Biosphere Reserve Information Series (BRIS) Volume 1 (2)

ACHANAKMAR-AMARKANTAK BIOSPHERE RESERVE

Tropical Forest Research Institute
(Indian Council of Forestry Research and Education)
P.O.RFRC, Mandla Road, Jabalpur

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TFRI 2008

Front Cover: Golden backed Woodpecker, *Dinopium bengalensis*
- Photo by: Dr. N. Kulkarni
Back Cover- Transition zone of Achanakmar- Amarkantak-Biosphere Reserve Kota Range, Chhattisgrah
- Photo by Dr. K.C. Joshi

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PREFACE

In the present Biosphere Reserve Information Series (BRIS) volume 1 part 2, the various species of fauna both invertebrates and vertebrates reported by different experts from Achanakmar - Amarkantak Biosphere Reserve are listed under the chapter Current Information- Faunal Resources. The information of each recorded species from different localities of BR and its status have also been mentioned. The list of threatened as well as endangered fauna, scientific information published on them in different scientific journals are also documented for the use of BR managers, academicians, scientists and scholars. This information will be helpful to provide the BR a National and International repute besides giving up to date scientific information, which may be helpful to scientists, academician, etc. in project formulation for financial assistance from Ministry of Environment and Forests, Government of India, New Delhi for further studies on this Biosphere Reserve.

In the previous issue i.e. 1st part of the BRIS, a total of 1,301 species of micro and macro flora were listed. During April 2007, a workshop on Research needs for Achanakmar - Amarkantak Biosphere Reserve was organized at Tropical Forest Research Institute, Jabalpur. Many academicians, scientists from different organizations presented their findings on latest flora and fauna of BR. The new species described by these authors along with already known species, have been published in the proceedings of Workshop. In the present BRIS, the updated list of fungi, lichens and pteriodophytes recorded from Achanakmar-Amarkantak BR is also given, which will be *an asset to BR managers while preparation of Management Plan of the BR.*

Hope, the information provided in this part – 2 of BRIS Volume 1 will be useful to forest managers, academicians, scientists and scholars.

The main object of the BRIS is to disseminate the research based information to the BR managers, academicians, scientists and scholars. Additional authentic information on flora, fauna, agencies helping on social upliftment of inhabitants of BR, ecotourism, scientific studies undertaken, etc. pertaining to Achanakmar- Amarkantak BR are welcomed from readers, BR managers, scientists of research Institutions, academicians and research scholars.

Editors are thankful to the Divisional Forest Officer, Bilaspur Forest Division, C.G.; Divisional Forest Officer, Dindori (M.P.) for providing useful information about core, buffer and transition zones; Shri K.P. Sinha, Dy. Range Officer, Lamni (Sanctuary Range), Lamni for his help to visit the remote areas of Lamni forest range; Project Assistant and staff associated with the project for their help in compilation of this part of BRIS.

Date Mar, 2008

Editors

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1. Introduction:

Achanakmar - Amarkantak Biosphere Reserve is the first Biosphere Reserve of Chhattisgarh state. Its boundaries start from Kota and Lormi forest ranges of Bilaspur district in (Chhattisgarh) south to Rajendragram forest range of Anuppur district Madhya Pradesh in the north and Belghana forest range of Chhattisgarh in the east to Dindori forest range of Dindori district in Madhya Pradesh. It consists of 3 distinct zones viz. core zone, buffer zone, and outer most transition zone. The transition and buffer zones surround the core zone. The buffer zone is dense forests with only few villages like Rajki, Bagdhora, Sarasdol, etc. in Chhattisgarh. The buffer zone and transition zones have 396 revenue and forest villages in both the states. Chhattisgarh alone has 225 revenue and forest villages. The inhabitants are mostly tribal, scheduled castes and other backward classes. The population of general category of people is low. The core zone starts from Achanakmar range in south (169.133 sq kms.), which is 60 kms. from Bilaspur railway station to Lamni range in north (203.769 sq kms.), which is 25 kms. from Pendra road railway station and Game range (178.65 sq kms.) on the western side of Achanakmar range. The core zone has 22 villages having a population of 7709 persons.

The climate of BR has 3 distinct seasons viz. monsoon, which begins from July and continues up to October; winter from November to February; and summer from March to June. The lowest temperature in winter is -2 ^{o}C, which rises up to a maximum of 40 ^{o}C in June. The humidity varies from 39 % to 90%. This climate has enriched a large number of flora and fauna of this BR.

Periodical surveys of Achanakmar - Amarkantak Biosphere Reserve have been conducted by state forest departments, many scientists including Zoological Survey of India and Universities, etc. during past few years and a large number of animals have been discovered and described in different scientific journals. The information available about the species, their distribution and status have been gathered and presented hereunder. The source of information of

each species and abstract of scientific information published in different journals/ volumes have also been given for further study.

2. Current Information:

Published information on Achanakmar- Amarkantak Biosphere Reserve in scientific journals reveals that BR represents the Deccan Peninsular zone of the bio-geographic classification of India. Due to its varied topography, climate and water sheds, etc., it is very rich in floral and faunal composition comprising of both aquatic as well as terrestrial ecosystems. The detailed information about the floral composition has already been published in part 1 of BRIS volume 1.The updated information, however has been given in Part 2 after the Faunal Resources.

I. Faunal Resources:

The faunal resources available in BR are very rich and varied. They consist of soil microbes, helping in decomposition of forest litter, to macrobes like various groups of arthropods (Shadangi and Nath, 2006), scavengers, phytophagous individuals, carnivores in terrestrial ecosystem and omnivorous to carnivorous aquatic individuals. The species reported from this biosphere reserve by different authorities have been grouped in to:

A. Invertebrate Fauna:

A large number of protozoan parasites like *Plasmodium vivax* G. & F., which is well known for benign malaria to inhabitants and *Entamoeba histolytica*, which attacks and causes amoebic dysentery in pigs, monkeys, etc.; aquatic fresh water coelenterates like various species of genus *Hydra*; platyhelmenthes like *Bilharzia* (*Schistosoma*), which are parasitic in hepatic portal and pelvic veins of birds and mammals (Joshi, 1992); nematodes like the whipworm *Trichusis* sp., which infests in intestine of pigs and primates and many species of annelids (Joshi, 1992) available in different zones of Achanakmar- Amarkantak BR but no published literature is available about them. Therefore, taxonomical identification of various species of each of the above phyla is urgently required on top priority basis. Departments working on various parasitic diseases in birds, cattle and mammals should be encouraged both by MOEF, GOI, New Delhi and State Forest Department of Chhattisgarh by inviting suitable projects for financial assistance to them.

In phylum arthropoda, a little work has been done on chilopods or centipedes. Specimens sampled from the different zones of Achanakmar- Amarkantak BR by Zoological Survey of India, Central Regional Station Jabalpur and identified by Northern Regional Station Dehra Dun indicate the existence of 5 species of centipedes (Table 1).

Table 1. Species of centipedes recorded from Achanakmar- Amarkantak BR.

S.N.	Name of the species	Distribution in BR	Status*	Reference
Chilopoda: Scolopendromorpha: Centipedes Family:Scolopendridae				
1.	*Scolopendra moraltans* Linn.	Ataria, Chaparwa	C	Khanna, 2006
2.	*Scolopendra amaxonica* (Bucharl.)	Amarkantak	C	Khanna, 2006
3.	*Cormocephalus dentipes* (Pocock)	Amarkantak	C	Khanna, 2006
4.	*Cormocephalus pilosus* Jangl.	Amarkantak	C	Khanna, 2006
5.	*Rhysida nuda nuda* (Newport)	Amarkantak	C	Khanna, 2006

*C= common

But, no work is available on the millipedes existing in different ranges of the BR. On other arthropods like insects, however, studies have been initiated by Zoological Survey of India, Central Regional Station Jabalpur, who identified 83 lepidopteran insects. Forty nine species of them belong to 21 different families belonging to butterflies and 34 species to the moths (Table 2).

Table2. Species of butterflies and moths known from Achanakmar- Amarkantak BR.

S.N.	Name of Species	Distribution In BR	Status*	Reference
A. Butterflies: Family:Papilionidae				
1.	*Chilasa clytia* (Linn.)	Achanakmar	C	Singh and Chandra, 2006
2.	*Graphium nomius nomius* (Esper)	Achanakmar	NR	Singh and Chandra, 2006
3.	*Papilio polytes romulus*	Achanakmar,	VC	Singh and Chandra, 2006

	Cramer	Amarkantak		
4.	*Papilio demoleus demoleus* Linn.	Achanakmar, Amarkantak, Tilaidabra	C	Singh and Chandra, 2006
Family: Pieridae				
5.	*Anapheis aurota aurota* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
6.	*Catopsilia pyranthe pyranthe* (Linn.)	Achanakmar	VC	Singh and Chandra, 2006
7.	*Catopsilia crocale* (Cramer)	Achanakmar, Lamni	VC	Singh and Chandra, 2006
8.	*Catposilia pomana* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
9.	*Eurema laeta laeta* Boisduval	Achanakmar	C	Singh and Chandra, 2006
10.	*Eurema hecabe simulata* Moore	Throughout BR	VC	Singh and Chandra, 2006
Family: Danaidae				
11.	*Danaus genutia* (Cramer)	Achanakmar, Lamni	VC	Singh and Chandra, 2006
12.	*Danaus chrysippus chrysippus* (Linn.)	Achanakmar	VC	Singh and Chandra, 2006
13.	*Danaus limniace leopardus* (Butler)	Achanakmar	C	Singh and Chandra, 2006
14.	*Euploea core core* (Cramer)	Achanakmar	VC	Singh and Chandra, 2006
Family : Satyridae				
15.	*Melanitis leda ismene* (Cramer)	Achanakmar	VC	Singh and Chandra, 2006
16.	*Mycalesis mineus* (Linn.)	Achanakmar	VC	Singh and Chandra, 2006
17.	*Mycalesis lepcha davisoni* Moore	Achanakmar	C	Singh and Chandra, 2006
Family: Nymphalidae				
18.	*Athyma perius* (Linn.)	Achanakmar	C	Singh and Chandra, 2006
19.	*Athyma selenophora* (Kollar)	Achanakmar	C	Singh and Chandra, 2006
20.	*Charaxes fabius cerynthus* Fruhstorfer	Achanakmar	C	Singh and Chandra, 2006
21.	*Hypolimnas bolina* (Linn.)	Achanakmar	C	Singh and Chandra, 2006
22.	*Hypolimnas misippus* (Linn.)	Achanakmar	Lc	Gupta and Mondal, 2005; Singh and Chandra, 2006
23.	*Moduza procris procris* (Cramer)	Achanakmar	C	Singh and Chandra, 2006
24.	*Neptis hylas* Moore	Achanakmar	C	Singh and Chandra, 2006
25.	*Neptis jumbah* Moore	Achanakmar	C	Singh and Chandra, 2006

26.	*Phaedyma columella* (Cramer)	Achanakmar	C	Singh and Chandra, 2006
27.	*Precis atlites* (Linn.)	Achanakmar	C	Singh and Chandra, 2006
28.	*Precis almana almana* (Linn.)	Achanakmar	C	Singh and Chandra, 2006
29.	*Precis orithya swinhoei* Butler	Achanakmar	C	Singh and Chandra, 2006
30.	*Precis hierta hierta* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
31.	*Precis lemonias lemonias* (Linn.)	Achanakmar, Chhaparwa	C	Singh and Chandra, 2006
32.	*Precis iphita iphita* (Cramer)	Achanakmar	C	Singh and Chandra, 2006
33.	*Phalanta phalanta* (Drury)	Achanakmar	C	Singh and Chandra, 2006
34.	*Symphaedra nais* (Forster)	Achanakmar	C	Singh and Chandra, 2006
Family: Riodinidae/ Erycinidae				
35.	*Abisara echerius* (Stoll)	Achanakmar	C	Singh and Chandra, 2006
Family: Lycaenidae				
36.	*Castalius rosimon rosimon* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
37.	*Euchrysopus phasius* Evans	Achanakmar	C	Singh and Chandra, 2006
38.	*Narathura* (*Eumolphus*) *amantes* (Hewitson)	Achanakmar	C	Singh and Chandra, 2006
39.	*Narathura* (*Atrax*) *atras* (Hewitson)	Achanakmar	C	Singh and Chandra, 2006
40.	*Rapala iarbus sorya* Fabricius	Achanakmar	C	Singh and Chandra, 2006
41.	*Spindasis vulcanus vulcanus* Fabr.	Achanakmar	C	Singh and Chandra, 2006
42.	*Syntarucus plinius* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
Family: Hesperiidae				
43.	*Badamia exclamationis* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
44.	*Caprona ransonnetti* (Felder)	Achanakmar	C	Singh and Chandra, 2006
45.	*Caltoris kumara* (Moore)	Achanakmar	C	Singh and Chandra, 2006
46.	*Caltoris farri* (Moore)	Achanakmar	C	Singh and Chandra, 2006
47.	*Suastus gremius* Fabr.	Achanakmar	C	Singh and Chandra, 2006
48.	*Spialia galaba* (Fabr.)	Achanakmar	C	Singh and Chandra, 2006
49.	*Udospes folus* (Cramer)	Achanakmar	VC	Singh and Chandra, 2006
B. Moth				
Family: Cossidae				

1.	*Xyleutes strix* (Linnaeus)	Chhaparwa	C	Chandra *et al.*, 2006
2.	*Zeuzera* sp.	Ataria	C	Chandra *et al*, 2006
Family:Pyralidae				
3.	*Agathodes ostentalis* Hubner	Tilaidobra	C	Chandra *et al*, 2006
4.	*Diaphania indica* (Saunders)	Ataria	C	Chandra *et al*, 2006
5.	*Nausinoe geometralis* (Guenee)	Ataria	C	Chandra *et al*, 2006
6.	*Sameodes cancellalis* (Zeller)	Tilaidobra	C	Chandra *et al*, 2006
7.	*Spoladea recurvalis* (Fabricus)	Tilaidobra	C	Chandra *et al*, 2006
8.	*Tyspanodes linealis* (Moore)	Tilaidobra	C	Chandra *et al*, 2006
Family: Eupterotidae				
9.	*Eupterote* sp.	Chhaparwa	C	Chandra *et al*, 2006
mily:Saturniidae				
10.	*Actias selene* (Hubner)	Chhaparwa	C	Chandra *et al*, 2006
11.	*Antheraea paphia* (Linnaeus) (Syn. *A. mylitta* Drury)	Marwahi	C	Chandra *et al*, 2006
Family: Geometridae				
12.	*Hyposidra talaca* (Walker)	Marwahi	C	Chandra *et al*, 2006
13.	*Macaria faciata* (Fabricius)	Chhaparwa	C	Chandra *et al*, 2006
Family: Sphingidae				
14.	*Clanis* sp.	Ataria	C	Chandra *et al*, 2006
15.	*Marumba dyras dyras* (Walker)	Ataria	C	Chandra *et al*, 2006
16.	*Oxyambulyx* sp.	Ataria	C	Chandra *et al*, 2006
17.	*Psilogramma menephron menephron* (Cramer)	Marwahi	C	Chandra *et al*, 2006
18.	*Theretra alecto alecto* (Linnaeus)	Ataria	C	Chandra *et al*, 2006
19.	*Theretra boisduvali* (Bugnion)	Chhaparwa	C	Chandra *et al*, 2006
20.	*Theretra oldenlandiae oldenlandiae* (Fabricius)	Lamni	C	Chandra *et al*, 2006
Family: Noctuidae				
21.	*Episparis varialis* Walker	Chhaparwa	C	Chandra *et al*, 2006
22.	*Fodina* sp.	Tilaidobra	C	Chandra *et al*, 2006
23.	*Polytela gloriosae* Fabricius	Marwahi	C	Chandra *et al*, 2006
24.	*Trisula variegata* Moore	Chhaparwa	C	Chandra *et al*, 2006

Family: Lymantriidae				
25.	*Euproctis* sp.	Ataria	C	Chandra *et al*, 2006
Family: Notodontidae				
26.	*Cerura liturata* Walker	Chhaparwa	C	Chandra *et al*, 2006
27.	*Phalera raya* Moore	Ataria	C	Chandra *et al*, 2006
Family: Agaristidae				
28.	*Mimeusemia* sp.	Ataria	C	Chandra *et al*, 2006
Family: Hypsiidae				
29.	*Asota caricae* (Fabricius)	Ataria	C	Chandra *et al*, 2006
Family: Arctiidae				
30.	*Creatonotus lactineus* Cramer	Ataria	C	Chandra *et al*, 2006
31.	*Macrobrochis gigas* (Walker)	Ataria	C	Chandra *et al*, 2006
32.	*Olepa ricini* (Fabricius)	Marwahi	C	Chandra *et al*, 2006
33.	*Phissama transiens* (Walker)	Ataria	C	Chandra *et al*, 2006
Family:Limacodidae				
34.	*Parasa* sp.	Ataria	C	Chandra *et al*, 2006

*C= Common, Lc= Least Concern; VC= Very Common; NR= Not Rare

Most of the species listed above are common to very common in status. The study needs further taxonomical work including their status because a large number of species like teak defoliator and skeletonizer, which are seen by one of the editors, are missing from the reports published by Zoological Survey of India as well as by other investigators. Further, out of 128 species of butterflies listed under schedules as per Wildlife (Protection) Act, 1972 (Anon, 1992), the nymphalid, *Hypolimnas bolina* (Linn.) and *H. missipus* Linn., are common to least concern in status and *Charaxes fabius cerynthus* Fruhsttor, as a common species of Achanakmar- Amarkantak BR (Singh and Chandra, 2006). Its allied sub species *C. fabius sulphureus* Roth., which is naturally distributed in Assam is rare in occurrence (Evans, 1932). It is protected by being kept under schedule II of the Wildlife Protection Act, 1972 (Anon., 1992). Similarly, *Phaedyma columella* (Crawer) is a common species recorded from Achanakmar (Singh and Chandra, 2006). Its subspecies *P. columella birghami* (Fruhsterfer), which is naturally distributed in Andaman and Nicobar only, is critically endangered (CR) and included under schedule II of the Act. Among Papilionidae, *Chilasa clytia* (Linn.) is a common

butterfly known from Achanakmar. Its allied *C. clytia clytia f. commixtus* Rothschild, which is naturally distributed in Meghalaya and Sikkim is endangered (EN) as per IUCN (Gupta and Mondal, 2005). *Euploea core core* (Cramer) (Family Danaidae) is very common in Achanakmar (Singh and Chandra, 2006). Its allied *E. core simulatrix* or *E. chimena simulatrix* WM & DeN, which is distributed in south Nicobar Island and categorized as rare, is protected by placing under schedule II. Out of 3 species of Satyridae recorded from Achanakmar, *Mycalesis lepcha davisoni* Moore is common in its status (Singh and Chandra, 2006). However, its allied subspecies *M. lepcha betham* M., which is naturally distributed from Orissa to M.P. (Evans, 1932) and not recorded during present study, is protected by being kept under schedule II (Anon., 1992).

Other insect groups consisting of beetles and crickets identified from different localities of Achanakmar- Amarkantak BR, their status, etc. by different experts including scientists from Zoological Survey of India, as per their published documents, are summarized in table 3.

Table 3. Species of beetles and cricket known from Achanakmar- Amarkantak BR.

S.N.	Name of Species	Distribution in BR	Status *	Reference
A. Beetles:				
Family: Scarabaeidae				
1.	*Adoretus bimarginatus* Ohaus	Achanakmar, Chhaparwa	C	Chandra, 2006 a
2.	*Adoretus lasiopygus* Burmeister	Achanakmar, Chhaparwa	C	Chandra, 2006 a
3.	*Adoretus limbatus* Blanchard	Achanakmar, Chhaparwa, Kewachi	C	Chandra, 2006 a
4.	*Anomala biharensis* Arrow	Achanakmar, Chhaparwa	C	Chandra, 2006 a
5.	*Anomala dorsalis* (Fabricius)	Achanakmar, Marwahi, Kewachi	C	Chandra, 2006 a
6.	*Anomala ruficapilla* Burmeister	Achanakmar, Chhaparwa	C	Chandra, 2006 a
7.	*Anomala rugosa* Arrow	Achanakmar, Chhaparwa	C	Chandra, 2006 a
8.	*Catharsius molossus* (Linnaeus)	Achanakmar, Chhaparwa, Lamni	C	Chandra, 2006 a
9.	*Catharsius sagax*	Achanakmar,	C	Chandra, 2006 a

	Queensland	Marwahi, Kewachi		
10.	*Clinteria klugi* (Hope)	Achanakmar, Chhaparwa, Jhandidongri	C	Chandra, 2006 a
11.	*Gymnopleurus cynaeus* (Fabricus)	Achanakmar, Lamni	C	Chandra, 2006 a
12.	*Gymnopleurus gemmatus* Harold	Achanakmar, Lamni	C	Chandra, 2006 a
13.	*Gymnopleurus sinuatus* (Olivier)	Achanakmar, Chhaparwa, Atariya range	C	Chandra, 2006 a
14.	*Heliocopris bucephalus* (Fabricus)	Achanakmar, Atariya	C	Chandra, 2006 a
15.	*Holotrichia problematica* Brenske	Achanakmar, Chhaparwa, Lamni	C	Chandra, 2006 a
16.	*Hybosorus orientalis* Westwood	Achanakmar, Chhaparwa	C	Chandra, 2006 a
17.	*Mimela inscripta* (Nonfried)	Achanakmar, Chhaparwa	C	Chandra, 2006 a
18.	*Onthophagus catta* (Fabricius)	Achanakmar, Chhaparwa, Motinala	C	Chandra, 2006 a
19.	*Onthophagus bonasus* (Fabricius)	Achanakmar, Chhaparwa	C	Chandra, 2006 a
20.	*Onthophagus pactolus* (Fabricius)	Achanakmar, Lamni	C	Chandra, 2006 a
21.	*Phyllognathus dionysius* (Fabricius)	Achanakmar, Chhaparwa, Kewachi	C	Chandra, 2006 a
22.	*Scarabaeus sanctus* (Fabricius)	Achanakmar, Ataria, Marwahi	C	Chandra, 2006 a
Family: Cerambycidae				
23.	*Hoplocerambyx spinicornis* Newman	Achanakmar, Chada, Jagatpur	C	Anon., 1997; Roychoudhury *et al*., 2004; Joshi *et al.*, 2006
24.	*Alaus sordidus* Westwood	Achanakmar, Chada, Jagatpur	C	Anon., 1997
B. Cricket				
25.	Monster Cricket, *Schizodactylus monstrosus* (Drury)	Achanakmar	R	Chandra and Gupta, 2005

*C= Common, R= Rare,

The gathered information from various sources still appears incomplete, due to lack of identity of many species of beetles belonging to the family Anthribidae, Bostrychidae, Cerambycidae, Chrysomelidae, Cantheridae, Scolytidae, Curculionidae, Coccinellidae, Elateridae, Platypodidae, etc.

