



Studies on flora and faunal diversity in Hirekalgudda state forest, Arasikere, Hassan, Karnataka, India

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Abstract

The present study is an attempt to enumerate the flora and fauna distributed in selected areas of Hirekalgudda state forest near Arasikeretaluk situated in the northern region of Hassan district of Karnataka state. A field survey of the study areas was carried out to document the flora and fauna accruing in that area. 201 plant species belonging to 71 families have been reported. With regard to species diversity, trees are represented by 76 forms, followed by shrubs (70 forms), herbs (45 forms), twinners (5 forms) and climbers (5 forms). Ten endangered and 36 medicinal plants were recorded. Twenty five faunal species were identified in the study areas. The study was undertaken to observe and record the diversity of plants and animal fauna of this area.

Keywords: Biodiversity, fauna, flora, Hassan, Hirekalgudda state forest,

Introduction

Biological diversity is an entity, which encircles different types of animals and plants. Biodiversity is not consistent across the earth. It is consistently rich in the tropics and it is less rich in polar regions where conditions support much less biomass (Philomena *et al.* 2011). A complex relationship exists among the different diversity levels. Rapid environmental changes typically cause extinctions (Drummond and Strimmer, 2001). Biodiversity is the resource upon which families, communities, nations and future generations depend. It is the link between all organisms on earth, binding each in to an interdependent ecosystem, in which all species have their role. Put simply, reduced biodiversity means millions of people face a future where food supplies are more vulnerable to pests and disease, and where freshwater is in irregular or short supply. Biodiversity has declined by more than a quarter in the last 35 years. In general terms, population

growth and over consumption are the reasons for this enormous loss. Specifically, habitat destruction and wildlife trade are the major causes of population decline in species.

Biodiversity conservation is the protection, preservation and management of wildlife and natural resources such as forests and water. Through the conservation of biodiversity the survival of many species and habitats which are threatened due to human activities can be ensured (Kannaiyan and Gopalan, 2007). In-situ biodiversity conservation includes the conservation of habitats, species and ecosystems where naturally occur. The conservation of element of biodiversity out of the context of their natural habitats is referred to as ex-situ biodiversity conservation. The study was undertaken to observe and record the diversity of plants and animal fauna of Hirekalgudda state forest of Arasikeretaluk of Hassan district of Karnataka state.

Study area: The study area Hirekalgudda state forest is located away from Arasikeretaluk of Hassan district. It lies between 15° 6' to 76° 75' Eastern latitude and 13° 4' to 13° 5' northern latitude. This forest consists of a mass of rocky hills raising more or less 3100 mt. above the surrounding area. The study area is divided in to 6 forest beats for the convenience of administration as shown in Table-1.

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Material and Methods

The survey was initiated in August 2005 and carried out till the end of August 2007. The survey of the biodiversity was undertaken with active co-operation of officials of the forest department. Pre-survey discussions were held with the forest officials and available information was collected.

During the period of investigation quadrat methods were used for analyzing the vegetation. Quadrat of 10 mt. X 10 mt. was placed in each forest beat. The plant specimens were collected after drying. The herbarium sheets were prepared and identified (Diwakar and Sharma, 2000; Naik, 1998; Sharma *et al.*, 1996; Singh *et al.*, 2001). The authenticity of the identified plant specimens were checked by referring the recent monographs and through comparison with authentic herbarium specimens at Madras Herbarium, Botanical survey of India, Sri Krishnadevaraya University Herbarium, Anantapur (SKU), Regional Research Centre, Bangalore (RRCBI) and Manasagangotri, Mysore(MGM).

During the study period, direct observation of animals could not be carried to the expected level. However, the presence of animals could be made out using pugmarks, faecal matter and non decaying body parts of the dead animals. The forest officials who are familiar with these evidences helped in identifying the animals from these indirect evidences.

Table-1: Name of the beats

S No.	Name of the beats	No. of Hectares
1	Tirupathi Beat (TB)	356.91
2	Jajur Beat (JB)	390.00
3	Puralehalli Beat (PB)	488.56
4	Jannavara Beat (JnB)	401.07
5	Nagapuri Beat (NB)	3561.28
6	Aggunda Beat (AB)	408.00

Source -Forest office Arasikere

Results and Discussion

Floral composition

The present investigation deals with the floristic composition of Hirekalgudda state forest located in the northern region of the Arasikeretaluk of Hassan district. The studied forest is rich with different species of herbs, shrubs and trees.

