and rails were almost absent. The most common passerine winter invader in the area are supposed to be the Starlings *viz.*, *Sturnus vulgaris* and *S. roseus* (Sternidae) and Buntings (Emberizidae) were not encountered during the course of present study. The probable reason may be postulated to the scarcity of natural wetlands as most of such available habitats prevalent the study area are the water filled quarries which are usually very poor in ecological requisites for establishing the habitat of bird and or for other animals.

REPTILES

Altogether 22 species of reptiles belonging to 18 genera, 9 families and 2 orders are recorded in the study areas. Two species of turtles *Melanochelys tricarinata* and *Lissemys punctata punctata* are included in the Schedule I of the Indian Wildlife (Protection) Act, 1972. The species *M. tricarinata* is also placed in the Appendix I of CITES. Beside these, the reptilian fauna in the area so far known includes some interesting species which need protection through management of their habitats.

AMPHIBIANS

The amphibian species recorded from the area are represented by 11 species distributed over 6 genera, 4 families under 1 order. The species like *Duttaphrynus melanostictus*, *D. stomaticus*, *Hoplibatrachus tigrina* and *Sphaerotheca breviceps* are included in the Schedule IV of the Indian Wildlife (Protection) Act, 1972. These species need special care for their conservation. The mining activity plays adverse effects on the amphibian population through habitat destruction.

PISCES

The fish population of the area is rich both in quantity and quality. The fishes so far known from the coalfield areas under the present study include 59 species belonging to 33 genera, 17 families and 6 orders. There are many fishes which are considered to be economically very important. Besides these, several species are reported here as very rare which need proper management for their survival and propagation. The water bodies are being polluted with effluents from the washeries resulting ill effect of fish population. The urgent need is proper management of the rivers, lakes and water bodies in the context of their pollution caused by the mining activities.

INSECTS

Among the orders of insects reported here Odonata, Coleopteran, Lepidoptera, Hemiptera and Orthoptera are found to occur in all the study areas and their population is also found

to be rich in some localities. Though no endemic and schedule species of insects were encountered during the survey, the insect denizens are very likely to be affected due to modification of their habitats in future.

The other arthropods represented by zooplanktons and crabs in aquatic habitats are also quite rich in their population. The terrestrial arthropods like arachnids including mites, ticks, spiders, scorpions, millipedes and centipedes are very common in occurrence and are represented by a good number of taxa. These tiny arthropods are not in a state of danger presently. But in near future, the gradual loss of habitat may cause devastating effects on them.

MOLLUSCS

Altogether 19 species of molluscs are recorded here as common inhabitants of aquatic habitat. Only one land inhabiting species the giant African Snail is recorded. The population of mollusc is rich and it may be affected if the pollution of water bodies is not checked and properly managed.

ANNELIDS

The annelid fauna reported in the report is rich both in quality and quantity. But the increasing trend of soil pollution may cause harmful effect on the annelid and other soil inhabiting forms in general.

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