The information about other group of insect arthropods like bees, wasps, grasshoppers, dragon and mayflies, mantids, termites, flies and others like crustaceans, spiders and mites, etc. are still unexplored. Though, these groups of insects are plenty in number.

Similarly, during recent periodical surveys conducted by one of editors, a large number of mollusk shells have been recorded on sal trees and near water sources in BR. Studies on mollusks existing in BR are also untouched and provide ample scope for their taxonomical and ecological studies.

B. Vertebrate fauna:

Different classes of vertebrates known from the Achanakmar- Amarkantak BR, are pisces, amphibian, reptiles, aves and mammalians. A brief about them are as hereunder:

The Pisces: These are fresh water inhabiting in running streams and ponds existing in core, buffer and transition zones of BR. On the basis of published literature, there are 16 species of pisces belonging to 8 families as detailed in table 4.

Table 4. Species of pisces known from different reservoirs and rivers under BR and their status.

S. N.	Name of Species	Distribution in BR	Status*	Reference
Family: Channidae				
1.	Giant Snake- head Murrel, *Channa marulius* (Buch. – Ham.)	Achanakmar	LR-nt	Chandra, 2006 b
Family: Clariidae				
2.	Air breathing cat fish, *Clarias batrachus* (Linnaeus)	Achanakmar	VU	Chandra, 2006 b
Family: Cyprinidae				
3.	Indian Carplet, *Amblypharyngodon mola* (Hamilton-Buchaman)	Achanakmar	LR-lc	Chandra, 2006 b

4.	Catla, *Catla catla* (Ham. – Buch.)	Achanakmar	VU	Chandra, 2006 b
5.	Mrigal, *Cirrhinus mrigala* (Ham. – Buch.)	Achanakmar	LR-nt	Chandra, 2006 b
6.	Flying Barb, *Esomus danricus* (Ham. – Buch.)	Achanakmar	LR-lc	Chandra, 2006 b
7.	Bata, *Labeo bata* (Ham. – Buch.)	Achanakmar	LR-nt	Chandra, 2006 b
8.	Orange Fin Labeo or Kalbasu, *Labeo calbasu* (Ham. – Buch.)	Ponds and dams of BR	LR-nt	Chandra, 2006 b
9.	Rohu, *Labeo rohita* (Ham. – Buch.)	Dams of Achanakmar	LR-nt	Chandra, 2006 b
10.	Olive Carp, *Puntius sarana sarana* (Ham. – Buch.)	Achanakmar	VU	Chandra, 2006 b
11.	Stigma Barb, *Puntius sophore* (Ham. – Buch.)	Achanakmar	LR-nt	Chandra, 2006 b
Family: Gobiidae				
12.	Bar-eyed Goby, *Glossogobius giuris* (Ham. – Buch.)	Achanakmar	LR-nt	Chandra, 2006 b
Family: Nandidae				
13.	*Nandus nandus* (Ham. – Buch)	Achanakmar	LR-nt	Chandra, 2006 b
Family: Notopteridae				
14.	Chital, *Notopterus chitala* (Ham. – Buch)	Achanakmar	EN	Chandra, 2006 b
Family: Heteroneustidae				
15.	Stinging Catfish, *Heteropneustes fossilis* (Bloch.)	Achanakmar	VU	Chandra, 2006 b
Family: Siluridae				
16.	Fresh water Shark, *Wallago attu* (Schneider)	Achanakmar	LR-nt	Chandra, 2006 b

*C= Common, LR-lc= Lower risk least concern, LR-nt=Lower risk near threatened, EN= Endangered, VU=Vulnerable

Out of 16 species of pisces, *Notopterus chitala* (Ham.-Buch), commonly known as chital or mohi, is silvery, dark along the back, and distributed in fresh water of Achanakmar-Amarkantak BR of Chhattisgarh and rivers of Bengal and Orissa. It is reported as endangered in the BR. Stinging catfish *Heteropneustes fossilis* (Bloch.), Olive carp *Puntius sarana sarana* (Ham.-Buch.), Catla *Catla catla* (Ham.-Buch.) and *Clarias batrachus* (Linnaeus) are vulnerable in their status and deserve for protection.

Amphibians: These cold blooded vertebrates are insectivorous in habits. Zoological Survey of India, Jabalpur studied the amphibians existing in different localities of the BR. The distribution of different species and their status are summarized in table 5.

Table 5. Species of amphibians recorded from Achanakmar- Amarkantak BR.

S. N.	Name of Species	Distribution in BR	Status	Reference
Family: Ranidae				
1.	Indian Skipping Frog, *Euphlyctis cyanophlyctis* (Schneider)	Chhaparwa, Ataria	LR-nt	Chandra and Pandey, 2004; Chandra, 2006 b
2.	Indian Bull Frog, *Hoplobatrachus tigerinus* (Daudin)	Chhaparwa, Ataria	VU	Chandra and Pandey, 2004; Chandra, 2006 b
3.	Leith's Frog, *Indirana leithii* (Boulenger)	Diyawan Pahari, Achanakmar	VU	IUCN 2001; Chandra and Pandey, 2004; Chandra, 2006 b
4.	Cricket Frog, *Limnonectes limnocharis* (Boie)	Amarkantak, Chhaparwa, Manjhi-Dongri	VU	Chandra and Pandey,2004; Chandra, 2006 b
5.	*Tomopterna breviceps* (Schneider)	Manjhi- Dongri, Amarkantak, Chhaparwa	C	Chandra and Pandey, 2004
Family: Hylidae				
6.	Marbled Balloon Frog, *Uperodon systoma* (Schneider)	Manjhi -Dongri, Amarkantak, Chhaparwa, Lamni	LR-nt	Chandra and Pandey, 2004; Chandra, 2006 b
7.	*Microhyla ornata* (Dumeril and Bibron)	Manjhi- Dongri, Amarkantak, Chhaparwa, Lamni	C	Chandra and Pandey, 2004
8.	Indian Tree Frog, *Polypedates maculatus* (Grey)	Kewachi, Manjhi- Dongri	LR-lc	Chandra and Pandey, 2004; Chandra, 2006 b
9.	Sacred Grove Bush Frog, *Philautus sanctisilvaticus* Das & Chanda	Amarkantak	CR	Das & Chandra, 1997; IUCN 2001
Family: Bufonidae				
10.	Common Asian Toad, *Bufo melanostictus* Schneider	Amarkantak, Chhaparwa	C	Chandra and Pandey, 2004; Chandra, 2006 b

C= Common, CR= Critically Endangered, LR-nt= Low risk- near threatened, LR-lc= Low risk- least concern, VU= Vulnerable

The population of *Philautus sanctisilvaticus* Das and Chandra, is decreasing and it is categorized as "Critically Endangered" (CR) as per IUCN 2001. Leith`s Frog *Indirana leithii* (Boulenger) and the Cricket frog *Limnonectes limnocharis* (Boie.) are the vulnerable species of amphibians reported from different localities of BR and need attention for the protection.

Reptiles: Reptiles are cold blooded animals. Many species of lizards and snakes belonging to the order lacertilia and squamata exist in the BR. Most of them are insectivorous, excepting a few who feed on amphibians, reptiles, birds and mammals. The species reported from different areas of BR and their status are summarized in the following table 6.

Table 6. Species of lizards and snakes reported from Achanakmar- Amarkantak BR

S.N.	Name of Species	Distribution in BR	Status*	Reference
Family: Gekkonidae				
1.	Kollegal ground gecko, *Cyrtodactylus collegalensis* (Beddome)	Manjhi -Dongri	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
2.	*Hemidactylus brookii* Grey	Chhaparwa, Maniyari river	C	Chandra and Pandey, 2005
Family: Agamidae				
3.	Indian Garden Lizard, *Calotes versicolor* (Daudin)	Diyawan	VC	Chandra and Pandey, 2005
4.	*Psammophilus blanfordanus* (Stoliczka)	Manjhi- Dongri	C	Chandra and Pandey, 2005
5.	Fan Throated Lizard, *Sitana ponticeriana* Cuvier	Marwahi Bharosang, Khudiya dam	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
Family: Scincidae				
6.	Keeled Grass Skink, *Mabuya carinata* (Schneider)	Chhaparwa, Atariya	LR-lc	Chandra and Pandey, 2005
7.	Bronze Grass Shink, *Mabuya macularius* (Blyth)	Maniyari river, Chhaparwa, Atariya	VC	Chandra and Pandey, 2005
Family: Varanidae				
8.	Bengal Monitor, *Varanus bengalensis* (Linnaeus)	Jhandi road, Bilaspur	VU	Chandra and Pandey, 2005
Family: Boidae				
9.	Indian Rock Python,	Khudiya dam, Lamni	LR-nt	IUCN, 2002;

	Python molurus molurus (Linnaeus)			Chandra and Pandey, 2005
Family: Elapidae				
10.	Common Indian Krait, *Bungarus caeruleus* (Schneider)	Atariya	LR-nt	Chandra and Pandey,2005; Chandra, 2006 b
Family: Colubiridae				
11.	Buf -striped Keelback, *Amphiesma stolata* (Linnaeus)	Sarasdol road	LR-nt	Chandra and Pandey,2005; Chandra, 2006 b
12.	Bronzeback tree snake, *Dendrelaphis tristis* Daudin	Sahastradhara	LR-lc	Kalaiarasan *et al*., 1991, Chandra, 2006 b
13.	Common Wolf Snake, *Lycodon aulicus* (Linnaeus)	Satta pani, Bilaspur	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
14.	Indian Rat Snake, *Ptyas mucosus mucosus* (Linnaeus)	Atariya	LR-nt	Chandra and Pandey, 2005; Chandra, 2006 b
15.	Checkered Keel-back Water Snake *Xenochrophis piscator* (Schneider)	Bharosang, Marwahi	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b

* C= Common, LR-nt= Low risk- near threatened, LR-lc= Low risk- least concern, VC= Very common, VU= Vulnerable

Bengal monitor *Varanus bengalensis* (Linnaeus) is a vulnerable species whereas the rock python *Python molurus molurus* (Linnaeus) is Lower risk near threatened category as per IUCN 2002. Common Krait *Bungarus caeruleus* (Schneider), Buf- striped keel back *Amphiesma stolata* (Linnaeus) and Rat snake *Ptyas mucosus mucosus* (Linnaeus) are reported as Lower risk near threatened (LR-nt) by some authors (Chandra and Pandey, 2005, Chandra, 2006 b). The species of snakes like Branded Krait *Bangarus multicinctus* Blyth and the Cobra *Naja naja* (Linn.) are not reported by any authors, though, they are seen during monsoon. Thus, further exploration on this line is also required.

Aves: Aves or birds are warm blooded vertebrates. Feathers on the body assist birds in maintaining an even temperature. They are able to withstand great extremes of climate. As per information from Zoological Survey of India, a large number of birds (Table 7) belonging to 52 families are known from different localities of Achanakmar- Amarkantak BR (Chandra, 2006 b). Most of these birds are common in their status and protected by being placed in schedules as per Wildlife (Protection) Act 1972 (Anon, 1992). A few species, categorized as Critically

Endangered (CR) like the Asian White-backed Vulture *Gyps* (*Paeudogyps*) *bengalensis* (Gmelin); Vulnerable (VU) like the Saras Crane *Grus* (*Antigone*) *antigone* (Linnaeus), Lower Risk –near threatened (LR-nt) like *Aythya nyroca* (Guldenstadt), *Torgos* (*Sarcogyps*) *calvus* (Scopoli) and *Esacus magnirostris recurvirostris* (Cuvier) as per IUCN categorization 2002, also exist in the BR.

Table 7. Different species of birds known from Achanakmar- Amarkantak BR

S.N.	Name of Species	Distribution in BR	Status*	Reference
Family: Anatidae				
1.	Bar-headed Goose, *Anser indicus* (Latham)	Manihari Dam	C	Ali, 1946; Chandra, 2006 b
2.	Pintail, *Anas acuta* Linnaeus	-	C	Ali, 1996; Chandra, 2006 b
3.	Spot Bill Duck, *Anas poecilorhyncha poecilorhyncha* J.R. Forster	Manihari Dam	C	Ali, 1946; Chandra, 2006 b
4.	Gadwall, *Anas strepera strepera* Linnaeus	-	C	Ali, 1996; Chandra, 2006 b
5.	Common Pochard, *Aythya ferina* (Linnaeus)	-	C	Ali, 1996; Chandra, 2006 b
6.	White eyed Pochard or Ferruginous Duck, *Aythya nyroca* (Guldenstadt)	-	LR-nt	IUCN, 2002; Chandra, 2006 b
7.	Tufted Pochard, *Aythya fuligula* (Linnaeus)	-	C	Chandra, 2006 b
8.	The Cotton Teal, *Nettapus coromandelianus* (Gmelin)	Manihari Dam	C	Ali,1946; Chandra, 2006 b
9.	The Comb Duck, *Sarkidiornis melanotos* (Pennant)	Manihari Dam	C	Ali, 1946; Chandra, 2006 b
10.	Brahminy Duck, *Tadorna ferruginea* (Pallas) (Syn. *Casarca ferruginea* (Vroeg.))	-	C	Ali, 1946; Chandra, 2006 b
Family: Alcedimidae (Kingfisher)				
11.	The Common Kingfisher, *Alcedo atthis* (Linnaeus)	-	C	Ali,1946; Chandra, 2006 b

12.	Lesser-Pied Kingfisher, *Ceryle rudis* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
13.	The White-breasted Kingfisher, *Halcyon smyrnensis* (Linnaeus)	-	C	Ali,1946; Chandra, 2006 b
Family: Accipitridae (Hawkers, Eagles)				
14.	The Marsh Harrier, *Circus aeruginosus* (Linnaeus)	-	C	Ali,1946
15.	Black-winged Kite, *Elanus caeruleus* (Desfontaines)	-	C	Ali,1946
16.	Asian White-backed Vulture, *Gyps* (*Pseudogyps*) *bengalensis* (Gmelin)	-	CR	Ali,1946; IUCN, 2002; Chandra, 2006 b
17.	Common Pariah Kite, *Milvus migrans govinda* (Boddaert)	-	C	Ali,1946
18.	The White Scavenger Vulture, *Neophron percnopterus* (Linnaeus)	-	C	Ali,1946
19.	Indian Black Vulture or King Vulture, *Torgos* (*Sarcogyps*) *calvus* (Scopoli)	-	LR-nt	Ali, 1946; ; IUCN, 2002; Chandra, 2006 b
Family:Ardeidae (Egret, Herons)				
20.	The Grey Heron, *Ardea cinerea* (Linnaeus)	-	C	Ali,1946; Chandra, 2006 b
21.	Purple Heron, *Ardea purpurea manilensis* Meyen	-	C	Chandra, 2006 b
22.	Indian Pond Heron or Paddy Bird, *Aredeola grayii grayii* (Sykes)	-	C	Ali,1946; Chandra, 2006 b
23.	Cattle Erget, *Bubulcus ibis coromandus* (Boddaert)	Lamni, Lormi	C	Ali,1946; Chandra, 2006 b
24.	Little Erget, *Egretta garzetta garzetta* (Linnaeus)	Lamni, Lormi	C	Ali,1946; Chandra, 2006 b
Family: Alaudidae (Larks)				
25.	Ashy-Crown Finch Lark, *Eremopterix grisea* (Scopoli)	-	C	Ali, 1946; Chandra, 2006 b

26.	The Crested Lark, *Galerida cristata chendoola* (Franklin)	-	C	Ali,1946; Chandra, 2006 b
Family:Apodidae (Swifts)				
27.	House Swift, *Apus* (*Micropus*) *affinis* Gray	-	C	Ali,1946
28.	White Rumped Spinetail, *Chaetura sylvatica* (Tickell)	-	C	Ali, 1996
Family: Bucerotidae (Hornbills)				
29.	Indian Pied Hornbill, *Anthracoceros malabaricus malabaricus* (Gmelin)	-	C	Ali, 1996; Chandra, 2006 b
30.	Common Grey Hornbill, *Tockus birostris* (Scopoli)	-	C	Ali,1946
Family: Burhinidae (Stone Plovers)				
31.	Stone- Curlew, *Burhinus oedicnemus indicus* (Salvadori)	-	C	Ali,1946; Chandra, 2006 b
32.	Great Stone Plover, *Esacus magnirostris recurvirostris* (Cuvier)	-	LR-nt	Ali, 1996; IUCN, 2002; Chandra, 2006 b
Family: Campiphagidae (Cuckoo-shrikes)				
33.	Large Cockoo Shrike, *Coracina novaehollandia* (Gmelin)	-	C	Ali, 1996
34.	Orange Minivet, *Pericrocotus flammeus flammeus* (Forster)	-	C	Ali,1946; Chandra, 2006b
35.	Small Minivet, *Pericrocotus cinnamomeus cinnamomeus* (Linnaeus)	-	C	Ali, 1996; Chandra, 2006 b
Family: Charadriidae (Sand Piper Snipes)				
36.	Jack snipe, *Capella minima* (Brunnich)	-	C	Chandra, 2006 b
37.	Black tailed Godwit, *Limosa limosa* (Linnaeus)	-	C	Ali, 1996
38.	Sand Piper, *Tringa totanus* (Linnaeus)	-	C	Ali, 1946
39.	Common Sand Piper, *Tringa* (*Actitis*) *hypoleucos* Linnaeus	-	C	Ali, 1946; Chandra, 2006 b

40.	Red Wattled Lapwing, *Vanellus* (*Lobivanellus*) *indicus* (Boddaert)	-	C	Ali, 1946
41.	The Yellow Wattled Lapwing, *Vanellus malabarica* (Boddaert)	-	C	Ali, 1946
Family: Ciconidae (Storks)				
42.	White- necked Stork, *Ciconia* (*Dissoura*) *episcopus episcopus* (Boddaert)	-	C	Ali, 1946; Chandra, 2006 b
Family:Columbidae (Pigeons, Doves)				
43.	Indian Emerald or Bronzewinged Dove, *Chalcophaps indica indica* (Linnaeus)	-	C	Ali, 1996; Chandra, 2006 b
44.	Indian Spotted Dove, *Streptopelia chinensis suratensis* (Gmelin)	Chhaparwa, Lamni, Tilaidobra, Shivtarai	C	Ali,1946; Chandra, 2006 b
45.	Red-Turtle Dove, *Streptopelia tranquebarica* Hermann	-	C	Ali,1946; Chandra, 2006 b
46.	Common Green Pigeon, *Treron* (*Crocopus*) *phoenicoptera phoenicoptera* (Latham)	Achanakmar, Lamni	C	Ali, 1946; Tiwari, 1997; Chandra, 2006 b
Family: Coprimulgidae (Nightjar)				
47.	Jungle Nightjar, *Caprimulgus indicus indicus* Latham	-	C	Ali, 1996; Chandra, 2006 b
48.	The Little Indian Nightjar, *Caprimulgus asiaticus asiaticus* Latham	Throughout BR	C	Ali, 1946; Chandra, 2006 b
49.	Franklin`s or Allied Nightjar, *Caprimulgus affinis monticola* Franklin	-	C	Ali, 1996; Chandra, 2006 b
Family: Coraciidae (Rollers)				
50.	Northern Roller or Blue Jay, *Coracias benghalensis benghalensis* (Linnaeus)	-	C	Ali,1946; Chandra, 2006 b
Family: Corvidae (Crows)				
51.	Indian Jungle -Crow,	Throughout BR	C	Ali,1946; Chandra,

	Corvus macrorhynchos Wagler			2006 b
52.	The House Crow, *Corvus splendens splendous* Vieillot	Amarkantak, Lamni	C	Ali,1946; Chandra, 2006 b
53.	The Tree- Pie, *Dendrocitta vagabunda vagabunda* (Latham)	Amarkantak, Jagatpur	C	Ali,1946; Chandra, 2006 b
Family: Cuculidae (Cuckoos)				
54.	Indian Cuckoo, *Cuculus micropterus micropterus* Gould	-	C	Ali, 1946; Chandra, 2006 b
55.	Common Hawk-Cuckoo or Brain fever Bird, *Cuculus* (*Heirococcyx*) *varius* (Vahl)	-	C	Ali, 1946; Chandra, 2006 b
56.	Pied Crested Cuckoo, *Clamator jacobinus serratus* (Sparrman)	-	C	Ali, 1946; Chandra, 2006 b
57.	The Crow-Pheasant or Coucal, *Centropus sinensis parroti* Stresemann	-	C	Ali, 1946; Chandra, 2006 b
58.	The Koel, *Eudynamys scolopacea scolopacea* (Linnaeus)	Lamni	C	Ali, 1946; Chandra, 2006 b
Family:Dicruridae (Drongos)				
59.	King Crow or South Indian Black Drongo, *Dicrurus adsimilis macrocercus* Vieillot (Syn. *D. macrocercus* Vieillot)	-	C	Ali, 1946; Chandra, 2006 b
60.	Southern Large Racket–tailed Drongo, *Dicrurus paradiseus paradiseus* (Linneus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Emberizidae				
61.	Crested Bunting, *Melophus lathami* (Gray)	-	C	Ali, 1946; Chandra, 2006 b
Family: Falconidae (Falcons)				
62.	The Kestrel, *Falco tinnunculus* Linnaeus	-	C	Ali, 1946; Chandra, 2006 b
Family:Glareolidae (Coursers)				
63.	The Indian Courser, *Cursorius*	-	C	Ali, 1946

	coromandelicus (Gmelin)			
Family: Gruidae (Cranes)				
64.	Saras Crane, *Grus* (*Antigone*) *antigone* (Linnaeus)	-	VU	Ali, 1946; IUCN, 2002; Chandra, 2006 b
Family: Hirundinidae				
65.	Dusky Crag Martin, *Hirundo* (*Riparia*) *concolor* Sykes	-	C	Ali, 1946
66.	The Indian Wire-tailed Swallow, *Hirundo smithii* Leach	-	C	Ali, 1946
67.	Indian Cliff Swallow, *Hirundo fulvicola* Blyth	-	C	Ali, 1996
Family: Irenidae (Ioras)				
68.	Gold fronted Bulbul, *Chloropsis aurifrons* (Temminck)	-	C	Ali, 1946; Chandra, 2006 b
69.	Gold Mantled Chloropsis, *Chloropsis cochinchinensis* (Gmelin)	-	C	Ali, 1996; Chandra, 2006 b
Family: Jacanidae (Jacanas)				
70.	The Pheasant- tailed Jacana, *Hydrophasianus chirugus* (Scopoli)	-	C	Ali, 1946; Chandra, 2006 b
71.	The Bronze- winged Jacana, *Metopidius indicus* (Latham)	-	C	Ali, 1946; Chandra, 2006 b
Family: Laniidae (Shrikes)				
72.	The Bay- backed Shrike, *Lanius vittatus* Valenciennes	-	C	Ali, 1996
73.	The Rufous- backed Shrike, *Lanius schach* Linnaeus	-	C	Ali, 1996
Family: Lariidae (Torus)				
74.	The River Tern, *Sterna aurantia* Gray	-	C	Ali, 1996
Family: Megalaiaedae Or Capitonidae (Barbets)				
75.	Crimson – throated Barbet *Megalaima haemacephala indica* (Latham)	-	C	Ali, 1996; Chandra, 2006 b
76.	Large Green Barbet, *Megalaima zeylanica caniceps* (Franklin)	-		Chandra, 2006 b