A total of 201 plant species are recorded which come under 71 families, out of which 66 families are dicotyledons and 5 families belonging to monocotyledons (Table-2). Species habitat diversity showed a maximum of trees (76), followed by shrubs (70), herbs (45), twinnings (5) and climbers (5). Relative abundance of flora showed maximum of Caesalpiniaceae (6.467%) followed by Apocynaceae (6.407%), Papilionaceae (4.477%), Asclepidaceae (3.980), Mimaceae (3.980%), Verbenaceae (3.980) and Rubiaceae (3.482%). Out of 71 families, 33 families were represented by a single species each (0.497).

Widely distributed Caesalpiniaceae members include, *Tamarindusindica*, *Bauhinia variegata*, *Cassia absus*, *Cassia auriculata*, *Cassia fistula*, *Cassia siamea*, *Cassia sophera*, *Cassia suffruticosa*, *Cassia tora*, *Pterolobiumhexapetalum*, *Bauhinia malabarica* and *Delonixregia*. Among the generic form *Cassia* is represented by 07 species namely *Cassia absus*, *C. auriculata*, *C. fistula*, *C. Siamea*, *C. Sophera*, *C. Suffruticosa* and *C. tora*. *Ficus* is represented by *Ficus benghalensis*, *F. racemosa*, *F. religiosa*, *F. hispida* and *Ficus exasperate*. *Syzygium* includes *S. hemisphericum*, *S. jambus*, *S. laetum*, *S. occidentale* and *S. zeylanicum*.

The endangered flora are represented 10 species in the study area namely *Butea superba*, *Capparisdivaricata*, *Clematis gouriana*, *DiospyrosSylvatica*, *Ficus racemosa*, *Gardenia gummifera*, *Ipomoea obscura*, *Rauvolfia serpentina*, *Vitexaltissima* and *Santalum album*.

As many as 36 medicinal plants have been identified and collected from this area of which the important ones include *Abrus pulchellus*, *Acacia nilotica*, *Achyranthesaspera*, *Adhatodavasica*, *Argemone mexicana*, *Azadirachta indica*, *Bauhinia variegata*, *Calotropisprocera*, *Carissa carandas*, *Cassia auriculata*, *Cassia fistula*, *Clerodendrum inermis*, *Ocimum americanum*, *Santalum album*, and *Wrightia tinctoria*.