Family: Merotidae (Bee Eaters)				
77.	The Common or Green Bee- eater, *Merops orientalis* Latham	-	C	Ali, 1946
Family: Motacillidae (Wagtails & Pipits)				
78.	Indian Tree Pipit, *Anthus hodgsoni* Richmond	-	C	Ali, 1996; Chandra, 2006 b
79.	Paddy Field Pipit, *Anthus novaeseelandiae waitei* Gmelin	-	C	Ali, 1996; Chandra, 2006 b
80.	The White Wagtail, *Motacilla alba alba* Linnaeus	-	C	Ali, 1946
81.	Yellow- headed Wagtail, *Motacilla citreola* Pallas	-	C	Ali, 1996
82.	The Large Pied Wagtail, *Motacilla maderaspatensis* Gmelin	-	C	Ali, 1946
Family:Muscicapidae (Fly catchers)				
83.	The Shama, *Copsychus malabaricus* (Scopoli) (Syn. *Kittacincla malabarica* (Scopoli))	Achanakmar	C	Ali, 1946
84.	The Magpie-Robin or Dhayal, *Copsychus saularis* (Linnaeus)	-	C	Ali, 1946
85.	The Blue Rock- Thrush, *Monticola solitarius pandoo* (Sykes) (Syn. *M. solitaria* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
86.	Tickell`s Redbreasted Blue Fly catcher, *Muscicapa tickelliae tickelliae* (Blyth)	-	C	Ali, 1946; Chandra, 2006 b
87.	Tailor Bird, *Orthotomus sutorius* (Pennant)	-	C	Ali, 1946
88.	The Ashy Wren-Warbler, *Prinia socialis* Sykes	Amarkantak	C	Ali, 1946
89.	Jungle Wren- Warbler, *Prinia sylvatica* Jerdon	-	C	Ali, 1996
90.	White browed Fantail Fly catcher, *Rhipidura* (*Leucocirca*) *aureola aureola* Lesson	-	C	Ali, 1946; Chandra, 2006 b
91.	The Pied Bush- Chat, *Saxicola caprata*	-	C	Ali, 1946

	(Linnaeus)			
92.	The Indian Robin, *Saxicoloides fulicata* (Linnaeus)	-	C	Ali, 1946
93.	Peninsular Indian Paradise Flycatcher, *Terpsiphone paradisi* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Nectariniidae				
94.	Purple Sunbird, *Nectarinia asiatica asiatica* (Latham) (Syn. *Cinnyris asiatica* (Latham)	-	C	Ali, 1946; Chandra,2006 b
95.	Purple- Rumped Sunbird, *Nectarinia zeylonica* (Linnaeus) (Syn. *Cinnyris zeylonica* (Linnaeus))	-	C	Ali, 1946; Chandra, 2006 b
Family: Orioiidae (Orioles)				
96.	Golden Oriole, *Oriolus oriolus kundoo* Sykes	-	C	Ali, 1946; Chandra, 2006 b
97.	The Black headed Oriole, *Oriolus xanthornus* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Paridae				
98.	Indian Grey Tit, *Parus major stupae* Koelz.	-	C	Ali, 1946; Chandra, 2006 b
Family: Phalacrocoracidae (Cormorants, Darters)				
99.	Little Cormorant, *Phalacrocorax niger* (Vieillot)	-	C	Ali, 1946; Chandra, 2006 b
100.	Indian Shag, *Phalacrocorax fuscicollis* Stephens	-	C	Ali, 1946; Chandra, 2006 b
Family: Phasinidae (Pheasants)				
101.	The Common or Grey Quail, *Coturnix coturnix* (Linnaeus)	Achanakmar	C	Ali, 1946; Tiwari, 1997; Chandra, 2006 b
102.	The Painted Partridge, *Francolinus pictus* (Jardine & Selby)	Achanakmar	C	Ali, 1946; Tiwari, 1997; Chandra, 2006 b
103.	South Indian Grey Partridge, *Francolinus pondicerianus pondicerianus* (Gmelin)	Achanakmar	C	Ali, 1946; Tiwari, 1997; Chandra, 2006 b

104.	The Red Jungle-fowl, *Gallus gallus murghi* Robinson & Kloss	Lamni, Achanakmar	C	Ali, 1946; Tiwari, 1997; Chandra, 2006 b
105.	The Common Peafowl, *Pavo cristatus* Linnaeus	Lamni	C	Ali, 1946; Chandra, 2006 b
106.	The Jungle Bush- Quail, *Perdicula asiatica asiatica* (Latham)	-	C	Ali, 1946; Chandra, 2006 b
Family: Picidae (Woodpeckers)				
107.	Northern or Lesser Golden- backed Woodpecker, *Dinopium benghalense benghalense* (Linnaeus) (*Syn. Brachypternus benghalensis*) (Linnaeus)	Achanakmar, Lamni, Tilaidobra	C	Ali, 1946; Chandra, 2006 b
108.	Rufous-Woodpecker, *Micropternus brachyurus phaioceps* Blyth	-	C	Ali, 1996; Chandra, 2006 b
109.	Yellow- fronted Pied, *Picoides mahrattensis mahrattensis* (Latham) (Syn. *Dryobates mahrattensis*) (Lantham))	-	C	Ali, 1946; Chandra, 2006 b
110.	Southern Brown-crowned Pygmy Woodpecker, *Picoides (Dendrocopos) nanus hardwickii* (Jerdon)	-	C	Chandra, 2006 b
Family: Pittidae				
111.	Indian Pitta, *Pitta brachyura brachyura* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Ploceidae a. Passerinae				
112.	Yellow-throated sparrow, *Petronia* (*Gymnorhis*) *xanthocollis* (Burton)	-	C	Ali, 1946
113.	The House- sparrow, *Passer domesticus* (Linnaeus)	Amarkantak, Karanjia, Gorakhpur, Chhaparwa	C	Ali, 1946
b. Ploceinae				
114.	The Baya or Common Weaver-Bird, *Ploceus philippinus philippinus*	-	C	Ali, 1946; Chandra, 2006 b

	(Linnaeus)			
c. Estrildinae				
115.	White- throated Munia, *Lonchura* (*Uroloncha*) *malabarica* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
116.	Spotted Munia, *Lonchura* (*Uroloncha*) *punctulata punctulata* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Podicipedidae (Grebes)				
117.	Dabchick, *Podiceps ruficollis capensis* (Pallas)	-	C	Ali, 1946; Chandra, 2006 b
Family: Psittacidae (Parakeets)				
118.	The Rose-ringed parakeet, *Psittacula krameri manillensis* (Bechstein)	-	C	Ali, 1946; Chandra, 2006 b
119.	Large Indian Parakeet, *Psittacula eupatria eupatria* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
120.	Southern Blossom-headed Parakeet, *Psittacula cyanocephala cyanocephala* (Linnaeus)	-	C	Ali, 1946; Chandra, 2006 b
Family: Pterodidae (Sandgrouse)				
121.	Indian Sandgrouse, *Pterocles exustus erlangeri* (Neuman)	Chhaparwa	C	Ali, 1946; Tiwari, 1997
Family: Pycnonotidae				
122.	Red- vented Bulbul, *Pycnonotus* (*Molpastes*) *cafer humayuni* Deignan	Amarkantak	C	Ali, 1946; Chandra, 2006 b
Family:Rallideae (Hens, Moore)				
123.	The White- breasted Waterhen, *Amaurornis phoenicurus chinensis* (Boddaert)	-	C	Ali, 1946; Chandra, 2006 b
124.	Brown Crake *Amaurornis akool akool* (Sykes)	-	C	Chandra, 2006b
125.	The Coot, *Fulica atra atra* Linnaeus	-	C	Ali, 1946; Chandra, 2006 b
126.	The Indian Moorhen, *Gallinula chloropus indica* (Blyth.)	-	C	Ali, 1946; Chandra, 2006 b

127.	Pulple Moorhen *Porphyrio porphyrio* (Linnaeus)	-	C	Chandra, 2006 b
Fam: Scolopacidae				
128.	Wood snipe, *Gallinago nemoricola* Hodgson	Amarkantak	C	McC.Clive, 1928
Family: Sittidae				
129.	The chestnut- bellied Nuthatch, *Sitta castanea* Lesson	Amarkantak, Jagatpur	C	Ali, 1946; Chandra, 2006 b
Family: Strigidae (Owls)				
130.	Southern Spotted Owlet, *Athene brama brama* (Temminck)	-	C	Ali, 1946; Chandra, 2006 b
131.	The Indian Great Horned - Owl, *Bubo bubo bengalensis* (Franklin)	Lamni	C	Ali, 1946; Chandra, 2006 b
132.	The Brown Fish-Owl, *Bubo* (*Ketupa*) *zeylonensis leschenault* (Gmelin)	-	C	Ali, 1946; Chandra, 2006 b
133.	Southern Mottled Wood-Owl, *Strix ocellata ocellata* (Lesson)	-	C	Chandra, 2006 b
Family: Sturnidae (Myna)				
134.	The Jungle Myna, *Acridotheres fuscus* (Wagler)	-	C	Ali, 1996
135.	The Common Myna, *Acridotheres tristis tristis* (Linnaeus)	Amarkantak, Chhaparwa	C	Ali, 1946; Chandra, 2006 b
136.	Black headed Myna, *Sturnus* (*Temenuchus*) *pagodarum* (Gmelin)	-	C	Ali, 1946; Chandra, 2006 b
Family: Silvidae (Babblers)				
137.	Large- grey Babbler, *Turdoides malcolmi* (Sykes)	-	C	Ali, 1946; Chandra, 2006 b
138.	Peninsular Jungle Babbler, *Turdoides striatus orientalis* (Jerdon)	-	C	Ali, 1996; Chandra, 2006 b
Family : Threskiormithidae (Ibises, Spoon bills)				
139.	Black Ibis, *Pseudibis papillosa papillosa* (Temminck)	-	C	Ali, 1946; Ali, 1996; Chandra, 2006 b

Family: Titonidae (Owls)				
140.	The Barn- or Screech-Owl, *Tyto alba stertens* Hartert	-	C	Ali, 1946; Chandra, 2006 b
Family: Upupidae (Hoopoes)				
141.	The Hoopoe, *Upupa epops* Linnaeus	-	C	Ali, 1946
Family: Zosteropidae				
142.	The White-eye, *Zostrops palpebrosa palpebrosa* (Temminck)	-	C	Ali, 1946; Chandra, 2006 b

* C= Common, CR= Critically endangered, LR-lc= Lower risk least concern, LR-nt= Lower risk near threatened, VU= Vulnerable

Though, the BR is very rich in avifauna, still, **t**here is a controversy on the number of species of birds existing in Achanakmar- Amarkantak BR. Rao and Bhatnagar (2007) reported the existence of 176 species of birds in this BR. Thus, it also provides ample scope for further study.

Mammals: Among mammals, eutherians are highly evolved, perfectly warm blooded animals. In Achanakmar- Amarkantak BR, following 26 species of mammals are distributed in different ranges (Table 8).

Table 8. Different species of mammals reported from Achanakmar-Amarkantak BR

S.N.	Name of Species	Distribution in BR	Status	Reference
Family: Bovidae				
1.	Bison, *Bos gaurus gaurus* Smith	Achanakmar, Marwahi, Lormi, Lamni	VU	Tiwari, *et al*., 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b ; IUCN, 2002; Akhtar & Chauhan, 2007
2.	Nilgai, *Boselaphus tragocamelus* (Pallas)	Achanakmar	LR-lc	Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
3.	Chinkara or Indian gazelle, *Gazella dorcas* (Linnaeus)	Lamni	LR-lc	Chandra, 2006 b
4.	Chausingha or Four horned antelope, *Tetracerus*	Achanakmar, Lamni	VU	Tiwari, *et al*., 1995; Tiwari, 1997; IUCN

	quadricornis (Blainville)			2002
Family: Cervidae				
5.	Spotted deer, *Axis axis axis* (Erxleben)	Achanakmar, Manihari river, Lamni	LR-lc	Tiwari, *et al*., 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
6.	Sambhar, *Cervus unicolor niger* (Blainville)	Achanakmar, Khudia, Kota, Lamni	LR-lc	Tiwari, *et al*., 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
7.	Barking deer, *Muntiacus muntjak* (Zimmermann)	Lamni, Achanakmar	LR-lc	Tiwari, 1995
Family: Suidae				
8.	Wild Boar, *Sus scrofa* Linnaeus	Achanakmar, Marwahi	LR-lc	Tiwari, 1972; Tiwari, *et al*., 1995; Harshey & Chandra, 2001; Chandra, 2006 b; Akhtar & Chauhan, 2007
Family: Canidae				
9.	Asian Jackal, *Canis aureus* Linnaeus	Marwahi, Lamni	LR-lc	Tiwari, *et al*., 1995; Chandra, 2006 b; Akhtar & Chauhan, 2007
10.	Bhediya or Indian Wolf, *Canis lupus pallipes* Sykes	Lamni	LR-nt	Chandra, 2006 b
11.	Indian Wild Dog, *Cuon alpinus* (Pallas)	Lamni	VU	Tiwari, *et al*., 1995; IUCN 2002; Chandra, 2006 b
12.	Lomri or Bengal Fox, *Vulpes bengalensis* (Shaw)	Lamni	LR-nt	Tiwari, *et al*., 1995; Chandra, 2006 b
Family: Felidae				
13.	Jungle Cat, *Felis chaus kutas* Pearson	Lamni	LR-nt	Tiwari, *et al*., 1995; Chandra, 2006 b
14.	Panther or Leopard, *Panthera pardus fusca* (Meyer)	Achanakmar, Marwahi, Lamni	VU	Tiwari, *et al*., 1995; Tiwari, 1997; Chandra, 2006 b; Akhtar & Chauhan, 2007
15.	Tiger, *Panthera tigris* (Linnaeus)	Achanakmar, Lamni	EN	Tiwari, *et al*., 1995; Tiwari, 1997; IUCN 2002; Chandra, 2006 b
Family: Hynaenidqae				

16.	Lakarbaggha or Striped Hyna, *Hyaena hyaena* (Linnaeus)	Marwahi, Achanakmar, Lamni	LR-nt	IUCN 1994; Tiwari, *et al*., 1995; Chandra, 2006 b; Akhtar & Chauhan, 2007
Family: Mustelidae				
17.	Bijoo, or Ratel, *Mallivora capensis indica* (Kerr)	Lamni	LR-nt	Chandra, 2006 b
Family: Scicuridae				
18.	Indian Porcupine *Hystrix indica* (Kerr)	Lamni	LR-lc	Tiwari, *et al*., 1995; Chandra, 2006 b
19.	Five striped palm squirrel, *Funambulus pennati* (Wroughton)	Lamni	LR-lc	Chandra, 2006 b
Family: Leporidae				
20.	Khargosh or Black-naped Hare, *Lepus nigricollis* (F. Cuvier)	Lamni	LR-lc	Chandra, 2006 b
Family: Cercopithecidae				
21.	Bandar or Rhesus Macaque *Macaca mulatta* (Zimmermann)	Lamni, Tilaidobra	LR-lc	Tiwari, *et al*., 1995; Chandra, 2006 b
22.	Langoor or Common Langoor, *Presbytis entellus* (Dufresne)	Lamni, Achanakmar, Shivtarai, Pateta	LR-lc	Tiwari, *et al*., 1995; Chandra, 2006 b
Family: Menidae				
23.	Indian Pangolin, *Manis crassicaudata* (Gray)	-	LR-nt	IUCN 1994; Chandra, 2006 b
Family: Ursidae				
24.	Sloth bear *Melursus ursinus* (Shaw)	Marwahi, Lamni	LR-nt	Tiwari, 1997; IUCN 2002; Chandra, 2006 b; Akhtar & Chauhan, 2007
Family: Muridae				
25.	Chuha or Lesser Bandicoot Rat, *Bandicota bangalensis* (Gray)	-	LR-lc	Chandra, 2006 b
Family: Soricidae				
26.	Chuchundar or House Shrew, *Suncus murinus* (Linnaeus)	-	LR-lc	Chandra, 2006 b
Family: Tragulidae				
27.	Mouse deer, *Moschiola meminna* (Erxleben)	Achanakmar	LR-nt	Tiwari, *et al*., 1995; Chandra, 2006 b

Most of the above species are of low risk (LR) either not threatened (-nt) or least concern (-lc) excepting a few species like the tiger *Panthera tigris* (Linnaeus), which is categorized as Endangered (EN) and the bison *Bos gaurus gaurus* Smith, wild dog *Cuon alpinus* (Pallas) and four horned antelope *Tetracerus quadricornis* (Blainville) as Vulnerable (VU) as per IUCN 2002. Bison *Bos gaurus gaurus* Smith, Indian Wolf *Canis lupus pallipes* Sykes, panther or leopard *Panthera pardus fusca* (Meyer), tiger *Panthera tigris* (Linnaeus) and the Sloth bear *Melursus ursinus* (Shaw) have been protected by listing under schedule I of the Wildlife Protection Act 1972 (Anon., 1992). The sloth bear was categorized as VU as per IUCN 1994. Thus, the BR is very rich in Biodiversity varying the category of mammals from "Lower risk" to "Endangered" species.

Flying squirrel has been seen in Lamni range of the BR, but it has not been reported by any author. Similarly, insectivores like Mole shrew, Musk shrew and Hedgehog, etc. and chiropterans are not reported so far from the various localities of BR. Therefore, there is a scope to explore further on mammals existing in the BR.

C. List of threatened fauna:

Out of nearly 89,317 species of animals described from India (Alfred, 1998), 366 species consisting of 148 species of mammals, 138 species of birds, 32 species of reptiles, 3 species of amphibians, 17 species of pisces and 28 species of invertebrates (12 species of insects, 10 species of crustaceans and 6 species of mollusks) are categorized as "threatened" by IUCN (2002). In Achanakmar- Amarkantak BR, the following 40 threatened species of animals are reported from Lower risk –least concern to critically endangered by different authorities (Table 9).

Table 9. List of threatened fauna from Achanakmar- Amarkantak BR:

S.N.	Name of the species	Class: Family	Status	Reference
1.	*Clarias batrachus* (Linnaeus)	Pisces:Clariidae	VU	Chandra, 2006 b
2.	*Catla catla* (Ham.- Buch.)	Pisces:Cyprinidae	VU	Chandra, 2006 b
3.	Olive Carp, *Puntius*	Pisces:Cyprinidae	VU	Chandra, 2006 b

	sarana sarana (Ham.-Buch.)			
4.	Chital, *Notopterus chitala* (Ham.- Buch)	Pisces: Notopteridae	EN	Chandra, 2006 b
5.	Stinging Catfish, *Heteropneustes fossilis* (Bloch.)	Pisces:Plotosidae	VU	Chandra, 2006 b
6.	Cricket Frog, *Limnonectes limnocharis* (Boie)	Amphibia:Ranidae	VU	Chandra & Pandey, 2004
7.	Indian Skipping Frog, *Euphlyctis cyanophlyctis* (Schneider)	Amphibia:Ranidae	LR-nt	Chandra and Pandey, 2004; Chandra, 2006 b
8.	Indian Bull Frog, *Hoplobatrachus tigerinus* (Daudin)	Amphibia:Ranidae	VU	Chandra and Pandey, 2004; Chandra, 2006 b
9.	Leith's Frog, *Indirana leithii* (Boulenger)	Amphibia:Ranidae	VU	IUCN 2001; Chandra and Pandey, 2004; Chandra, 2006 b
10.	Marbled Balloon Frog, *Uperodon systoma* (Schneider)	Amphibia:Hylidae	LR-nt	Chandra and Pandey, 2004; Chandra, 2006 b
11.	Indian Tree Frog, *Polypedates maculatus* (Grey)	Amphibia:Hylidae	LR-lc	Chandra and Pandey, 2004; Chandra, 2006 b
12.	Sacred Grove Bush Frog, *Philautus sanctisilvaticus* Das & Chanda	Amphibia:Hylidae	CR	Das & Chandra, 1997; IUCN 2001
13.	Kollegal ground gecko, *Cyrtodactylus collegalensis* (Beddome)	Reptilia: Gekkonidae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
14.	Fan Throated Lizard, *Sitana pontericeriana* Cuvier	Reptilia: Agamidae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
15.	Keeled-Grass Skink, *Mabuya carinata* (Schneider)	Reptilia: Scincidae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
16.	Bengal Monitor, *Varanus bengalensis* (Linnaeus)	Reptilia: Varanidae	VU	Chandra and Pandey, 2005; Chandra, 2006 b
17.	Indian Rock Python, *Python molurus molurus* (Linnaeus)	Reptilia: Boidae	LR-nt	Chandra and Pandey, 2005, IUCN, 2002
18.	Common Indian Krait, *Bungarus caeruleus* (Schneider)	Reptilia: Elapidae	LR-nt	Chandra and Pandey, 2005; Chandra, 2006 b
19.	Buf-striped Keelback,	Reptilia: Colubiridae	LR-nt	Chandra and Pandey,

	Amphiesma stolata (Linnaeus)			2005; Chandra, 2006 b
20.	Bronzebacked tree snake, *Dendrelaphis tristis* Daudin	Reptilia: Colubiridae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
21.	Common Wolf Snake, *Lycodon aulicus* (Linnaeus)	Reptilia: Colubiridae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
22.	Indian Rat Snake, *Ptyas mucosus mucosus* (Linnaeus)	Reptilia: Colubiridae	LR-nt	Chandra and Pandey, 2005; Chandra, 2006 b
23.	Checkered Keelback Water Snake *Xenochropis piscator* (Schneider)	Reptilia: Colubiridae	LR-lc	Chandra and Pandey, 2005; Chandra, 2006 b
24.	White eyed Pochard, or Ferruginous Duck, *Anthya ferina* (Linnaeus)	Aves: Anatidae	LR-nt	Chandra, 2006 b
25.	Asian White-backed Vulture, *Gyps* (*Paeudogyps*) *bengalensis* Gmelin	Aves: Accipitridae	CR	Chandra, 2006 b; IUCN, 2002
26.	Indian Black Vulture, or King Vulture, *Torgos* (*Sarcogyps*) *calvus* (Scopoli)	Aves: Accipitridae	LR-nt	Chandra, 2006 b, IUCN, 2002
27.	Great Stone Plover or Beach Thick- Knee, *Esacus magnirostris,* (Cuvier)	Aves: Burhinidae	LR-nt	Ali, 1996; Chandra, 2006 b, IUCN, 2002
28.	Saras Crane, *Grus* (*Antigone*) *antigone* (Linnaeus)	Aves: Gruidae	VU	Ali, 1946; Chandra, 2006 b, IUCN, 2002
29.	Gaur, *Bos gaurus* Smith.	Mammalia: Bovidae	VU	Tiwari, *et al.,* 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
30.	Nilgai, *Boselaphus tragocamelus* (Pallas)	Mammalia: Bovidae	LR-lc	Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
31.	Chinkara or Indian gazelle, *Gazella dorcas* (Linnaeus)	Mammalia: Bovidae	LR-lc	Harshey & Chandra, 2001; Chandra, 2006 b
32.	Chausingha or Four horned antelope, *Tetracerus quadricornis* (Blainville)	Mammalia: Bovidae	VU	Tiwari, *et al.,* 1995; Tiwari, 1997; IUCN 2002

33.	Indian Wild Dog, *Cuon alpinus* (Pallas)	Mammalia: Canidae	VU	Tiwari, *et al.,* 1995; IUCN 2002; Chandra, 2006b
34.	Asian Jackal, *Canis aureus* Linnaeus	Mammalia: Canidae	LR-lc	Tiwari, *et al.,* 1995; Chandra, 2006 b; Akhtar & Chauhan, 2007
35.	Indian Wolf, *Canis lupus pallipes* Sykes	Mammalia: Canidae	LR-nt	Chandra, 2006 b
36.	Lomri or Bengal Fox, *Vulpes bengalensis* (Shaw)	Mammalia: Canidae	LR-nt	Tiwari, *et al.,* 1995; Chandra, 2006 b
37.	Bandar or Rhesus Macaque *Macaca mulatta* (Zimmermann)	Mammalia: Cercopithecidae	LR-lc	Tiwari, *et al.,* 1995; Chandra, 2006 b
38.	Langoor or Common Langoor, *Presbytis entellus* (Dufresne)	Mammalia: Cercopithecidae	LR-lc	Tiwari, *et al.,* 1995; Chandra, 2006 b
39.	Spotted deer, *Axis axis axis* (Erxleben)	Mammalia: Cervidae	LR-lc	Tiwari, *et al*., 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
40.	Sambhar, *Cervus unicolor niger* (Blainville)	Mammalia: Cervidae	LR-lc	Tiwari, *et al*., 1995; Tiwari, 1997; Harshey & Chandra, 2001; Chandra, 2006 b
41.	Barking deer, *Muntiacus muntjak* (Zimmermann)	Mammalia: Cervidae	LR-lc	Tiwari, 1995
42.	Jungle Cat, *Felis chaus kutas* Pearson	Mammalia: Felidae	LR-nt	Tiwari, *et al*., 1995; Chandra, 2006 b
43.	Panther or Leopard, *Panthera pardus fusca* (Meyer)	Mammalia: Felidae	VU	Tiwari, *et al*., 1995; Tiwari, 1997; Chandra, 2006 b; Akhtar & Chauhan, 2007
44.	Tiger, *Panthera tigris* (Linnaeus)	Mammalia: Felidae	EN	Tiwari, *et al*.,1995; Tiwari, 1997; Chandra, 2006 b
45.	Lakarbaggha or Striped Hyna, *Hyaena hyaena* (Linnaeus)	Mammalia: Hynaenidae	LR-nt	Tiwari, *et al.,* 1995; Chandra,2006 b; Akhtar & Chauhan, 2007
46.	Khargosh or Black-naped Hare, *Lepus nigricollis* (F. Cuvier)	Mammalia: Leporidae	LR-lc	Chandra, 2006 b
47.	Indian Pangolin, *Manis crassicaudata* (Gray)	Mammalia: Menidae	LR-nt	Chandra, 2006 b
48.	Chuha or Lesser	Mammalia: Muridae	LR-lc	Chandra, 2006 b

	Bandicoot Rat, *Bandicota bangalensis* (Gray)			
49.	Bijoo, or Ratel, *Mallivora capensis indica* (Kerr)	Mammalia: Mustelidae	LR-nt	Chandra, 2006 b
50.	Indian Porcupine *Hystrix indica* (Kerr)	Mammalia: Scicuridae	LR-lc	Tiwari, *et al.,* 1995; Chandra, 2006 b
51.	Five striped palm squirrel, *Funambulus pennati* (Wroughton)	Mammalia: Scicuridae	LR-lc	Chandra, 2006 b
52.	Chuchundar or House Shrew, *Suncus murinus* (Linnaeus)	Mammalia: Soricidae	LR-lc	Chandra, 2006 b
53.	Wild Boar, *Sus scrofa* Linnaeus	Mammalia: Suidae	LR-lc	Tiwari, 1972; Tiwari, *et al.,* 1995; Harshey & Chandra, 2001; Chandra, 2006 b; Akhtar & Chauhan, 2007
54.	Mouse deer, *Moschiola meminna* (Erxleben)	Mammalia: Tragulidae	LR-nt	Chandra, 2006 b
55.	Sloth bear *Melursus ursinus* (Shaw)	Mammalia: Ursidae	LR-nt	Tiwari, *et al*., 1995; Tiwari, 1997; IUCN 2002; Chandra, 2006 a; Akhtar & Chauhan, 2007

D. Scientific information published:

After consultation with the various scientific journals and books on wildlife of India, the information published on fauna of Achanakmar – Amarkantak BR is summarized year wise as hereunder**:**

McC. Clive, J. 1928. Occurrence of wood snipe in Central Provinces. ***Journal of Bombay Natural History Society,*** **32**(2): 600.

Abstract: The author reported the distribution of Wood Snipe, *Gallinago nemoricola* Hodgson at Amarkantak.

Saharia, V.B. 1982. Wildlife in India. Natraj Publishers, Dehra Dun, 278 pp.

Abstract: The author described different national parks and sanctuaries existing in India. The species of mammals prevalent in Achanakmar wildlife sanctuary are mentioned as examples.

Kalaiarasan, V. Rathinasabapathy, B., Tamilarasan, P., Aengals, R. and Ganesh Prasanna, A.J. 1991. Reptiles of Narmada Valley. *Cobra,* **40**: 8-12.

Abstract: Report based on the study made by the Madras Snake Park Trust Research team during October- November 1990 at Narmada Valley in Madhya Pradesh, showed the presence of Bronzeback tree snake, *Dendrelaphis tristis* from bark of a dried teak tree near Sahasradhara beside many other species recorded from the valley.

Tiwari, K.P.; Pandey, R.K., Date, G.P., Prasanth, K.P. and Goswami Ashok. 1995. Preliminary report on flora of Amarkantak for detailed project formulation to constitute Amarkantak Biosphere Reserve. *A report submitted to Enviroment Planning and Coordination Organization*, Bhopal. State Forest Research Institute, Polipather, Jabalpur. 94 pp.

Abstract: A preliminary report on survey and documentation of flora & fauna of Achanakmar Wildlife sanctuary was submitted to EPCO, Bhopal for the proposed Biosphere Reserve. The work was carried out in Amarkantak plateau and within the boundaries of the BR.

Tiwari, S.K. 1997. Wildlife sanctuaries of Madhya Pradesh. APH Publishing corporation. Daryaganj, New Delhi, 139pp.

Abstract: The author has reported peacock, jungle fowl, patridges, green pigeon, quails and sand groves as common birds of Achankamr Sanctuary consisting of Achanakmar, Lamni and Game ranges. Tigers, bison, panther, deer, sambhar, spotted deer, antilopes, blue bull and pigs

were the mammals known from the area. Sambhar which was gradually disappearing reported from hilly tracts of Khudia, Kota and Lamni ranges.

Anonymous, 1997. Report of the Committee for Sal Borer Affected Areas of M.P. Submitted to Ministry of Environment and Forests, Government of India, New Delhi. December 1997.

Abstract: On the basis of visits of the committee to various sal forests of Madhya Pradesh including Amarkantak and Bajag ranges, sal trees were found badly damaged by sal heartwood borer, *Hoplocerambyx spinicornis* Newman. The population of the borer depends on a number of biotic and abiotic factors. The insect completes one generation in a year. A predator *Alaus sordidus* preys on the grubs of the sal borer. The remedial measures have been recommended for the protection of sal from the attack of this borer.

Das, I. and Chandra, S.K. 1997. *Philautus sanctisilvaticus* (Anura: Rhacophoridae) A New Frog from the Sacred Groves of Amarkantak, Central India. *Hamadryad,* 22:21-27.

Abstract: The authors have identified a new species of frog from Amarkantak.

Harshey, D.K. and Chandra, K. 2001. Mammals of Madhya Pradesh and Chhattisgarh. ***Zoos'Print Journal*, 16**(12): 659-668.

Abstract: A comprehensive account of mammals of Madhya Pradesh and Chhattisgarh is given, which includes an annonated list of mammals of these two states with current district-wise distribution and global/national threatened status. A complete bibliography of mammals of Madhya Pradesh and Chhattisgarh is also provided

Roychoudhury N., Sambath, S. and Joshi, K. C. 2004. Girth class of *sal* trees prone to the attack of heartwood borer, *Hoplocerambyx spinicornis* Newman (Coleoptera:Cerambycidae). *Indian Forester,* 130 (12):1403-1409.

Abstract: An experiment was laid out in Sal forest at Jagatpur under Karanjia range of Mandla division during the recent epidemic of Sal heartwood borer, *Hoplocerambyx spinicornis*, Newman, in Madhya Pradesh, with a view to find out the girth class preference of the insect in Sal trees and subsequent mortality. Results based on four years observations revealed that total percent mortality of Sal trees due to borer attack was 5.17% in experimental plot. The results reflect the post effect of Sal borer epidemics. The borer attack was noticed from the girth class more than 61-90cm (4.24%), 91-120cm (5.08%) and finally peak in 121-150cm (6.78%) and then declined in girth class above 151cm (3.12%). Further, the frequency distribution of girth class of Sal trees and tree mortality due to borer attack exhibited maximum mortality in 102-116 and 117-131 cm ranges. These findings clearly advocate the girth class preference by borer beetles in Sal forests.

Chandra, K. and Pandey, V. K. 2004. Notes on Anuran Fauna of Achanakmar Wildlife Sanctuary. *Cobra,* 57: 32-37**.**

Abstract: The paper deals with the study of Anuran fauna of Achanakmar range earlier known as Wildlife Sanctuary, Chhattisgarh. It includes nine species viz. *Bufo melanostictus* Schneider, *Euphylictus cyanophylictus* (Schneider), *Hoplobatrachus tigerinus* (Daudin), *Hyla maculata* (Gray) , *Indirina leithii* (Boulenger), *Limnonectus limnocharis* (Boie), *Microhyla ornata* (Dumeril & Bibron), *Tomopterna breviceps* (Schneider), *Uperodon systoma* (Schneider) pertaining to nine genera and four families. All the species are new record to the fauna of earlier known Achanakmar Wildlife sanctuary which is now the core area of the biosphere reserve.

Chandra, K. and Gupta, S. K. 2005. Record of Monster Cricket, *Schizodactylus monstrosus* (Drury) (Aschizodactylidae: Orthoptera) from Chhattisgarh. *Insect Environment*, 11(2):56**.**

Abstract: A monster cricket *Schizodactylus monstrosus* (Drury) the lone representative of the family Schizodactylidae is India and recorded from the Maniyari river of Achanakmar-Amarkantak Biosphere Reserve. It is the Ist record, collected by Zoological Survey of India in the month of July 2004 during their faunistic survey.

Chandra, K. and Pandey, V. K. 2005. Reptilia of Achanakmar Wildlife Sanctuary, Chhattisgarh. *Cobra,* 60: 1-5.

Abstract: The present paper deals with the study of reptiles from the Achanakmar. The paper gives information on 14 species viz. *Amphiesma stolata* (Linnaeus), *Bungarus caeruleus* (Schneider), *Calotes versicolor* (Daudin), *Cyrtodactylus collegalensis* (Beddome), *Hemidactylus brooki* Gray, *Lycodon aulicus* (Linnaeus), *Mabuya carinata* (Schneider), *Mabuya macularia* (Blyth), *Psammophilus blanfordanus* (Stoliczka), *Ptyas mucosus* (Linnaeus), *Python molurus* (Linnaeus), *Sitana ponticeriana* Cuvier, *Varanus bengalensis* (Linnaeus), *Xenochrophis piscator* (Schneider) belonging to 13 genera and seven families. Kollegal ground gecko *Cyrtodactylus collegalensis* (Beddome) has been recorded for the first time from Chhattisgarh.

Chandra, K. and Gajbe, P. U. 2005. An inventory of herpetofauna of Madhya Pradesh and Chhattisgarh. *Zoos' Print Journal,* 20(3): 1812-1819.

Abstract: A comprehensive account of the herpetofauna of Madhya Pradesh and Chhattisgarh has been provided, which includes an annonated list of 104 species of amphibians and reptiles along with their distribution in the districts and protected areas. The IUCN status of endangered species and a complete biography are also provided.

Chandra, K. 2006 a. Scarabaeid Beetles of Achanakmar Wildlife Sanctuary, Chhattisgarh. *Rec. Zoological Survey of India* (Communicated).

Abstract: Achanakmar, a core area of Biosphere Reserve, is located in Bilaspur district of Chhattisgarh state. Its valley has ideal habitats of many rare and medicinally important plant species. The sanctuary possesses rich diversity of fauna and flora. The present paper deals with an account of 22 species of scarabaeid beetles *viz. Hybosorus orientalis* Westwood, *Adoretus bimarginatus* Ohaus, *Adoretus lasiopygus* (Burmeister), *Adoretus limbatus* Blanchard, *Anomala biharensis* Arrow, *Anomala dorsalis* (Fabricius), *Anomala ruficapilla* (Bermeister), *Anomala*

rugosa Arrow, *Catharsius molossus* (Linnaeus), *Catharsius sagax* Queensland, *Clinteria klugi* (Hope), *Gymnopleurus sinuatus* (Oliv.), *Gymnopleurus cynaeus* (Fabricius), *Gymnopleurus gemmatus* Harold, *Heliocopris bucephallus* (Fabricius), *Holotrichia problematica* Brenske, *Mimela inscripta* (Nonfried), *Onthophagus bonasus* (Fabricius), *Onthophagus catta* (Fabrisius), *Onthophagus pactolus* (Fabricius), *Phyllognathus dionysius* Fabricius, *Scarabaeus sanctus* Fabricius belonging to 12 genera and six subfamilies collected from the sanctuary. All these species are recorded for the first time from Achanakmar area of Biosphere Reserve.

----------. 2006 b. Threatened Animals of Madhya Pradesh and Chhattisgarh. *Indian J. Trop. Biodiv.,* **14** (2): 97-122.

Abstract: The paper includes the complete list of threatened species of mammals, birds, reptiles, amphibians and fishes known to occur in these two states. Their status in different schedules under Wildlife (Protection) Act, 1972 and in IUCN categories is incorporated. The cause of extinction and the extinct species in India are also given.

Chandra, Kailash, Nema, D.K. and Singh, Shivesh Pratap. 2006. On a Collection of Moths from Achanakmar Wildlife Sanctuary, Chhattisgarh. ***National Journal of Life Sciences*****, 3** (2): 183-189.

Abstract: During the extensive survey of Achanakmar Wildlife Sanctuary, now core region of Biosphere Reserve by the scientific team of Zoological Survey of India, Jabalpur between 2004 to 2005, collected thirty four species of moths belonging to 32 genera under 13 families. All these species viz. *Actias selene* (Hubner), *Aganodes ostentalis* Hubner, *Antheraea paphia* (Linnaeus), *Asota caricae* (Fabricius), *Cerura liturata* Walker, *Clanis* sp., *Creatonotus lactineus* Cramer, *Diaphania indica* (Saunders), *Episparis varialis* Walker, *Euproctis* sp., *Eupterote* sp., *Fodina* sp., *Polytela gloriosae* Fabricius, *Hyposidra talaca* (Walker), *Macaria fasciata* Fabricius, *Macrobrochis gigas* (Walker), *Marumba dyras dyras* (Walker), *Mimeusemia* sp., *Nausinoe geometralis* (Guenee), *Olepa ricini* (Fabricius), *Oxymbulyx* sp., *Parasa* sp., *Phalera raya* Moore, *Phissama transiens* (Walker), *Psilogramma menephron menephron* (Cramer), *Sameodes cancellalis* Zeller, *Spoladea recurvalis* (Fabricius), *Theretra alecto alecto* (Linnaeus) , *Theretra boisduvali* (Bugnion), *Theretra oldenlandiae oldenlandiae* (Fabricius), *Trisula variegata* Moore, *Tyspanodes linealis* Moore , *Xyleutus strix* (Linnaeus), *Zeuzera* sp., are new record to the fauna of the sanctuary as well as to the fauna of Chhattisgarh.

Singh, Ajeet and Chandra, Kailash 2006. Study on the Species Composition and Diversity of Butterflies (Lepidoptera: Insecta) In Achanakmar Wildlife Sanctuary, Chhattisgarh. (In press).

Abstract: The present investigation deals with the studies on the species composition and diversity of butterflies in Achanakmar Wildlife Sanctuary. Butterflies are the most important ecological indicators which were studied from an ecological sensitive area falling in the core zone of proposed Amarkantak Biosphere Reserve. Species composition and diversity of butterflies from Achanakmar Wildlife Sanctuary was studied during June and July 2004. A total of 49 species of butterflies *viz*., *Abisara echerius* (Stoll), *Anapheis aurota aurota* (Fabr.), *Athyma perius* (Linn.), *Athyma selenophora* (Kollar), *Badamia exclamationis* (Fabr.), *Caltoris farri* (Moore), *Caltoris kumara* (Moore), *Caprona ransonnetti* (Felder), *Castalius rosimon*

rosimon (Fabr.), *Catopsilia crocale* (Cramer), *Catopsilia pyranthe pyranthe* (Linn.), *Catposilia pomana* (Fabr.), *Charaxes fabius ceryathus* Fruhstorfer, *Chilasa clytia* (Linn.), *Danaus chrysippus chrysippus* (Linn.), *Danaus genutia* (Cramer), *Danaus limniace leopardus* (Butler), *Euchrysops phasius* Evans, *Euploea core core* (Cramer), *Eurema hecabe simulata* Moore, *Eurema laeta laeta* Boisduval, *Graphium nomius nomius* (Esper), *Hypolimnas bolina* (Linn.), *Hypolimnas misippus* (Linn.), *Melanitis leda ismene* (Cramer), *Moduza procris procris* (Cramer), *Mycalesis lepcha davisoni* Moore, *Mycalesis mineus* (Linn.), *Narathura amantes* (Hewitson), *Narathura atrax atrax* (Hewitson), *Neptis hylus* (Linn.), *Neptis jumbah* (Linn.), *Papilio demoleus demoleus* Linn., *Papilio polytes romulus* Cramer, *Phaedyma columalla* (Cramer), *Phalanta phalanta* (Drury), *Precis almana almana* (Linn.), *Precis atlites* (Linn.), *Precis hierta hierta* (Fabr.), *Precis iphita iphita* (Cramer), *Precis lemonias lemonias* (Linn.), *Precis orithya swinhoei* Butler, *Rapala airbus sorya* Koller, *Spialia galaba* (Fabr.), *Spindasis vulcanus vulcanus* Fabr, *Suastus gremius* Fabr., *Symphaedra nais* (Forster), *Udaspes folus* (Cramer). *Syntracus plinius* (Fabr.), belonging to 8 families were recorded. Nymphalidae was the dominant family with 17 species followed by Lycaenidae (7), Hesperiidae (7), Pieridae (6), Danidae (4), Papilionidae (4), Satyridae (3), and Riodinidae (1). *Catopsila pomona* (Fabr.) was the most dominant species, while *Charaxes fatius cerynthus* Frustorfer was the rarest species recorded from the Achanakmar Wildlife Sanctuary area. Total species diversity of butterflies during June, 2004 to July, 2004 was 3,486.

Joshi, K.C., Roychoudhury, N. Kulkarni, N. and Sambath, S. 2006. Sal Heartwood Borer in Madhya Pradesh. *Indian Forester,* 132 (7):799-808.