Table. 2: Distribution of flora in the Hirekalgudda state forest

Sl.N o.	Name of the plants/Habit	Families	Name of the Beats/ No. of Species					
Trees			PB	TB	JnB	JB	NB	AB
1.	<i>Sapindusemarginatus</i>	Sapindaceae						√
2.	<i>Anacardiumoccidentale</i>	Anacardiaceae		√				
3.	<i>Mangiferaindica</i>							√
4.	<i>Semecarpusanacordium</i>						√	
5.	<i>Buteamonosperma</i>	Fabaceae						√
6.	<i>Dalbergialatifolia</i>				√			
7.	<i>Saracaasoca</i>	Caesalpiniaceae		√				
8.	<i>Tamarindusindica</i>			√				
9.	<i>Bouhinia variegata</i>						√	
10.	<i>Bauhinia malabarica</i>			√				
11.	<i>Cassia fistula</i>						√	
12.	<i>Cassia siamea</i>				√			
13.	<i>Delonixregia</i>			√				
14.	<i>Acacia ferruginea</i>	Mimosaceae		√				
15.	<i>Acacia leucophloea</i>					√		
16.	<i>Ficusexasperata</i>					√		
17.	<i>Acacia nilotica</i>				√			
18.	<i>Alibizialebeck</i>						√	
19.	<i>Dichrostachyscinerea</i>					√		
20.	<i>Prosopisjuliflora</i>							√
21.	<i>Anogeissuslatifolia</i>	Combretaceae					√	
22.	<i>Terminaliaalata</i>						√	
23.	<i>Terminaliabellirica</i>						√	
24.	<i>Terminaliachebula</i>						√	
25.	<i>Terminaliapamiculata</i>				√			
26.	<i>Careyaarborea</i>	Lecythidaceae			√			
27.	<i>LagerstromeaParviflora</i>	Lythraceae	√					
28.	<i>Haldiniacordifolia</i>	Rubiaceae			√			
29.	<i>Diospyromelonoxylon</i>		√					
30.	<i>Diospyrossylvatica</i>	Ebenaceae					√	
31.	<i>Diospyromontana</i>			√				
32.	<i>Micheliachampaca</i>	Magnjoliaceae					√	
33.	<i>Dilleniapentagyna</i>	Dilleniaceae						√
34.	<i>Kidiacalycina</i>	Malvaceae	√					
35.	<i>Thespesia lampas</i>				√			
36.	<i>Bombaxceiba</i>	Bombacaceae			√			
37.	<i>Salmaliamalabarica</i>		√					
38.	<i>Sterculiaguttata</i>	Sterculiaceae	√					
39.	<i>Sterculiavillosa</i>						√	
40.	<i>Mollotusphilippensis</i>	Euuphorbiaceae			√			
41.	<i>Helicianilagirica</i>	Proteaceae			√			
42.	<i>Aegelmarmelos</i>	Rutaceae					√	
43.	<i>Atalantamonophylla</i>				√			
44.	<i>Limoniaacidissima</i>		√					
45.	<i>Boswelliaserrata</i>	Burseraceae			√			



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46.	<i>Madhuca indica</i>	Sapotaceae	√					
47.	<i>Madhucal longifolia</i>				√			
48.	<i>Garuga pinnata</i>					√		
49.	<i>Azadirachta indica</i>	Meliaceae	√					
50.	<i>Meliadubia</i>				√			
51.	<i>Toona ciliata</i>						√	
52.	<i>Cochlospermum religiosum</i>	Bixaceae					√	
53.	<i>Annona reticulata</i>	Annonaceae	√					
54.	<i>Alstonia scholaris</i>	Apocynaceae					√	
55.	<i>Wrightia arborea</i>					√		
56.	<i>Wrightia tinctoria</i>					√		
57.	<i>Tecomastans</i>						√	
58.	<i>Carallia brachiata</i>	Bignoniaceae			√			
59.	<i>Ficus benghalensis</i>	Moraceae				√		
60.	<i>Ficus religiosa</i>						√	
61.	<i>Ficus hispida</i>					√		
62.	<i>Salix tetrasperma</i>	Salicaceae				√		
63.	<i>Ficus racemosa</i>	Moraceae	√					
64.	<i>Syzygium hemisphericum</i>	Myrtaceae					√	
65.	<i>Syzygium jambos</i>						√	
66.	<i>Syzygium laetum</i>		√					
67.	<i>Syzygium occidenatale</i>		√					
68.	<i>Syzygium zeylanicum</i>		√					
69.	<i>Olax wightiana</i>	Olacaceae					√	
70.	<i>Santalum album</i>	Santalaceae	√					
71.	<i>Dendrophthoe trigona</i>	Loranthaceae	√					
72.	<i>Tectona grandis</i>	Verbenaceae			√			
73.	<i>Vitex negundo</i>				√			
74.	<i>Vitex altissima</i>				√			
75.	<i>Dolichandroneaatrovirens</i>	Bignoniaceae			√			
76.	<i>Trema orientalis</i>	Ulmaceae					√	
Shrubs								
77.	<i>Scutiamyrtina</i>	Rhamnaceae		√				
78.	<i>Ziziphus mauritiana</i>				√			
79.	<i>Ziziphus oenoplia</i>		√					
80.	<i>Ampelocissus tomentosa</i>	Vitaceae					√	
81.	<i>Dodonaea viscosa</i>	Sapindaceae				√		
82.	<i>Abrus pulchellus</i>	Papilionaceae			√			
83.	<i>Butea superba</i>		√					
84.	<i>Crotalaria retusa</i>			√				
85.	<i>Desmodium pulchellum</i>						√	
86.	<i>Cassia auriculata</i>	Caesalpinaceae		√				
87.	<i>Cassia Sophera</i>						√	
88.	<i>Cassia suffruticosa</i>		√					
89.	<i>Pterolobium hexapetalum</i>				√			
90.	<i>Acacia sinuate</i>	Mimosaceae			√			
91.	<i>Passiflora foetida</i>	Passifloraceae					√	
92.	<i>Opuntia cochenillifera</i>	Cactaceae					√	
93.	<i>Opuntia stricta</i>		√					
94.	<i>Canthium parviflorum</i>	Rubiaceae					√	