Abstract: *Shorea robusta*, which is one of the most important timber species of India, yields about 2.5 lakh m^3 of timber and 3 lakh m^3 of firewood. A heartwood borer, *Hoplocerambyx spinicornis*, often damages it in sal areas of Jagatpur in Karanjia range of M.P. and in Lamni range of Bilaspur forest division of BR in Chhattisgarh. Its beetles emerge soon after a few showers of monsoon rains from the third week of June to the end of August. They attract to the odour of freshly cut bast and sapwood of sal. Soon after mating, the beetle oviposit white, cream coloured eggs in cracks on the bark. After 3-7 days of egg period, the hatching takes place. The freshly hatched grubs bore the bark and reach to the sapwood, where they form tunnels. After feeding the sapwood, the grubs move to heartwood where they form a wider pupal chamber, the grubs start pupation from December onwards, develop to immature beetles between April to May and emerge out from middle June onwards during monsoon. The male has long antennae than their body while the female has short antennae. The incidence of attacked sal trees due to heartwood borer lasts up to 24.53 per cent during epidemics. Continuous favourable climate conditions, vicinity of human and herbivore population, physiological properties of sal trees to insect borer, quantitative and qualitative changes in host trees, natural enemies of sal borer and weakening of defensive system of sal trees are recorded as probable factors responsible for sal borer epidemics. Borer killed more than 26 lakhs of sal trees during recent sal borer epidemics between 1996-02. Felling of these attacked sal trees in dense sal forest opened the canopy and resulted an average regeneration up to 4.18 saplings per squire meter of sal and other miscellaneous species as compared to 1.95 saplings per squire meter unfilled sal areas. In human inhabitant areas however, it is reported to be comparatively low. Besides existing preventive and remedial control measures, the authors have advocated spraying of 0.05 % endosulfan 3.5 ml insecticide per litre of water or chlorpyriphos 0.05 % (10 ml insecticide/ litre) on stored borer

attacked sal stacks in June before onset of monsoon and then covering them with polythene sheets to kill the beetles emerging from sal logs. Further research need on sal heartwood borer, its out break and management are also mentioned.

Khanna, V. 2006. A checklist of centipedes (Chilopoda: Scolopendromorpha) from Central India. ***Zoos' Print Journal,*** **21** (2): 2164-2166.

Abstract: The paper deals with a collection of scolopendrid collected by scientists of Central Regional Station, Zoological Survey of India, Jabalpur from Amarkantak Biosphere Reserve and adjoining areas in Chhattisgarh and Madhya Pradesh. The author listed 5 species of centipedes from different localities of BR.

Chandra, Kailash 2007. Faunal Diversity of Achanakmar - Amarkantak Biosphere Reserve. Paper presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, held on 30 April 2007, *Tropical Forest Research Institute*, Jabalpur: 24.

Abstract: Achanakmar-Amarkantak Biosphere Reserve (AABR) is located in Central India. The major part of AABR lies in Chhattisgarh *i.e*. in Achanakmar Wildlife Sanctuary, Bilaspur district and the remaining part of the area extends into the Dindori and Shahdol districts of Madhya Pradesh. The area falls in 6th bio-geographical zone and province 6A, "Deccan Peninsula-Central Highlands".

While working on a multidisciplinary project on 'Studies on the biological resources and documentation of traditional knowledge of Achanakmar-Amarkantak Biosphere Reserve, Chhattisgarh and Madhya Pradesh' funded by the Ministry of Environment and Forests, New Delhi, for the last three years, Zoological Survey of India has carried out the study on faunal diversity of the AABR and the data on various groups of animals from different habitats are collected.

Among the vertebrates, except fishes, data on mammals, birds, reptiles and amphibians are recorded, while the invertebrates are collected and brought to the laboratory for the identification. Although, information of more than 600 species are collected, but presently 414 species belonging to 13 groups of animals including 169 vertebrates and 245 invertebrates are identified and the remaining are still in process of determination.

AABR is very rich in natural resources but a few studies have been carried out on the status of bio-resources. Thus, there is an urgent need to evaluate the availability of bio-resources and their sustainable utilization to conserve it for the future generations.

Kulkarni N., Soni K.K. and Joshi K.C. 2007. Assessment of Biotic and Abiotic Factors Responsible for Out-Break of the Sal Heartwood Borer, *Hoplocerambyx spinicornis* **Newman in Selected Areas of Achanakmar-Amarkantak Biosphere Reserve.** Paper

presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, on 30 April 2007, Tropical Forest Research Institute, Jabalpur: 29

Abstract: *Sal* (*Shorea robusta*) is an important tree species in India, and dominates other miscellaneous associate tree species in Achanakmar-Amarkantak Biosphere Reserve. This tree species has been facing reoccurring epidemics of the sal heartwood borer (*Hoplocerambyx spinicornis* Newman). Affected trees succumb to the damage leading to heavy economic losses due to the poor quality of timber, with subsequent tree mortality. Recent epidemic from 1996 to 2000, which covered considerable part of Achanakmar-Amarkantak Biosphere Reserve, also compelled to remove affected trees for maintaining the forest hygiene. There being no reliable control method available for the pest except tree trapping, prevention is the better option over remedial measures and also as an integrated approach to manage the pest population within endemic level. Recent observations have indicated that the environment along with local biotic factors could play a major role in determining population build-up of the pest. Despite the above realization, there is no systematic study available to substantiate the possible role of environmental conditions and local biotic factors in reoccurring epidemics in the region of Achanakmar-Amarkantak biosphere reserve. Moreover, such studies need to be taken up repeatedly during the non-epidemic periods also to understand the interaction of biotic and abiotic factors with pest resurgence in a better way. It will be useful in monitoring the pest resurgence in the future. Considering the above the assessment of local biotic and abiotic factors on the population of sal heartwood borer in the areas having history of epidemic is the urgent research need. This concept note invites attention on these aspects of the research need in Achanakmar-Amarkantak Biosphere Reserve.

Rao R.J. and Bhatnagar Abhishek 2007.**Amarkantak Biosphere Reserve: A biological hot spot.** Paper presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, on 30 April 2007, *Tropical Forest Research Institute*, Jabalpur: 22- 23

Abstract: Amarkantak region in the States of Madhya Pradesh and Chattisgarh is one of the important wilderness areas in Central India. The elegant, tranquil pilgrim resort of Amarkantak nestles on the mighty lap of the Maikal hills and forms the cradle of the Narmada, Son and Johila Rivers. Amarkantak has tropical sub-montane grassland with its flora similar to those of Central Indian Sub-tropical hill forests. Its floral type bears a close resemblance to the northwest and Central Himalayan flora. The diverse flora of the forests in this region include Sal, the dominant tree species; saja, sagun, bija, boira, pipal, neem, mahua, tinsa, lac, chironji, tendu, *Eucalyptus*, rubber and other medicinal plants. The Amarkantak Range harbours more than 33 species of flora of medicinal importance with a density of 43420 plants per hectare. The important medicinal plants are, kali musli, safed musli, satawar, jungli adarak, jungli haldi, brahmi, jungli pyaz, tikhur, madhukamni, hath kand, kamraj, tejraj, sarpgandha, gulbakawali, etc. The different parts of these medicinal plants are used in the form of medicines and are of immense value. The Amarkantak-Achanakmar Biosphere Reserve (AABR) is declared in Central India in recognition of the unique cultural heritage and significant natural environment, strengthened by regional initiatives that seek to balance protection of the environment with a sustainable regional economy. The Amarkantak and surrounding ranges in the Madhya Pradesh and Chhattisgarh are

good habitats for large number of wild animals including tiger, leopard, sloth bear, bison, deer, sambhar, jackal, fox, monkey, flying squirrel, many resident and migratory birds, snakes, lizards, turtles, variety of frogs, fishes and other invertebrates. The species diversity in Amarkantak-Achanakmar Biosphere Reserve is very rich, faunal species found in the reserve includes mammals (27), birds (176), reptiles (26), amphibians (11), butterflies (19), honey bees (3) and number of other invertebrates and among flora, large trees (75), small trees (28), shrubs and under shrubs (63), and grasses (20) species are present.

Research studies should be conducted for better management of the AABR. Priorities should be given to traditional ecological approaches, phyto-sociological studies and food-web research in the ABR. The priority should be put on pre-requisite a sound monitoring and assessment base and careful, in-depth studies on forest ecosystems rather than a superficial and broad-brush approach. Future research could be divided into two categories like in-depth studies of biodiversity and sustainable use of natural resources.

Shrivastav, A.B. 2007. Conservation of Wild Fauna Needs Scientific Wildlife Health Management. Paper presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, on 30 April 2007, *Tropical Forest Research Institute*, Jabalpur: 25-26.

Abstract: India has the largest livestock population in the world (0.692 billion, FAO Animal Health Year book, 1988) and contributes about 7% towards national income. According to a conservative estimate, animal diseases reduce production in India by 30-40%. The quality of livestock around the wildlife areas is poor in terms of health and production. Agriculture development has brought domestic and wild animals together to share common grassland. It has increased the chances for sharing and exchanging certain infectious diseases. A critical objective for understanding disease occurrence and impacts in wild and domestic animals is pursuit of studies to determine the relationships of various diseases shared between wild animals and livestock.

Biodiversity is a valuable asset, which provides insurance and investment to sustain agriculture, forestry, livestock, fisheries and microbes. India is one of the 12-mega biodiversity regions of the world and share 8% world's total biodiversity of flora and fauna. Biodiversity in MP is threatened due to adverse climate, biotic pressure especially uncontrolled grazing, habitat destruction, and livestock diseases**.**

The study of "Wildlife Health" and the practice of 'Wildlife Health Management' are new disciplines in India. There is growing need for such wildlife health inputs in the rapidly expanding network of protected areas. Some of the most significant threats facing wildlife today are health related. It is emphasized that wildlife can also be a reservoir of number of infectious and parasitic diseases, that may be transmitted to domestic animals at the time of sharing common grasslands and water holes. There are number of examples where the diseases were responsible for high percentage of morbidity and mortality. Some diseases may affect the population dynamics by death of young ones, abortions and poor health.

Apart from these, wild carnivores may be a source of certain zoonotic diseases such as Rabies. If the infectious diseases in wild animals are closely monitored, and kept under surveillance, then this will have a direct bearing on the health and welfare of domestic animals

also. Till recent past the wildlife health discipline was ignored in the country. Though, number of veterinarians with limited knowledge engaged for veterinary assistance to wildlife. Thus, there is an urgent need for trained personnel in protected areas and surveillance of diseases in protected areas.

Ganguli Jaya Laxmi, Ganguli R. N. and Shukla B.C. 2007. Pest Scenario of Agro-Forestry Trees in Plantations of Chhattisgarh. Paper presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, on 30 April 2007, *Tropical Forest Research Institute,* Jabalpur: 27-28.

Abstract: Chhattisgarh popularly known as the herbal state has a forest canopy of around 46 per cent. The natural forests include tree species like Teak, *Tectona grandis*; Sal, *Shorea robusta*, Shisham, *Dalbergia sisoo*; Arjun, *Terminalia arjuna*; Palas, *Butea monosperma;* babool; *Acacia nilotica; Ziziphus spp*. etc,. Apart from these a large number of fast growing, multipurpose tree species have been identified which establishes easily with agricultural crops under it. These are best suited for the practice of agro-forestry, a boon for the poor and marginal farmers of the state and for conservation of natural resources for sustainable agriculture for the future. The trees commonly preferred by farmers and plantation growers are Khamar, *Gmelina arborea*; Eucalyptus, *Eucalyptus teriticornis*, Teak, *Tectona grandis*, Safed and Kala Siris, *Albizia procera* and *A. lebek*, bamboo, *Dendrocalamus strictus*, A*cacia mangium,* etc.. Apart from these, the bio-diesel yielding plant, *Jatropha curcas* is also highly preferred along with some medicinal plants like Aonla, *Emblica officinalis* and Meetha neem, *Murraya koenigii*. The best advantage of these species are that they have a narrow canopy and a number of herbs like turmeric, ginger and other medicinal and aromatic plants can easily be grown underneath it.

One of the major constraints in the successful growth of agro-forestry trees in the state are the attack by a number of insect pests. An attempt was made to study and identify the insect pests which cause economic loss to the plantation trees and have been categorized as major and minor pests based on their incidence. The extent of losses caused by majority of these insects is yet to be studied.

Akhtar Naim and Chauhan N.P.S. 2007. **Status of Human-Wildlife Conflict and Mitigation Strategies in Marwahi Forest Division, Bilaspur Chhattisgarh**. Paper presented in Workshop on Research Needs for Achanakmar-Amarkantak Biosphere Reserve, on 30 April 2007, *Tropical Forest Research Institute*, Jabalpur: 30-31

Abstract: Marwahi Forest Division has been well known for human-sloth bear conflict. Available forest cover is highly degraded, fragmented and interspersed with agriculture crop fields, and small townships. The study area lies between one of the oldest mountain chains of India i.e. Vindhya or Maikal range. Wildlife Institute of India, Dehradun had conducted a study during 1998-2000 and concluded with recommendations i.e. translocation of sloth bear population from isolated den sites to other suitable areas, restoration of sloth bear habitat in degraded areas, protection of large contiguous forests, sustainable use of forest resources and easy mechanism of compensation for the people to their crop and lives loss caused by bear. Marwahi Forest Division was visited again during 2006 to find the changes in status of human-wildlife conflict.

Data since 1990 onwards revealed 28 cases of human death by wild animals, comprising of 13 men and 15 women. Except 2, all casualties were caused by sloth bear. 801 incidences of human mauling comprised of 591 men and 210 women were registered by Forest department. Maximum 528 incidences of mauling were caused by sloth bear followed by 220 and 53 by jackals and other wild animals (leopard, hyena, wild pig, gaur etc.) respectively. Occurrence of mauling in human across the different months was not significantly different ($Z=0.813$, $n=12$, $p= 0.52$). Range of incidences per month varied 51-93 with the mean 66.8 ± 14.8, whereas occurrences of mauling incidences in men and women ($T=12.13$, $DF=11$, $p= 0.00$) were significantly different. In Marwahi range 72.5% incidences of human mauling were occurred in village area followed by 18.5% and 9.0% in forest and house respectively. Altogether 1453 incidences of livestock lifting were recorded in Marwahi forest division. No major changes were observed in extent of biotic pressure as compared to last study. However, extraction of stones from bear den sites has been increased considerably.

Except translocation of sloth bear population from isolated den sites, most of the recommendations suggested earlier are still valid. Moreover, people need to be educated and aware for ecology, feeding habits, movement and behaviour of problematic animals such as sloth bear, jackal, hyena and leopard through seminars, workshop and chat shows so that people can avoid confrontation and play role in conservation. Stone extraction from all bear areas or forest land should be immediately stopped to protect sloth bear and other animal habitats. Livestock should be properly protected by villagers in enclosures made up of rubble wall. Sloth bear population has declined by 40% during last six years so there is need to monitor the status of sloth bear population in the area.

II. Updated list of fungi recorded from BR:

As per the documented information given in BRIS Volume 1 Part I, only 81 species of the fungi are known from the BR. Recently, a few more species of fungi have been recorded (Patel *et al*., 2002; Verma and Soni, 2007) from different localities of the BR. The updated list of the fungi, including their habitat, distribution in BR and status is given in the following table:

Table 1. Updated list of fungi from Achanakmar- Amarkantak BR

S.N.	Species name	Locality	Habitat	Sta-tus	Reference
Fungi: Perfecti **Fam: Absidiaceae**					
1.	*Absidia butleri* Lendner	Amarkantak	Soil fungus	C	Shettyi,1957
2.	*Absidia corymbifera* (Cohn.)	Achanakmar	Soil fungus	C	Chakraborty *et al.,* 1991
3.	*Absidia ramosa* (Lindl.) Lendner	Achanakmar	Soil fungus	C	Chakraborty *et al.,* 1991
4.	*Absidia spinosa* Lendner	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,* 1991
Fam: Acaulosporaceae					
5.	*Acaulospora delicata* C. Walker, CM Pfeiff. & Bloss	Amarkantak	VAM Fungus	C	Jamaluddin and Chandra, 1997
6.	*Acaulospora longula* Spain & Schenck.	Amarkantak	VAM Fungus	C	Jamaluddin and Chandra, 1997
7.	*Acaulospora scrobiculata* Trappe	Amarkantak	VAM Fungus	C	Jamaluddin and Chandra, 1997
Fam:Agaricaceae					
8.	*Agaricus* sp.	BR area	Mushroom	C	Tiwari, *et al*.,1995
9.	*Lepiota procera* (Scop. *ex* Fr.) Kumm.	BR area	Mushroom	C	Tiwari, *et al*.,1995
10.	*Macrolepiota dolichaula* Singer	BR area	Mushroom	C	Tiwari, *et al*.,1995
Fam:Agonomycetaceae					
11.	*Sclerotium rolfsii* Sacc.	Amarkantak	Leaves of *Jatropha*	C	Singh *et al.,* 2002

			pandurifolia		
Fam:Amphisphaeriaceae					
12.	*Bartalina robillardoides* Tassi	Amarkantak, Rajendragram	Parasitic on *Shorea robusta, Murraya exotica*	C	Verma & Soni, 2007, Singh *et al*., 2002
Fam:Botryosphaeriaceae					
13.	*Botryosphaeria obtusa* (Schw.) Shoemaker	Amarkantak	Parasitic on *Pinus patula*	C	Verma & Soni, 2007
14.	*Pleurotus flabellatus* Berk. & Br.	-	Mushroom	C	Tiwari *et al.*,1995
Fam:Chaetomiaceae					
15.	*Chaetomium globosum* Kunze & Schm.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
16.	*Chaetomium gracile* Udagawa	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
17.	*Chaetomium reflexum* Skolko & J W Grove	Amarkantak	Parasitic on *Pinus caribaea*	C	Verma & Soni, 2007
18.	*Thielavia terricola* (Gilman & Abbott) Emmons	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
19.	*Blakeslea trispora* Thaxter	Amarkantak	Soil Fungus	C	Mehrotra and Mehrotra, 1964
Fam:Coprinaceae					
20.	*Coprinus* sp.	-	Mushroom	C	Tiwari, *et al*.,1995
Fam:Cunnighamellaceae					
21.	*Cunnighamella echinulata* Thaxt.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Dematiaceae					
22.	*Acremonium* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,* 1991
23.	*Acrophialophora fusispora* (S B Saksena) Samson	Amarkantak	Parasitic on *Pinus caribaea*	C	Verma & Soni, 2007
24.	*Acrophyllophora* sp.	Lamni	Soil fungus	C	Chakraborty *et al.,* 1991
25.	*Alternaria alternata* (Fr.) Keissler	Amarkantak, Lamni	Parasitic	C	Jamaluddin *et al*.,1993
26.	*Alternaria humicola* Oudemans	Achanakmar	Soil fungus	C	Chakraborty *et al.,* 1991
27.	*Alternaria* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
28.	*Alternaria tenuissima* (Nees *ex* Fr.)	Achanakmar	Soil fungus	C	Chakraborty *et al.*,1991

29.	*Annellophragmia coonoorensis* (Subram.) Subram.	Sonemuda, Amarkantak	Present on *Saccharum munja*	C	Singh *et al*., 2002
30.	*Aspergillus candidus* Link.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
31.	*Aspergillus fischeri* Wehmer	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
32.	*Aspergillus flavipes* (Bain & Sart.)Thom.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
33.	*Aspergillus flavus* Link.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
34.	*Aspergillus fumigatus* Fres.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
35.	*Aspergillus nidulans* (Eidam.) Wingate	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
36.	*Aspergillus niger* Van Tiegh.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
37.	*Aspergillus ochraceus* Withelm.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
38.	*Aspergillus oryzae* (Ahlburg) Cohn.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
39.	*Aspergillus terreus* Thom.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
40.	*Aspergillus versicolor* (Vuill) Tiraboschi	Amarkantak	Soil fungus	C	Shettyi, 1957
41.	*Botryotis* sp.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
42.	*Cephaliophora tropica* Thaxt.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
43.	*Cephalosporium curtipes* Sacc.	Amarkantak	Soil fungus	C	Shettyi, 1957
44.	*Cercospora pinidensiflorae* Hori *et* Nambu	Amadoh, Amarkantak	Parasitic	C	Jamaluddin *et al*., 1990
45.	*Cercospora paramigmyae* Thirum. & Chupp.	Amarkantak	Parasitic on *Lagerstoemia parviflora*	C	Verma & Soni, 2007
46.	*Cercospora timoriensis* Cooke	Rajendragram, Amarkantak	Parasitic on leaf of *Ipomoea hedrifolia*	C	Singh *et al*., 2002
47.	*Cercosporidium helicteretis* Soni *et al*.	Amarkantak	Parasitic	C	Soni *et al*.,1984
48.	*Cladosporium acaciae* Panwar	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
49.	*Cladosporium herbarum* (Pers.) Link.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991

50.	*Cladosporium oxysporum* Berk. & M.A. Curtis	Amarkantak	Parasitic on *Cassia* sp.	C	Verma & Soni, 2007
51.	*Cladosporium werneckii* Parreirs Horta	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
52.	*Endocalyx amarkantakensis* Patel, Pandey & Rajak	Amarkantak	On dead fungus of *Shorea robusta*	C	Patel *et al.*, 2002
53.	*Eriocercospora moghaniae* Singh	Lakshaman dhara, Durghdhara, Amarkantak	Leaf spot disease on *Dioscorea bulbifera*	C	Singh *et al*., 2002
54.	*Humicola grisea* Traaen.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
55.	*Humicola indica* Haware & Singh	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
56.	*Metarhizium anisopliae* (Metschnikoff) Sorokin.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
57.	*Mycoleptodiscus indicus* (Sahni) Sutton	Amarkantak	Leaf of *Grewia acuminata*	C	Singh *et al*., 2002
58.	*Paecilomyces fusisporus* Saksena	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
59.	*Penicillium citrinum* Thom.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
60.	*Penicillium javanicum* Van Beyma	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
61.	*Sarcinella indica* Kamal & Narayan	Kirar forest, Rajendragram	Leaves of *Cryptostegia grandiflora*	C	Singh *et al*., 2002
62.	*Scopulariopsis* sp.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
63.	*Sepedonium maheswa - rianum* Mukerji	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
64.	*Sporotrichum sp.*	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
65.	*Sytalidium* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
66.	*Trichoderma viride* Pers. ex Fr.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
67.	*Tripospermum acaciae* Agarwal & Sharma	Jagatpur, Amarkantak	*Chisocheton paniculatum*	C	Singh *et al.*, 2002
68.	*Tripospermum juglandis* (Thum.) Hughes	Sonemuda, Amarkantak	*Lagerstoemia parviflora*	C	Singh *et al.*, 2002
69.	*Verticillium* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991

70.	*Zygosporium minus* Hughes	Jagatpur, Amarkantak	Leaves of *Acalypha* sp.	C	Singh *et al*., 2002
Fam:Diatrypaceae					
71.	*Diatrype* sp.	Amarkantak	Parasitic on *Flacourtia indica, Acacia auriculiformis, Grewia* sp.	C	Verma & Soni, 2007
72.	*Diatrype syzygii* Narendra & VG Rao	Jagatpur	Parasitic on *Syzygium cumini*	C	Verma & Soni, 2007
73.	*Cryptosphaeria sessilis* Patel, Pandey & Rajak	Lakshaman Dhara	Dead wood of *Shorea robusta*	C	Patel *et al*., 2002
Fam: Englerulaceae					
74.	*Sarcinella indica* Kamal & Narayan	Rajendragram	Parasitic on *Cryptostegia grandiflora*	C	Singh *et al*., 2002
Fam:Geastraceae					
75.	*Geastrum sp.*	BR area	Mushroom	C	Tiwari, *et al*.,1995
Fam:Gigasporaceae					
76.	*Gigaspora marginata* (Becker) Hall.	Amarkantak	Soil fungus	C	Jamaluddin & Chandra, 1997
77.	*Scutellospora* sp.	Amarkantak	Soil fungus	C	Jamaluddin & Chandra, 1997
Fam:Glomaceae					
78.	*Glomus aggregatum* Schenk. & Smith	Amarkantak	Soil fungus	C	Jamaluddin & Chandra, 1997
79.	*Glomus intraradics* Schenk. & Smith	Amarkantak	Soil fungus	C	Jamaluddin & Chandra, 1997
Fam:Hymenochaetaceae					
80.	*Aurificaria shoreae* (Wakef & Grove) Ryv. Syn *Polyporus shorae* Wakef & Grove	Jagatpur	Parasitic on stem of *Shorea robusta*	C	Verma & Soni, 2007
81.	*Inonotus tabacinus* (Mont.) Kavst.	BR area	-	C	Tiwari, *et al*.,1995
82.	*Polystictus* sp.	BR area	-	C	Tiwari, *et al*.,1995
83.	*Polystictus steinheilianus* Berk & Lev.	BR area	-	C	Tiwari, *et al*.,1995
84.	*Phellinus caryophylli* (Racib.) G. Cunn., (Syn.	BR area	-	C	Tiwari, *et al*.,1995

	Fomes caryophylli (Racib.) Bres.)				
85.	*Phellinus fustuosus* (Lev.) Ryv.	Achanakmar	Parasitic on stem of *Shorea robusta*	C	Verma & Soni, 2007
86.	*Phellinus gilvus* (Schwein) Pat.	Chada	Parasitic on stem of *Shorea robusta*	C	Verma & Soni, 2007
87.	*Phellinus pachyphloeus* (Pat.) Pat. (Syn. *Fomes pachyphloeus* sensu G.Cunn.)	BR area	-	C	Tiwari, *et al*.,1995
88.	*Phellinus* sp.	Amarkantak	Parasitizes on stem of *Bauhinia* sp.	C	Verma & Soni, 2007
Fam:Hypoxylaceae					
89.	*Hypoxylon diatrypeoides* Rehm.	Keonchi, Amarkantak	Parasitic on twig of *Shorea robusta, Ougeinia oojeinensis, Flacourtia indica*	C	Verma & Soni, 2007
90.	*Hypoxylon rubiginosa* Pers. *ex* Fr.	Achanakmar	Parasitic on *Dendrocalamus strictus*	C	Verma & Soni, 2007
91.	*Hypoxylon sp.*	Chada, Jagatpur	Parasitic on *Ziziphus xylopyra, Terminalia tomentosa, Syzygium cumini*	C	Verma & Soni, 2007
92.	*Hypoxylon stygium* (Lev.) Sacc.	Jagatpur	Parasitic on twig of *Shorea robusta*	C	Verma & Soni, 2007
93.	*Hypoxylon vogesiacum var microsporum* J H Mill.	Amarkantak	Parasitic on *Holoptelia integrifolia*	C	Verma & Soni, 2007
Fam:Hysteriaceae					
94.	*Hysterium angustatum* Alb. Schwein	Amarkantak	Parasitic on leaves of *Dillenia pentagyna*	C	Verma & Soni, 2007
Fam:Incertaesedis					

95.	*Kutilakesa madreeya* Subram.	Amarkantak	Parasitic on *Populus* sp.	C	Verma & Soni, 2007
96.	*Myrothecium roridum* Tode *ex* Fr.	Amarkantak	Parasitic on *Populus* sp.	C	Verma & Soni, 2007
Fam:Leptosphaeriaceae					
97.	*Coniothyrium sp.*	Amarkantak	Parasitic on *Grevillea pteridifolia*	C	Verma & Soni, 2007
Fam:Lycoperdaceae					
98.	*Lycoperdon pusillum* (Batsch) Pers.	BR area	Mushroom	C	Tiwari, *et al*.,1995
Fam:Melanconiaceae					
99.	*Colletotrichum capsici* (Syd.) Butler	Amarkantak	Parasitic on *Bauhinia purpurea*, *Dioscorea daemona*	C	Verma & Soni, 2007
100.	*Pestalotiopsis palmarum* (Cook)	Amarkantak	Parasitic on needle of *Pinus roxburghii*	C	Verma & Soni, 2007
101.	*Pestalotiopsis* sp.	Amarkantak	Parasitic on leaves of *Gardenia latifolia, Grevillea pteridifolia*	C	Dadwal & Jamaluddin, 1991
102.	*Pestalotiopsis versicolor* (Speg.) Steyaert	Amarkantak	Parasitic on leaves of *Randia dumetorum, Pinus patula*	C	Verma & Soni, 2007
Fam:Meliolaceae					
103.	*Meliola* sp.	Chada	Parasitic on *Shorea robusta*	C	Verma & Soni, 2007
Fam:Moniliaceae					
104.	*Fusarium chlamydosporium* Wollenw. & Reink.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
105.	*Fusarium compactum* (Wollenw.) W. Gordon	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
106.	*Fusarium flocciferum* Corda	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
107.	*Fusarium oxysporum* Schlecht.	Achanakmar, Lamni, Amarkantak, Jagatpur nursery	Soil fungus, On *Coffea arabica*	C	Chakraborty *et al.,*1991; Singh *et al*., 2002

108.	*Fusarium solani* (Mart.) App. & Wollenw.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
109.	*Fusarium* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
110.	*Geotrichum candidun* Link *ex* Pers.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
111.	*Septofusidium* sp.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
112.	*Volutella lini* Mukerji, Tewari & Rai	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Mucoraceae					
113.	*Circinella muscae* (Sorok.) Berl. & de Toni.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
114.	*Mucor pusillus* Lindt.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
115.	*Rhizopus nigricans* Ehrenb.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al,*1991
116.	*Rhizopus stolonifer* (Ehrenb. *ex* Fr.) Lind.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Mycenastraceae					
117.	*Mycenastrum corium* (Gueresent) Desv.	BR area	Mushroom	C	Tiwari, *et al*.,1995
Fam: Nectriaceae					
118.	*Neocosmospora* sp.	Lamni	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Nidulariaceae					
119.	*Cyathus limbatus* Tul.	BR area	Cup fungi	C	Tiwari, *et al*.,1995
Fam:Nitschkiaceae					
120.	*Nitschkia conanii* Patel, Pandey & Rajak	Kapildhara	On dead wood and bark of *Shorea robusta*	C	Patel *et al*., 2002
Fam:Onygenaceae					
121.	*Chrysosporium keratinophilum* (Fres.) Carmichael	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
122.	*Chrysosporium tropicum* Carmichael	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Peniophoraceae					
123.	*Peniophora* sp.	BR area	-	C	Tiwari, *et al*.,1995
Fam:Phallaceae					
124.	*Phallus impudicus* L. *ex* Pers.	BR area	-	C	Tiwari, *et al*.,1995
Fam:Pleoporaceae					

125.	*Leptosphaerulina trifolii* (Rost.) Petr.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
126.	*Curvularia lunata* (Walker) Bedd.	Achanakmar, Lamni	Soil fungus	C	Chakraborty *et al.,*1991
127.	*Curvularia verruculosa* Tandon & Bilgrami *ex* M B Ellis	Amarkantak	Parasitic on *Pinus patula*	C	Verma & Soni, 2007
Fam:Podoschyphaceae					
128.	*Podoschypha petaloides var rosulata* Reid	Amarkantak	On decomposed needles of *Pinus kesiya, P. patula*	C	Verma & Soni, 2007
Fam:Polyporaceae					
129.	*Diacathodes novo guinensis* Cooke & Harku	Jagatpur	On stem of *Shorea robusta*	C	Verma & Soni, 2007
130.	*Fomes tricolor* (Murr.) Bres.	Common	-	C	Tiwari *et al*.,1995
131.	*Microporus vernicipes* (Berk) Kuntze.	Jagatpur	-	C	Verma & Soni, 2007
132.	*Microporus xanthopus* (Fr.) Kuntze	BR area	-	C	Tiwari *et al*.,1995
133.	*Nigroporus venosus* (Berk.) Murr.	BR area	Mushroom	C	
134.	*Polyporus arcularius* Batsch *ex* Fr.	BR area	-	C	Tiwari, *et al*.,1995
135.	*Polyporus ostreiformis* Berk.	BR area	-	C	Tiwari, *et al*.,1995
136.	*Polyporus secernibilis* Berk.	BR area	-	C	Tiwari, *et al*.,1995
137.	*Poria* sp.	BR area	-	C	Tiwari, *et al*.,1995
138.	*Pycnocarpus sanguineus* (L. *ex* Fr.) Murr.	Amarkantak	On dead stem of standing tree of *Shorea robusta*	C	Verma & Soni, 2007
139.	*Pyrofomes tricolor* (Murr.) Corner	Achanakmar	-	C	Verma & Soni, 2007
140.	*Trametes cubensis* (Murr.) Sacc.	Achanakmar	-	C	Verma & Soni, 2007
141.	*Trametes inserta* (Currey) Cooke	BR area	-	C	Tiwari, *et al*.,1995
142.	*Polystictus leoninus* Klotzsch (Syn.	BR area	-	C	Tiwari, *et al*.,1995

	Trametes leonina (Klotzsch) Imazeki)				
143.	*Trametes meyenii* Klotzsch.	BR area	-	C	Tiwari, *et al*.,1995
144.	*Trametes versatilis* Berk.	BR area	-	C	Tiwari, *et al*.,1995
145.	*Trichaptum bioforme* (Syn. *Polystictus elongatus* Berk.)	BR area	-	C	Tiwari, *et al*.,1995
Fam:Pythiaceae					
146.	*Pythium* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,* 1991
147.	*Pythium aphanidermatum* (Eds.) Fitz.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
Fam:Russulaceae					
148.	*Russula* sp.	BR area	Mushroom	C	Tiwari, *et al*.,1995
149.	*Russula emetica* Fr.	Achanakmar	Mushroom	C	Das, *et al*., 2006
150.	*Russula pseudodelica* Lange	Achanakmar	Mushroom	C	Das, *et al*., 2006
Fam:Schizophyllaceae					
151.	*Leucophellinus hobsoni* (Berk. *ex* Cooke) Ryv. (Syn. *Trametes straminea* (Pat.) Lloyd)	BR area	-	C	Tiwari, *et al*.,1995
Fam:Sclerodermataceae					
152.	*Astraeus hygrometricus* (Pers.) Morg.	-	-	C	Tiwari, *et al*.,1995
153.	*Scleroderma bovista* Fr. (Syn. *S. texense* Berk.)	Amarkantak	Edible Mushroom	C	Harsh *et al.,* 1989
154.	*Scleroderma radicans* Lloyd	BR area	-	C	Tiwari, *et al*.,1995
Fam:Sphaeropsidaceae					
155.	*Flavodon flavus* (Klotzch) Ryv.	Keonchi	On log of *Shorea robusta*	C	Verma & Soni, 2007
156.	*Junghuhnia luteoalba* (P. Karst) Ryv.	Jagatpur, Dindori	On log of *Shorea robusta*	C	Verma & Soni, 2007
157.	*Macrophomina phaseolina* (Maubl.) Ashby	Amarkantak	Parasitic on *Grevillea pteridifolia*	C	Dadwal & Jamaluddin, 1991
158.	*Phoma glomerata* (Corda) Wr. & Hochapfel	Amarkantak	Parasitic *Grevillea pteridifolia*	C	Dadwal & Jamaluddin, 1991
159.	*Phoma medicaginis* Malbr. & Roum.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991

160.	*Phoma sorghina* (Sacc) Boerema	Achanakmar, Amarkantak	Parasitic *Grevillea pteridifolia*, Soil fungus	C	Chakraborty *et al*., 1991; Dadwal & Jamaluddin, 1991
161.	*Phoma* sp.	Achanakmar	Soil fungus	C	Chakraborty *et al.,*1991
162.	*Phomopsis eucalypti* Zerova	Amarkantak nursery	Parasitic on *Eucalyptus* sp.	C	Verma & Soni, 2007
163.	*Phomopsis* sp.	Amarkantak	Parasitic on *Gravillea pteridifolia, Agathis* sp.	C	Verma & Soni, 2007
164.	*Phomopsis vexans* (Sacc. & P. Syd.)	Amarkantak	Parasitic on *Acacia auriculiformis*	C	Verma & Soni, 2007
165.	*Phyllosticta grevilleae* Gadd.	Amarkantak	Parasitic on *Gravillea pteridifolia*	C	Verma & Soni, 2007
Fam:Stereaceae					
166.	*Stereum* sp.	BR area	-	C	Tiwari, *et al*.,1995
Fam: Teichosporaceae					
167.	*Teichospora* sp.	Achanakmar	Parasitic on stem of *Grewia hirsuta*	C	Verma & Soni, 2007
Fam:Thelephoraceae					
168.	*Thelephora* sp.	BR area	-	C	Tiwari, *et al*.,1995
Fam:Tricholomataceae					
169.	*Clitocybe cerussata* (Fr.) P. Kumm	BR area	-	C	Tiwari, *et al*.,1995
170.	*Podabrella microcarpa* (Berk. & Broome) Singer	BR area	-	C	Tiwari, *et al*.,1995
171.	*Termitomyces* sp.	Amarkantak	Common edible mushroom	C	Harsh *et al.,*1993
172.	*Termitomyces albumi-nosa* (Berk) Heim	Amarkantak	Edible	C	Harsh *et al*., 1989
Fam:Xerocomaceae					
173.	*Xerocomus* sp.	Achanakmar	-	C	Tiwari, *et al*.,1995
Fam:Xylariaceae					
174.	*Biscogniauxia nummularia* (Bull.) Kuntze	Achanakmar	Parasitic on *Shorea robusta,*	C	Verma & Soni, 2007

			Syzygium cumini		
175.	*Xylaria mellisii* Berk.	Achanakmar	Parasitic on *Randia dumetorum*	C	Verma & Soni, 2007
176.	*Xylaria papyrifera* (Link) Fr.	Amarkantak	Parasitic on cut ends of stump of *Shorea robusta*	C	Verma & Soni, 2007
177.	*Xylaria* sp.	Chada, Amarkantak	Parasitic on twigs of *Emblica officinalis, Flacourtia indica*	C	Verma & Soni, 2007
Fungi: Imperfecti **Fam:Valsaceae**					
178.	*Cytospora pini* Desm.	Amarkantak	Parasitic on twigs of *Pinus patula*	C	Verma & Soni, 2007
179.	*Cytospora* sp.	Amarkantak	Parasitic *Grevillea pteridifolia*	C	Dadwal & Jamaluddin, 1991

Thus, as per the latest knowledge, there are 179 species of fungi representing 47 families distributed in different zones of Achanakmar- Amarkantak BR.

III. Updated list of lichens recorded from BR:

In all 37 species of lichens existing in Achanakmar-Amarkantak BR were listed in volume I part I of Biosphere Reserve Information series (BRIS). Recently, a few more species have been identified from different localities of BR. An updated list of 130 species of lichen taxa belonging to 25 families as reviewed by various authors is summarized in the following table.

Table 2.Updated list of lichens from Achanakmar- Amarkantak BR

S. N.	Lichen Taxa	Type	Habitat	Distribution	Reference
Fam: Arthoneaceae					
1	*Arthothelium abrorme* (Ach.) Müll. Arg.	Cructose	Bark of *Shorea robusta, Emblica officinalis, Ficus, Terminalia arjuna, Mallotus philippensis, Syzygium cumini, Holigarna* sp.	Jwaleshwar, Border of core zone (Achanakmar Wildlife sanctuary)	Nayaka, *et al*., 2007; Upreti and Satya, 2007
2	*A. pycnocarpoides* Müll. Arg .	Crustose	Bark of *Ficus* sp., *Mangifera indica, Shorea robusta, Syzygium cuminii, Mallotus philippensis, Holigarna* sp.	Jwaleshwar, Kabirchabutra, Border of core zone	Nayaka, *et al*., 2007; Upreti and Satya, 2007
3	*A. nigrodiscum* Patw. & Makh.	Crustose	Bark of *Shorea robusta, Syzygium cuminii, Ficus* sp., *Mangifera indica*	Chauradadar, Kabirchabutra	Upreti and Satya, 2007
4	*Arthonia recedens* Stirton	Crustose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica, Mallotus phpilipensis, Ficus racemosa, Holigarna* sp.	Kapildhara, Mai ki Bagia, Durgadhara, Kabirchabutra, 5 km Chhaparwa towards Kota, Chhaparwa nala	Nayaka, *et al*., 2007; Upreti and Satya, 2007
5	*Cryptothecia* sp.	Crustose	Bark of *Shorea*	From	Upreti and

			robusta, Syzygium cumini, Ficus sp., *Mangifera indica*	Chhaparwa 22 km. before Kewachi	Satya, 2007
6	*C. culbursonae* Patw. & Makh.	Crustose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica*	Kabirchabutra, From Chhaparwa 22 km. before Kewachi	Upreti and Satya, 2007
7	*C. lunulata* (Zahlbr.) Makh. & Patw.	Crustose	Bark and Root of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica, Mallotus phillippensis, Ficus racemosa, Terminalia cuneata, , Holigarna* sp., *Emblica officinalis*, *Bauhinia* sp.	Kabirchabutra, Kapildhara, Mai ki Bagia, Jwaleshwar, Durgadhara, Gabhighat, 5 km before Chhaparwa from Amarkantak, Chhaparwa nala, 5 km away from Chhaparwa towards Kota, Border of core zone, 22 km before Keonchi from Chhaparwa	Nayaka, *et al*., 2007; Upreti and Satya, 2007
8	*C. involuta* Stirton	Crustose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica*	Jagatpur, Kabirchabutra	Upreti and Satya, 2007
Fam: Bacidiaceae					
9	*Bacidia millegrana* (Taylor) Müll. Arg.	Crustose	Bark of *Shorea robusta*	Jagatpur forest rest house	Upreti and Satya, 2007
10	*B. rubella* (Hoffm.) Massal.	Crustose	Bark of *Shorea robusta, Mallotus phillippensis, Ficus racemosa, Terminalia cuneata, Syzygium cuneata, Mangifera indica*	From Chhaparwa 22 km. before Kewachi, Border of core zone, Gabhighat	Nayaka, *et al*., 2007; Upreti and Satya, 2007
11	*B. alutacea* (Krempleh.) Zahlbr.	Crustose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica,*	Ataria, 13 km. from Chauradadar to Kabirchabutra,	Nayaka, *et al*., 2007; Upreti and Satya, 2007

			Mallotus phillippensis	Kabirchabutra, 5 km before Chhaparwa from Amarkantak	
12	*B. psorina* (Nyl. in Hue) Pant & Awasthi	Crustose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica*	13 km. from Chauradadar to Kabirchabutra, Kabirchabutra	Upreti and Satya, 2007
Fam: Collemataceae					
13	*Collema ryssoleum* (Tuck.) A. Schneider	Fruticose	Root of *Shorea robusta, Mallotus phillippensis, Ficus racemosa, Terminalia cuneata, Syzygium cuneata, Mangifera indica*	Kabirchabutra, Kapildhara, Jwalehswar, Gabhighat	Nayaka, *et al*., 2007; Upreti and Satya, 2007
14	*C. subflaccidum* Degel.	Fruticose	Bark of *Shorea robusta, Syzygium cumini, Ficus* sp., *Mangifera indica*	Near to Kabirchabutra	Upreti and Satya, 2007
15	*Leptogium cyanescens* (Robenh.) Körber	Fruticose	Bark of *Mallotus philippensis, Ficus racemosa, Terminalia arjuna, Mangifera indica, Syzygium cuminii*	Gabhighat, 22 km. from Chhaparwa before Kewanchi	Upreti and Satya, 2007
16	*L. chloromelum* (Swartz ex Ach.) Nyl.	Fruticose	Bark and root of *Mallotus philippensis, Ficus racemosa, Terminalia arjuna, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis*	Jwaleshwar, 5 km. away from Chhaparwa towards Kota, Khurkhuri dadar VALCO mining site.	Upreti and Satya, 2007
17	*L. furfuraceum* (Harm.) Sierk	Fruticose	Bark of *Shorea robusta, Syzygium cumini, Ficus sp., Mangifera indica*	Khurkhuri dadar Valco mining site.	Upreti and Satya, 2007
18	*L. austro-americanum* (Malme) Dodge	Fruticose	Bark of *Mallotus philippensis, Syzygium cuminii*, *Shorea robusta*	5 km. away from Chhaparwa towards Kota, Tarwartola,	Upreti and Satya, 2007

				Khurkhuri dadar	
19	*L. denticulatum* Nyl.	Fruticose	Bark of *Mallotus philippensis, Bauhinia* sp., *Syzygium cuminii*, *Shorea robusta*	Chhaparwa-nala	Upreti and Satya, 2007
20	*L. marginellum* (Swartz) Gray	Fruticose	Bark of *Shorea robusta*	Mai ki Bagia, Kabirchabutra	Upreti and Satya, 2007
21	*L. phyllocarpum* (Pers.) Mont.	Fruticose	Root of *Shorea robusta*	Near to Kabirchabutra	Upreti and Satya, 2007
22	*L. indicum* Awasthi & P. Akhtar	Fruticose	Root of *Shorea robusta*	Tarwartola, Kabirchabutra	Upreti and Satya, 2007
Fam: Crysothericaceae					
23	*Chrysothrix candelaris* (L.) Laundon	Crustose	Bark of *Shorea robusta*	Tarwartola, Near to Kabirchabutra	Upreti and Satya, 2007
24	*C. chlorina* (Ach.) Laundon	Crustose	Bark of *Shorea robusta, Mangifera indica Syzygium cuminii, Ficus* sp., *Mallotus phillippensis*	Ataria, Border of Core zone, 5 km before Chhaparwa from Amarkantak	Nayaka, *et al*., 2007; Upreti and Satya, 2007
Fam: Dermatocarpaceae					
25	*Dermatocarpon miniatum* (L.) Mann	Fruticose	Root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis*	Kapildhara, Kabirchabutra	Upreti and Satya, 2007
Fam: Ectolechiaceae					
26	*Schadonia indica* Upreti & Nayaka	Crustose	Bark of *Shorea robusta, Emblica officinalis*	From Chauradadar 8 km. before Kabirchabutra, Kabirchabutra	Upreti and Satya, 2007
Fam: Graphidaceae					
27	*Graphis proserpens* Vainio	Crustose	Bark of *Shorea robusta*	Jagatpur, Khurkhuri dadar	Upreti and Satya, 2007
28	*Graphina panhalensis* Patw. Kulkarni	Crustose	Bark of *Mallotus philippensis, Ficus racemosa, Terminalia arjuna, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis,*	Ataria, Kapildhara, Mai ki bagia, Jwaleshwar, Durgadhara, Gabhighat, 5 km before Chhaparwa	Nayaka, *et al*., 2007; Upreti and Satya, 2007

			Ficus sp., *Holigarna* sp., *Bauhinia* sp.	from Amarkantak, Chhaparwa nala, 5 km away from Chhaparwa towards Kota, Border of core zone, 22 km before Keonchi from Chhaparwa	
29	*G. platycarpa* (Eschw.) Zahlbr.	Crustose	Bark of *Mangifera indica, Syzygium cumini*	Durgadhara, 22 km before Keonchi from Chhaparwa	Nayaka, *et al*., 2007; Upreti and Satya, 2007
30	*G. schyzographita* Müll. Arg.	Crustose	Bark of *Shorea robusta*	Jagatpur	Upreti and Satya, 2007
Fam: Haematommataceae					
31	*Haematomma puniceum* (Sm. *ex* Ach.) Massal.	Crustose	Bark of *Mangifera indica, Syzygium cumini*, *Shorea robusta, Mallotus philippensis*	Kapildhara, Durgadhara, 22km before Keonchi from Chhaparwa, Chhaparwa nala	Nayaka, *et al*., 2007; Upreti and Satya, 2007
Fam: Lecanoraceae					
32.	*L. iseana* Räsänen	Crustose	Bark of *Mallotus philippensis, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis, Ficus racemosa*	Durgadhara, Chhaparwa nala	Upreti and Satya, 2007
33.	*L. perplexa* Brodo	Crustose	Bark of *Mallotus philippensis, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis, Ficus racemosa, Terminalia arjuna, Mangifera indica*	Ataria, Mai ki bagia, Jwaleshwar, Durgadhara, From Amarkantak 5 km. before Chhaparwa, Chhaparwa nala, 5 km away from Chhaparwa towards Kota,	Nayaka, *et al*., 2007; Upreti and Satya, 2007

				Border of core zone, 22 km before Keonchi from Chhaparwa	
34.	*L. achroa* Nyl.	Crustose	Bark of *Mangifera indica., Grewia* sp., *Pongamia pinnata, Azadirachta indica*, *Acacia nilotica*	From Gorakhpur 7 km. before Karanjia, Kabirchabutra	Upreti and Satya, 2007
35.	*L. alba* Lumbsch	Crustose	Bark of *Shorea robusta*	Jagatpur , Kabirchabutra	Upreti and Satya, 2007
36.	*L. coronulaus* Nyl.	Crustose	Bark of *Mangifera indica., Grewia sp., Pongamia pinnata, Azadirachta indica Acacia nilotica*	From Gorakhpur 7 km. before Karanjia, Kabirchabutra	Upreti and Satya, 2007
37.	*L. flavidofusca* Müll. Arg.	Crustose	Bark of *Shorea robusta*	Karanjia , Kabirchabutra, Tarwartola	Upreti and Satya, 2007
38.	*L. imshaugii* Brodo	Crustose	Bark of *Mallotus philippensis, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis*	From Chhaparwa 22 km before Kewachi, Kabirchabutra	Nayaka, *et al*., 2007; Upreti and Satya, 2007
39.	*L. leproplaca* Zahlbr.	Crustose	Bark of *Mallotus philippensis, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis, Ficus racemosa, Terminalia arjuna*	Jwaleshwar, Chhaparwa nala	Upreti and Satya, 2007
40.	*Lecanora subimmersa* (Fee) Vainio	Crustose	*Mallotus philippensis, Shorea robusta*	5 km before Chhaparwa from Amarkantak	Nayaka, *et al*., 2007
41.	*L. sulphurescens* Fée	Crustose	Bark and Root of *Shorea robusta*	Kabirchabutra	Upreti and Satya, 2007
42.	*Lecanora* sp.	Crustose	*Mallotus philippensis, Syzygium cumini*, *Shorea robusta, Bauhinia* sp.	Border of core zone	Nayaka, *et al*., 2007
43.	*Lecanora tropica*	Crustose	Bark and Root	Karanjia,	Upreti and

	Zahlbr		*Mallotus philippensis, Ficus racemosa, Terminalia arjuna, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis, Ficus* sp., *Eucalyptus* sp., *Grewia* sp., *Pongamia pinnata, Azadirachta indica, Acacia nilotica*	Jagatpur, From Gorakhpur 7 km. before Karanjia, from Chauradadar 13 km. and 8 km.before Kabirchabutra, Khurkhuri dadar -Valco mining site plantation, Khurkhuri dadar - Valco mining site, Khurkhuri dadar, Near to Kabirchabutra, Pataleshwar,	Satya, 2007
44.	*Vainoria* sp.	Crustose	Bark of *Shorea robusta*	Jagatpur and Near Kabirchabutra	Upreti and Satya, 2007
45.	*Lecidella* sp.	Crustose	Bark of *Mangifera indica, Syzygium cumini, Ficus racemosa, Mallotus philippensis, Shorea robusta*	Durgadhara, Chhaparwa nala	Upreti and Satya, 2007
Fam: Lichen-imperfecti					
46.	*Lepraria* sp.	Crustose	Bark and Root of *Mallotus philippensis, Mangifera indica, Syzygium cuminii*, *Shorea robusta, Emblica officinalis, Ficus racemosa, Terminalia arjuna*	Jwaleshwar, From Chhaparwa 5 km. towards Kota, From Chhaparwa 22 km. before Kewachi, Jagatpur, Tarwartola, Kabirchabutra	Nayaka, *et al*., 2007; Upreti and Satya, 2007
47.	*L. lobificans* Nyl.	Crustose	Bark and Root of *Malllotus philippensis, Shorea robusta, Ficus racemosa, Terminalia cuneata, Mangifera,*	Jwaleshwar, Gabhighat, Chhaparwa 5 km. towards Kota,Jagatpur, Tarwartola, Kabirchabutra,	Nayaka, *et al*., 2007; Upreti and Satya, 2007

			Syzygium cumini, Bauhinia sp.	Border of core zone	
Fam: Lecidiaceae					
48.	*Lecidia* sp.	Crustose	Root of *Shorea robusta, Mallotus philippensis, Syzygium cuminii*	Kapildhara	Upreti and Satya, 2007
49.	*Phyllopsora kiiensis* (Vainio) Gotth.	Fruticose	Root of *Shorea robusta, Mangifera indica, Syzygium cumini, Ficus* sp.	Kabirchabutra, Tarwartola	Upreti and Satya, 2007
50.	*P. corallina* (Eschw.) Müll. Arg.	Fruticose	Bark and Root *Shorea robusta, Mallotus philippensis, Syzygium cumini, Ficus racemosa*	Kapildhara and Chhaparwa-nala	Upreti and Satya, 2007
51.	*P. manipurensis* (Müll.Arg.) Gotth	Fruticose	Bark of *Shorea robusta*	Jagatpur and Tarwartola	Upreti and Satya, 2007
Fam: Letrouitiaceae					
52.	*Letrouitia transgressa* (Malme) Haf. & Bellem.	Crustose	Bark of *Shorea robusta, Mangifera indica, Syzygium cumini, Ficus* sp., *Mallotus philippensis, Emblica officinalis, Terminalia arjuna, Ficus racemosa, Terminalia cuneata, Holigarna* sp., *Bauhinia* sp.	Ataria, Kabirchabutra, Kapildhara, Mai ki Bagia, Jwaleshwar, Durgadhara, Gabhighat, Chharparwa nala, From Chhaparwa 22km. from Keonchi, Karanjia, 5 km away from Chhaparwa towards Kota, Border of core zone, 5 km before Chhaparwa from Lamni	Nayaka, *et al.*, 2007; Upreti and Satya, 2007
Fam: Physciaceae					
53.	*Pyxine cocoes* (Swartz.) Nyl.	Fruticose	Bark of *Shorea robusta, Mallotus philippensis, Emblica officinalis,*	Ataria, Kapildhara, Mai ki Bagia, Jwaleshwar,	Nayaka, *et al.*, 2007; Upreti and Satya, 2007

			Ficus sp., *Terminalia arjuna, Mangifera indica*, *Syzygium cuminii, Ficus racemosa, Bauhinia* sp., *Holigarna* sp.	Durgadhara, From Amarkantak 5 km. before Chhaparwa, Gabhighat, Chhaparwa nala, Border of core zone, Tarwartola, Kabirchabutra, 22 km before Keonchi from Chhaparwa	
54.	*P. berteriana* (Fée) Imsh.	Fruticose	Bark of *Shorea robusta*	From Gorakhpur 5 km. before Karanjia	Upreti and Satya, 2007
55.	*P. subcinerea* Stirton	Fruticose	Bark of *Shorea robusta*	Chauradadar	Upreti and Satya, 2007
56.	*P. petricola* Nyl.	Fruticose	Bark of *Mallotus philippensis, Shorea robusta, Bauhinia* sp., *Syzygium cuminii*	Border of core zone	Upreti and Satya, 2007
57.	*Buellia stillingiana* Steiner	Crustose	Bark of *Shorea robusta, Mangifera indica, Emblica officinalis*	Karanjia, Jagatpur, Chahuradadar, From Chauradadar 8 km. before Kabirchabutra, Kabirchabutra	Upreti and Satya, 2007
58.	*B. albatrior* (Nyl.) Szat. *ex* Awasthi	Crustose	Bark of *Shorea robusta*	Tarwartola	Upreti and Satya, 2007
59.	*B. curtisii* (Tuck.) Imsh.in Brodo	Crustose	Bark of *Mangifera indica*, *Shorea robusta*, *Syzygium cumini, Mallotus philippensis, Emblica officinalis*	Durgadhara, Border of core zone	Nayaka, *et al*., 2007; Upreti and Satya, 2007
60.	*B. pusillula* (Nyl.) Zahlbr.	Crustose	Bark of *Shorea robusta*	Ataria	Upreti and Satya, 2007
61.	*B. almorensis* S. Singh & Awasthi	Crustose	Bark and Root of *Shorea robusta, Mangifera indica, Syzygium cuminii,*	Ataria , Kabirchabutra, Kapildhara, Jwaleshwar,	Nayaka, *et al*., 2007; Upreti and Satya, 2007

			Ficus sp., *Mallotus philippensis, Terminalia arjuna, Emblica officinalis*	Durgadhara, From Amarkantak 5 km. before Chhaparwa, 5 km before Chhaparwa from Amarkantak, Gabhighat, Chhaparwa nala, Border of core zone, 22 km before Keonchi from Chhaparwa	
62.	*Heterodermia diademata* (Taylor) Awas.	Fruticose	Bark and root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis, Emblica officinalis*	Kapildhara, Jagatpur forest rest house, Chauradadar, Tarwartola, From Chauradadar, 8 km. from Kabirchabutra	Upreti and Satya, 2007
63.	*H. speciosa* (Weelfen) Trensan	Fruticose	Bark of *Shorea robusta, Emblica officinalis*	From Chauradadar 8 km. before Kabirchabutra, Near to Kabirchabutra	Upreti and Satya, 2007
64.	*H. angustiloba* (Müll. Arg.) Awasthi	Fruticose	Bark of *Shorea robusta*	Tarwartola, Kabirchabutra	Upreti and Satya, 2007
65.	*H. hypocoesia* (Yasuda) Awasthi	Fruticose	Bark of *Shorea robusta, Mangifera indica*, *Eucalyptus* sp., *Grewia* sp.	Tarwartola, Khurikhuri dadar, VALCO mining site	Upreti and Satya, 2007
66.	*H. pseudospeciosa* (Kurok.) Culb.	Fruticose	Bark and Root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis*	Near to Kabirchabutra,	Upreti and Satya, 2007
67.	*H. dissecta* (Kurok.) Awasthi	Fruticose	Root of *Shorea robusta, Syzygium cuminii, Mallotus philipenensis*	Kapildhara	Upreti and Satya, 2007

68.	*H. obscurata* (Nyl.) Trevisan	Fruticose	Bark of *Shorea robusta*	Tarwartola, Kabirchabutra	Upreti and Satya, 2007
69.	*Physcia tribacia* (Ach.) Nyl.	Fruticose	Bark and root of *Shorea robusta, Emblica officinalis, Ficus* sp., *Terminalia arjuna, Mallotus phillipenensis*	Jwaleshwar	Upreti and Satya, 2007
70.	*P. dimidiata* (Aru.) Nyl.	Fruticose	Bark of *Shorea robusta, Mangifera indica, Eucalyptus* sp, *Grewia* sp.	Khurikhuri dadar, VALCO mining site-virgin forest site	Upreti and Satya, 2007
71.	*Phyaeophyscia orbicularis* (Necker) Moberg	Fruticose	Root of *Shorea robusta, Emblica officinalis, Ficus* sp, *Terminalia arjuna, Mallotus phillipenensis*	Jwaleshwar	Upreti and Satya, 2007
72.	*P. hispidula* (Ach) Essl.	Fruticose	Bark and Root of *Shorea robusta, Emblica officinalis, Ficus* sp, *Terminalia arjuna, Mallotus phillipenensis, Bauhinia* sp. , *Syzygium cuminii*	Jwaleshwar, border of Achanakmar Wildlife Sanctuary, Near to Kabirchabutra,	Upreti and Satya, 2007
73.	*Dirinaria aegialata* (Afz. in Ach.) Moore	Fruticose	Bark of *Shorea robusta, Syzygium cuminii, Ficus* sp, *Mangifera indica*	Jagatpur forest rest house, Tarwartola, Khurhuridadar , Near to Kabirchabutra,	Upreti and Satya, 2007
74.	*D. consimilis* (Stirton) Awas.	Fruticose	Bark and Root of *Shorea robusta*	Attaria, Tarwartola	Upreti and Satya, 2007
75.	*Rinodina sophodes* (Ach.) Massal.	Crustose	Bark of *Mangifera indica, Pomgamia pinnata,Grewia* sp., *Azadirachta indica, Accacia nilotica*	From Gorakhpur 7 Kms. before Karanjia	Upreti and Satya, 2007
76.	*R. oxydata* (Massal.) Massal.	Crustose	Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp.	Kabirchabutra, Tarwartola	Upreti and Satya, 2007

Fam: Pyrenulaceae					
77.	*Pyrenula subglabriscula* Vainio	Crustose	Bark of *Mangifera indica, Pomgamia pinnata,Grewia* sp., *Azadirachta indica, Accacia nilotica, Shorea robusta, Mallotus philippensis, Bauhinia* sp., *Syzygium cumini*	From Gorakhpur 7 Kms. before Karanjia, Kabirchabutra, Border of core zone	Nayaka, *et al*., 2007; Upreti and Satya, 2007
78.	*P. fuscoolivacea* Vainio	Crustose	Bark of *Shorea robusta*	Ataria, Kabirchabutra, 22 km before Keonchi from Chhaparwa, 5 km before Chhaparwa from Amarkantak	Nayaka, *et al*., 2007; Upreti and Satya, 2007
Fam: Pertusariaceae					
79.	*Pertusaria* sp.	Crustose	Bark of *Shorea robusta*	Jagatpur	Upreti and Satya, 2007
80.	*P. acuta* Müll. Arg.	Crustose	Bark of *Shorea robusta, Ficus* sp., *Emblica officinalis, Terminalia arjuna, Mallotus phillipinensis, Syzygium cuminii, Holigarna* sp., *Bauhinia* sp.	Mai ki Baghia, Jwaleshwar, 5 kms away from Chaparwa towards Kota , Border of core zone, from Chaparwa 22Kms before Keonchi, Kurkhuri dadar, Kabirchabutra	Nayaka, *et al*., 2007; Upreti and Satya, 2007
81.	*P. amarkantakana* Srivastava & Awasthi	Crustose	Bark of *Shorea robusta, Mangifera indica, Grewia* sp, *Eucalyptus* sp.	Jagatpur, Tarwartola, Kurkhuri dadar,VALCO mining site, near to Kabirchaburtra	Upreti and Satya, 2007
82.	*P. amara* (Ach.) Nyl.	Crustose	Bark of *Shorea robusta*	Kurkhuri dadar,VALCO mining site platation area	Upreti and Satya, 2007
83.	*P. concinna* Erichsen	Crustose	Bark of *Shorea*	Karanjia,	Upreti and

			robusta, Mangifera indica	Jagatpur, Khurkhuri dadar VALCO mining site, Kabirchabutra	Satya, 2007
84.	*P. coronata* (Ach.) Th. Fr.	Crustose	Bark of *Shorea robusta, Mangifera indica*	Karanjia, Jagatpur, Khurkhridadar VALCO mining site , near to Kabirchabutra	Upreti and Satya, 2007
85.	*P. cinchonae* Müll. Arg.	Crustose	Bark of *Shorea robusta, Mangifera indica*	Karanjia, Jagatpur	Upreti and Satya, 2007
86.	*P. dehiscens* var. *depressior* Müll. Arg.	Crustose	Bark of *Shorea robusta*	Jagatpur	Upreti and Satya, 2007
87.	*P. quassiae* Fée	Crustose	Bark of *Shorea robusta, Mangifera indica*	Karanjia, Jagatpur	Upreti and Satya, 2007
88.	*P. leioplacella* Nyl.	Crustose	Bark of *Shorea robusta, Mangifera indica, Eucalyptus* sp., *Grewia* sp.	Jagatpur, Khurkhuri dadar VALCO mining site, Khurkhri dadar	Upreti and Satya, 2007
89.	*P. melastomella* Nyl.	Crustose	Bark of *Shorea robusta*	Jagatpur, Tarwartola, Kabirchabutra	Upreti and Satya, 2007
90.	*P. pustulata* (Ach.) Duby	Crustose	Bark of *Shorea robusta*	Karanjia, Jagatpur, Tarwartola	Upreti and Satya, 2007
91.	*P. subdepressa* Mull. Arg.	Crustose	Bark and Root of *Shorea robusta, Emblica officianalis, Ficus* sp., *Terminalia arjuna, Mallotus philippensis, Syzygium cuminii, Mangifera indica, Ficus racemosa, Bauhinia* sp.	Ataria, Mai ki Bagia, Jwaleshwar, Durgadhara, From Amarkantak 5km. from Chhaparwa, Gabhighat, Chhaparwa nala, 5 km from Chhaparwa towards Kota, Border of core zone, Kabirchabutra,	Nayaka, *et al*., 2007; Upreti and Satya, 2007

				Tarwartola, 22 km before Keonchi from Chhaparwa	
92.	*P. subochracea* Stirton	Crustose	Bark *Shorea robusta*, *Grewia* sp., *Pongamia pinnata*	Chauradadar, Tarwartola, From Chauradadar 13 km before Kabirchabutra	Upreti and Satya, 2007
93.	*P. rigida* Müll. Arg.	Crustose	Bark of *Shorea robusta*, *Mangifera indica*	Karanjia, Jagatpur, Kabirchabutra, Tarwartola, Chauradadar	Upreti and Satya, 2007
94.	*P. rimosa* Awsathi & Srivastava	Crustose	Bark of *Shorea robusta*	From Chauradadar 13 km before Kabirchabutra	Upreti and Satya, 2007
95.	*P. coccoed* (Ach.) Nyl.	Crustose	Bark of *Mangifera indica, Syzygium cuminii*, *Mallotus philippensis, Ficus racemosa, Shorea robusta*	Durgadhara, Chhaparwa nala, Kabirchabutra	Upreti and Satya, 2007
96.	*P. himalayensis* Awasthi & Srivastava	Crustose	Bark of *Shorea robusta, Emblica officinalis, Ficus* sp., *Terminalia arjuna, Mallotus philippensis, Mangifera indica, Syzygium cuminii, Bauhinia* sp., *Ficus racemosa*	Jwaleshwar, Durgadhara, Gabhighat, Kabirchabutra, Border of core zone, 22 km before Keonchi from Chhaparwa	Nayaka, *et al*., 2007; Upreti and Satya, 2007
97.	*P. puctata* Nyl.	Crustose	Bark of *Shorea robusta, Mangifera indica, Eucalyptus* sp., *Grewia* sp.	Khurkhuri dadar-VALCO mining site, Kabirchabutra	Upreti and Satya, 2007
98.	*P. splendens* Awasthi & Srivastava	Crustose	Bark of *Shorea robusta*	Khurkhuri dadar, Kabirchabutra	Upreti and Satya, 2007
Fam: Parmeliaceae					
99.	*Bulbothrix setschwanensis* (Zahlbr.) Hale	Fruticose	Bark of *Shorea robusta*	Jagatpur, Tarwartola, Khurikhuri	Upreti and Satya, 2007

				dadar, Kabirchabutra	
100.	*B. isidiza* (Nyl.) Hale	Fruticose	Bark of *Shorea robusta, Mallotus philippensis, Bauhinia* sp., *Syzygium cuminii, Mangifera indica, Grewia* sp., *Eucalyptus* sp.	From Amarkantak 5 km before Chhaparwa, Border of core zone, Jagatpur, Chauradadar, Tarwartola, Khurikhuri dadar, Kabirchabutra	Upreti and Satya, 2007
101.	*B. tabacina* (Mont. & Bosch) Hale	Fruticose	Bark of *Shorea robusta*	Tarwartola, Kabirchabutra	Upreti and Satya, 2007
102.	*Canoparmelia texana* (Tuck.) Elix & Hale	Fruticose	Bark of *Shorea robusta, Mallotus philippensis, Bauhinia* sp., *Syzygium cuminii*	From Amarkantak 5km. from Chhaparwa, Border of core zone, Tarwartola	Upreti and Satya, 2007
103.	*C. aptata* (Krempelh.) Elix & Hale	Fruticose	Bark of *Shorea robusta*	Jagatpur	Upreti and Satya, 2007
104.	*Parmotrema crinitum* (Ach.) Choisy	Fruticose	Bark of *Shorea robusta*	Kabirchabutra	Upreti and Satya, 2007
105.	*P. praesorediosum* (Nyl.) Hale	Fruticose	Bark and Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp., *Mallotus philippensis, Emblica officinalis, Terminalia arjuna, Eucalyptus* sp., *Grewia* sp.	Ataria , Kabirchabutra, Kapildhara, Jwaleshwar, Jagatpur Chauradadar, Tarwartola, Khurikhuri dadar-VALCO mining site plantation area, Khurikhuri dadar-VALCO mining site, Kabirchabutra	Upreti and Satya, 2007
106.	*P. tinctorum* (Nyl.) Hale	Fruticose	Bark and Root of *Mallotus philippensis,*	From Amarkantak 5km before	Upreti and Satya, 2007

			Shorea robusta, *Ficus racemosa, Terminalia arjuna, Mangifera indica, Syzygium cuminii*	Chhaparwa, Gabhighat, Chhaparwa nala, Border of core zone	
107.	*P. andinum* (Müll. Arg.) Hale	Fruticose	Bark of *Mangifera indica , Pongamia pinnata, Grewia* sp., *Azadirachta indica, Acacia nilotica, Shorea robusta*	From Gorakhpur 7 km. before Karanjia, Karanjia	Upreti and Satya, 2007
108.	*P. kamatii* Patw. & Prabhu	Fruticose	Bark of *Shorea robusta*	Jagatpur , Kabirchabutra	Upreti and Satya, 2007
109.	*P. mesotropum* (Müll. Arg.) Hale	Fruticose	Bark of		Upreti and Satya, 2007
110.	*P. upretii* Divakar	Fruticose	Bark of *Shorea robusta*	Kabirchabutra	Upreti and Satya, 2007
111.	*P. wallichiana* (Taylor) Elix & Hale	Fruticose	Bark of *Mallotus philippensis, Shorea robusta, Ficus racemosa*	Chhaparwa nala, Chauradadar, Tarwartola	Upreti and Satya, 2007
112.	*Hypotrachyna infirma* (Kurok.) Hale	Fruticose	Bark of *Shorea robusta*	Tarwartola	Upreti and Satya, 2007
Fam: Pilocarpaceae					
113.	*Fellhenera semecarpi* (Vainio) Vezda	Crustose	Leaf of *Mallotus philippensis, Syzygium cuminii, Shorea robusta, Holigarna* sp.	Towards Kota 5km. away from Chhaparwa	Nayaka, *et al*., 2007; Upreti and Satya, 2007
Fam: Psoraceae					
114.	*Protoblastenia russula* (Ach.) Räsänen	Crustose	Bark of *Shorea robusta, Mangifera indica*	Karanjia, Khurikhuri dadar-VALCO mining site plantation area	Upreti and Satya, 2007
Fam: Peltulaceae					
115.	*Peltula euploca* (Ach.) Poelt	Crustose	Root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis*, *Ficus racemosa, Terminalia cuneata, Mangifera indica*	Kapildhara, From Amarkantak 5 km before Chhaparwa, Gabhighat	Nayaka, *et al*., 2007; Upreti and Satya, 2007
Fam: Licheniaceae					

116.	*Phylliscum indicum* Upreti	Crustose	Lime plaster of monument	Pataleshwar temple	Upreti and Satya, 2007
Fam: Thelotremataceae					
117.	*Diploschistes rampoddensis* (Nyl.) Zahlbr.	Crustose	Root of *Shorea robusta*	Khurikhuri-dadar	Upreti and Satya, 2007
Fam: Teloschistaceae					
118.	*Caloplaca* sp.	Crustose	Root of *Shorea robusta, Emblica officinalis, Ficus* sp., *Terminalia arjuna, Mallotus philippensis*	Jwaleshwar	Upreti and Satya, 2007
119.	*C. bassiae* (Ach.) Zahlbr.	Crustose	Bark and Root of *Shorea robusta, Mangifera indica, Eucalyptus* sp., *Grewia* sp.	Chauradadar, Khurikhuri-dadar-VALCO mining site plantation area, Khurikhuri-dadar	Upreti and Satya, 2007
120.	*C. citrina* (Hoffm.) Th. Fr.	Crustose	Bark of *Mangifera indica, Pongamia pinnata, Grewia* sp., *Azadirachta indica, Acacia nilotica*	From Gorakhpur 7 km before Karanjia	Upreti and Satya, 2007
121.	*C. poliotera* (Nyl.) Steiner	Crustose	Root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis*	Ataria, Kapildhara	Upreti and Satya, 2007
122.	*C. amarkantakana* Joshi & Upreti	Crustose	Root of *Shorea robusta, Syzygium cuminii, Mallotus philippensis*	Tarwartola, Kapildhara, Khurkhuri-dadar, Kabirchabutra	Upreti and Satya, 2007
Fam: Verrucariaceae					
123.	*Endocarpon nanum* A. Singh & Upreti	Crustose	Root of *Mallotus philippensis, Syzygium cuminii, Shorea robusta*, Lime plaster of monument	Towards Kota 5 km away from Chhaparwa, Pataleshwar, Gabhighat	Nayaka, *et al*., 2007; Upreti and Satya, 2007
124.	*E. subrosettum* A. Singh & Upreti	Crustose	Root of *Mallotus philippensis, Syzygium cuminii,*	Towards Kota 5 km away from	Nayaka, *et al*., 2007; Upreti and Satya, 2007

			Shorea robusta	Chhaparwa, Gabhighat	
125.	*E. nigrozonatum* A. Singh & Upreti	Crustose	Root of *Shorea robusta*	Mai ki Bagia, Khurkhuri-dadar, Tarwartola	Upreti and Satya, 2007
126.	*Staurothele clopima* (Wahlenb.) Th. Fr.	Crustose	Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp., *Mallotus philippensis, Terminalia arjuna, Ficus racemosa*	Kabirchabutra, Kapildhara, Maiki Bagia, From Amarkantak 5 km before Chhaparwa, Gabhighat, Tarwartola	Nayaka, *et al*., 2007; Upreti and Satya, 2007
127.	*S. fissa* (Taylor) Zwack	Crustose	Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp.	Kabirchabutra, Tarwartola	Upreti and Satya, 2007
128.	*Verrucaria coerulea* (Ram.) DC.	Crustose	Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp., *Mallotus philippensis*	Kabirchabutra, Kapildhara	Upreti and Satya, 2007
Fam: Thelenellaceae					
129	*Thelenella levidella* (Nyl.) Mayrh.	Crustose	Root of *Mallotus philippensis, Shorea robusta*	From Amarkantak 5km before Chhaparwa	Upreti and Satya, 2007
Fam: Trapeliaceae					
130	*Trapeliopsis* sp.	Crustose	Root of *Shorea robusta, Mangifera indica, Syzygium cuminii, Ficus* sp.	Kabirchabutra, Tarwartola, 5 km before Chhaparwa from Amarkantak	Nayaka, *et al*., 2007; Upreti and Satya, 2007

In Achanakmar- Amarkantak BR, pure patch of *Shorea robusta* bear luxuriant growth of lichens (Upreti and Satya, 2007). The available data will be useful in conducting research related to phyto-sociology, food-webs, energy flow, productivity, eco-physiology, etc.

IV. Updated list of ferns:

Twenty seven species of ferns have been listed in volume 1 part I of BRIS. Recently, some of them have been recorded to exist in other ranges of the BR (Table 3). The updated list of 32 species of ferns belonging to 16 families is as hereunder.

Table 3. Updated List of Pteridophytes (Ferns) Existing in Achanakmar- Amarkantak BR:

S.N.	Name of species and its synonyms	Distribution in BR	Status*	References
Fam: Adiantaceae				
1.	*Adiantum capillus-veneris* L.	Lamni, Amadob, Amarkantak	EN	Prasad & Pandey, 1987; Pandey *et al.*,1991; Verma *et al.,* 1993; Saini, 2005; Tiwari, *et al.,* 1995
2.	*Adiantum lunulatum* Burm. (Syn. *Adiantum philippense* L.)	Achanakmar, Kapildhara, Dugdh dhara, Aamanala, Chachai, Kirer ghati	C	Saxena, 1970; Verma *et al.*, 1993; Tiwari *et al.,* 1995; Chaubey e*t al.,*, 2001; Khare and Bahera, 2007
3.	*Adiantum incisum* (Retz.) Copel. (Syn. *Adiantum caudatum* Auct. Beddome)	Throughout BR	C	Panigrahi & Murti, 1989; Khare and Bahera, 2007
Fam: Aspidiaceae				
4.	*Dryopteris cochleata* (D. Don) C. Chr. (Syn. *Nephrodium cocheatum* Buch., *Lastrea macrocarpa* C., *Dryopteris heliopteroides* Christ.)	Dudhdhara, Kapildhara, Panchdhara, Amadob, Amarkantak	C	Saxena, 1970; Panigrahi and Murti, 1989; Verma *et al.*, 1993; Tiwari *et al.*, 1995; Khare and Bahera, 2007
5.	*Dryopteris sparsa* (D.Don) O. Ktze.	Amarkantak	C	Verma *et al.*, 1993; Tiwari *et al.*, 1995
6.	*Polystichum*	-	EX	Saxena, 1970;

	auriculatum Sensu Bedd. (Syn. *Polystichum harpohyllum* (Zenk. *et* Kze) Sledge			Tiwari *et al*., 1995; Khare and Bahera, 2007
7.	*Tectaria macrodonta* (Fee.) C. Chr. (Syn. *Aspidium coadunatum* Wall *ex* Hook *et* Grev., *Tectaria macrodonta* (Wall *ex* Hook. *et* Grev.) C. Chr.	Sonmuda, Amanala, Kapildhara	C	Saxena, 1970; Panigrahi and Murti, 1989; Tiwari *et al*., 1995; Khare and Bahera, 2007
8.	*Tectaria polymorpha* (Wall. *ex* Hook) Copel	Kapildhara	C	Verma *et al*., 1993
Fam: Aspleniaceae				
9.	*Asplenium cheilosorum* Kze. *ex* Mett. (Syn. *Asplenium heterocarpum* Wall.)	Amarkantak	EN	Saxena, 1970; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
Fam: Athyriaceae				
10.	*Athyrium falcatum* Bedd. (Syn. *Athyrium drepanophyllum* (Bak.) Bedd., *Asplenium drepanophyllum* Bak.)	Amarkantak, Aamanala, Dudhdhara, Kapildhara, Maikibagia, Sonmuda	R	Saxena, 1970; Tiwari, *et al*., 1995; Panigrahi & Murti, 1989
Fam: Blechnaceae				
11.	*Blechnum orientale* Linn. (Syn. *Asplenium orientale* (L.) Bernh., *Blechnum javanicum* (L.) Pr.)	Amarkantak, Dudhdhara, Shambhudhara	R	Saxena, 1970; Panigrahi and Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Khare and Bahera, 2007
Fam: Cheilanthaceae				
12.	*Cheilanthes farinosa* Forsk.) (Syn. *Pteris farinosa* Forsk., *Cheilanthes pulveracea* Pr., *Aleuritopteris farinosa* (Forsk.) Fee)	Kapildhara, Aama nala, Dudhdhara, Chachai, Chada, Amarkantak	C	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
Fam: Equisetaceae				
13.	*Equisetum*	Dudhdhara,	C	Saxena, 1970;

	ramossissimum Desf. subsp. *debile* (Roxb. *ex* Vaucher) Hauke	Chachai		Verma *et al*., 1993; Tiwari *et al*., 1995; Singh and Dixit, 2005; Khare and Bahera, 2007
14.	*Equisetum diffusum* D. Don.	Amarkantak	C	Panigrahi & Murti, 1989; Verma *et al*., 1993; Saini, 2005
Fam: Isoetaceae				
15.	*Isoetes bilaspurensis* Panigrahi	Pasan, Amritdhara	Endemic	Panigrahi & Murti, 1989; Singh & Dixit, 2005
16.	*Isoetes coromandelina* L.f.	Near Kota	C	Panigrahi & Murti, 1989; Singh & Dixit, 2005
Fam: Marsileaceae				
17.	*Marsilea quadrifolia* Linn. (Syn. *Marsilea minuta* L.*, Marsilea major* (Haines) Chowdhury)	Throughout BR	C	Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Khare and Bahera, 2007
Fam: Ophioglossaceae				
18.	*Ophioglossum reticulatum* Linn. (Syn. *Ophioglossum peruvianum* Presl., *Ophioglossum cordifolium* Roxb.)	Jaleshwar, Shambhudhara, Amarkantak	C/R	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
Fam: Osmundaceae				
19.	*Osmunda* sp.	-	R	Verma *et al*., 1993; Tiwari, *et al*., 1995
Fam: Parkeriaceae				
20.	*Ceratopteris thalictroides* (Linn.) Brogn. (Syn. *C. siliquosa* Copeland; *Acrostichum*	Amarkantak	C	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et*

	thalictroides L.)			*al*., 1995; Khare and Bahera, 2007
Fam: Polypodiaceae				
21.	*Marginaria macrocarpa* (Bory.*ex* Wild) Nayar *et* Kaur (Syn. *Pleopeltis lanceolata* Linn.)	Bhrigukamandal	EX	Saxena, 1970; Tiwari *et al.,*1995; Khare and Bahera, 2007
22.	*Microsorium membranaceum* (D.Don.) Ching. (Syn. *Polypodium membranaceum* D. Don., *Pleopeltis membranacea* Moore)	Amarkantak	R	Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
23.	*Paraleptochilus decurrens* (Bl.) Copel var. *lanceolata* (Fee) Dixit, (Syn. *Leptochilus lanceolatus* Fee; *Gymnopteris variabilis* Hook. var. *lanceolata* (Hook.) Bedd.)	Kabirchabutra	C/R	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
Fam: Pteridaceae				
24.	*Pteris quadriaurita* Retz.	Dudhdhara, Kabirchabutra, Amarkantak	C	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Khare and Bahera, 2007
25.	*Pteris vittata* Linn. (Syn. *Pteris longifolia* Linn.)	Foothill of Amarkantak	C	Panigrahi & Murti, 1989; Verma, *et al*., 1993
Fam: Schizaeaceae				
26.	*Lygodium flexuosum* (Linn.) Ws. (Syn. *Ophioglossum flexuosum* Linn., *Ophioglossum scandens* Linn., *Lygodium scandens* (Linn.) Sw.)	Amadob	Rare	Prasad & Pandey, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Chaubey, *et al*., 2001; Saini, 2005;Khare and Bahera, 2007

Fam: Selaginellaceae				
27.	*Selaginella ciliaris* (Retz.) Spring (Syn. *Selaginella proniflora* Baker)	Kapildhara, Mai ki bagia, Amarkantak	C	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al*., 1995; Saini, 2005; Singh & Dixit, 2005; Khare and Bahera, 2007
28.	*Selaginella indica* (Milde) Trayon (Syn. *Selaginella longipila* Hieron, *Selaginella rupestris* Spring)	Shambhudhara	R	Saxena, 1970; Panigrahi & Murti, 1989; Tiwari *et al*., 1995; Singh & Dixit, 2005; Khare and Bahera, 2007
29.	*Selaginella bryopteris* (L.) Baker (Syn. *Lycopodium bryopteris* L.)	-	C	Verma *et al*., 1993; Singh & Dixit, 2005
30.	*Selaginella repanda* (Dev. *ex* Poir.) Spring	Amarkantak	C	Panigrahi & Murti, 1993; Singh & Dixit, 2005
31.	*Pronephrium nudatum* (Roxb. *ex* Griffith) Holttum (Syn. *Abcopteris multilineata* (Wall *ex* HK.) Ching, *Polypodium nudatum* Roxb., *Cyclosorus nudatum* (Roxb.) Nayar *et* Kaur)	Sonemuda, Dugdhadhara, Kabirchabutra	C	Saxena, 1970; Panigrahi & Murti, 1989; Verma *et al*., 1993; Tiwari *et al.,* 1995; Chaubey *et al*., 2001; Khare and Bahera, 2007
32.	*Christella parasitica* (Linn.) Tardieu (Syn. *Cyclosorus parasitica* (Linn.) *Polypodium parasiticum* L., *Dryopteris parasitica* L., *Nephrodium procurrens* (Mett.))	Dudhdhara, Kapildhara	C	Saxena, 1970; Verma *et al*., 1993; Tiwari *et al.,* 1995; Khare and Bahera, 2007

* C= common; R=rare; EN= endangered; EX= extinct in wild

During the recent workshop held on 30th April 2007, Khare & Bahera (2007) presented a research article on ferns of Achanakmar-Amarkantak BR. They summarized a list of fern species distributed in different ranges of BR. Ten species of them were not reported from the BR area by any other previous authors. These were – 1. *Ampelopteris prolifera* (Retz.) Copel. (Syn. *Hemionitis incisum* Retz.; *Goniopteris prolifera* (Retz.) Fr.), 2. *Araiostegia pseudocystopteris* (Kze.) *ex*. Mett. (Syn. *Davanallia pseudocystopteris* Kunze), 3. *Azolla pinnata* R.Br., 4. *Cheilanthes rufa* D.Don (Syn. *Aleuritopteris rufa* (D.Don) Ching), 5. *Cyclosorus subpubescene* (Bl.) Ching., 6. *Diplazium esculentum* (Retz.) Sw. (Syn. *Hemionitis esculenta* Retz., *Asplenium esculentum* (Retz.) Presl., *Callipteris ambigua* Sw.), 7. *Dryoathyrium boryanum* (Willd.) Ching. (Syn. *Aspidium boryanum* Willd., *Lastrea boryana* Willd., *Phegopteris kingii* Beddome), 8. *Nephrolepis exaltata* (L.) Scott., 9. *Pteris vittata* Linn. (Syn. *Pteris longifolia* Linn. and 10. *Thelypteris ciliata* Wall. (Syn. *Trigonospora caudipinna* (Ching) Sledge). The authors reported that 6 species of the above ferns namely *Cheilanthes rufa* D. Don., *Diplazium exculentum* (Retz.) Sw., *Dryoathyrium boryanum* (Willd.) Ching, *Marginaria macrocarpa* (Bory *ex* Wild.) Nayar *et* Kaur, *Polystichum auriculatum* sensu Bedd. and *Thelypteris ciliata* Wall. are extinct in Wild. This needs further confirmation and hence excluded from the table.

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3. News/ Events/ Visits:

I. Visit of scientists from Anthropological society:

Dr. Arun Kumar Singh and Shri. D.N. Pandey Scientists from Anthropological Survey of India, Ministry of Culture, Government of India visited the Biosphere as their first phase of study on *Man* in Biosphere: Amarkantak-Achanakmar Biosphere Reserve on 11.07.07. The study will continue by their frequent visits to the core as well as buffer zones of the BR.

II. Meetings of state level steering committee:

Meeting of state level steering committee held at Raipur (Chhattisgarh) on 25th August 2007 under the chairman ship of Principal Secretary, Government of Chhattisgarh, Forest Department to finalise the Annual Plan of Operation of Achanakmar- Amarkantak Biosphere Reserve for the year 2007-08.

III. Project Sanctioned on BR:

1. Project entitled "Faunal Resources of Achanakmar-Amarkantak Biosphere Reserve" is sanctioned to Zoological Survey of India, Central Region, Jabalpur by Ministry of Environment and Forests, Government of India.

Annexure-I Format for projects submission on Achanakmar-Amarkantak Biosphere Reserve

APPLICATION FOR GRANT FOR RESEARCH PROJECT

(To be completed by the Principal Investigator)

1. Title of the Project :
2. Name and Designation of the Principal-Investigator :
3. Name and Designation of the Co-Investigator :
4. Postal Address of the Principal Investigator and Co-investigator :
5. Name of the institution/organisation in which the project will be carried out :
6. Name of other institution(s)/ Organisation(s) involved in the project :
7. Duration of the project :
8. Total amount of assistance required :
9. Following documents are enclosed :

Statement I – An abstract, not exceeding one page, describing the back ground, objectives, methodology and figures of year-wise budget.

Statement II - Should contain the following :

A. State of Art of the subject including work done in India and elsewhere;
B. Detailed literature survey
C. Objectives
D. Detailed methodology
E. Quarter-wise work-plan
F. PERT – Chart
G. Practical relevance/utility of the project
H. Agencies which can utilize the results of the project.

Statement III – giving brief background of the investigator who will carry out the project including papers published in the area of the proposed research project.

Statement IV – indicating facilities (equipment/instrument) available at institution organisation for carrying out the projects.

Statement V – Project budget in the prescribed format.

APPENDIX TO THE APPLICATION FOR GRANT OF RESEARCH PROJECTS

PROJECT BUDGET

A.	**Salaries & Wages :**	**I Year**	**II Year**	**III Year**	**Total**
1.	Investigator				
2.	Research Associate				
3.	SRF/JRF/SPF/JPF				
4.	Supporting technical staff or other personnel, if any				
	Grand total : ……. …….				

* Please specify, the rate of salary and wages per month for each category and also rates of HRA and Medical reimbursement.

B. Permanent Equipment

Grand total: ……

C. Expendables
(Chemicals & Glassware)

D. Travel

E. Other project costs, if any (please specify)

F. Contigencies

G. Institutional charges
(15% of the total Project Cost)

Grand Total : ……

Procedure for sending the research projects to Ministry of Environment and Education, New Delhi:

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