95.	<i>Chasaliaophioxyloides</i>						√	
96.	<i>Gardenia gummifera</i>			√				
97.	<i>Gardenia latifolia</i>					√		
98.	<i>Ixoracoccinia</i>		√					
99.	<i>Clematis gouriana</i>	Ramunculaceae					√	
100.	<i>Naraveliazeylanica</i>				√			
101.	<i>Stephania japonica</i>	Manispermaceae					√	
102.	<i>Tinosporacordifolia</i>			√				
103.	<i>Cadabrafruticosa</i>	Capparaceae					√	
104.	<i>Capparisdivaricata</i>				√			
105.	<i>Cappariszeylanica</i>		√					
106.	<i>Bixaorellana</i>	Bixaceae	√					
107.	<i>Abutilon hirtum</i>	Malvaceae					√	
108.	<i>Hibiscus aculeatus</i>						√	
109.	<i>Helicteresisora</i>	Sterculiaceae	√					
110.	<i>Grewiaabutlifolia</i>	Tiliaceae			√			
111.	<i>Aspidopterysindica</i>	Malpighiaceae					√	
112.	<i>Euphorbia antiquorum</i>	Euphorbiaceae					√	
113.	<i>Murrayakoenigii</i>	Rutaceae	√					
114.	<i>Toddaliaasiatica</i>		√					
115.	<i>Annonasquamosa</i>	Annonaceae	√					
116.	<i>Carissa carandas</i>	Apocynaceae	√					
117.	<i>Ervatamiaheyneana</i>						√	
118.	<i>Holorrhenapubescens</i>						√	
119.	<i>Holorrhenaantidysenterica</i>				√			
120.	<i>Ichnacarpusfrutescens</i>				√			
121.	<i>Rauvolfia serpentine</i>				√			
122.	<i>Neriumindicum</i>						√	
123.	<i>Calotropisgigantea</i>	Asclepiadaceae			√			
124.	<i>Calotropisprocera</i>				√			
125.	<i>Cynanchumcallialata</i>		√					
126.	<i>Sarcestemmaacidum</i>		√					
127.	<i>Wattakakavolulubilis</i>					√		
128.	<i>Ipomoea Staphylina</i>	Convolvulaceae					√	
129.	<i>Argyreia nervosa</i>						√	
130.	<i>Daturastramonium</i>	Solanaceae					√	
131.	<i>Barleriabuxifolia</i>	Acantheaceae	√					
132.	<i>Nilgirianthusheyneanus</i>					√		
133.	<i>Rhinacanthusnasutus</i>							√
134.	<i>Meliesmapimata</i>	Sabiaceae						√
135.	<i>Celosia argentea</i>	Amaranthaceae						√
136.	<i>Ochnaobtusata</i>	Ochnaceae				√		
137.	<i>Embeliaribes</i>	Myrsinaceae				√		
138.	<i>Ximeniaamericana</i>	Olacaceae						√
139.	<i>Carnonaretusa</i>	Boraginaceae					√	
140.	<i>Callicarpatomentosa</i>	Verbenaceae	√					
141.	<i>Clerodendruminermis</i>		√					
142.	<i>Durantarepens</i>		√					
143.	<i>Lantana camara</i>				√			
144.	<i>Lantana indica</i>					√		



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145.	<i>Canthiumangustifolium</i>	Rubiaceae	√					
146.	<i>Ardisinia</i>					√		
Herbs								
147.	<i>Crotalaria calycina</i>	Papilionaceae		√				
148.	<i>Crotalaria juncia</i>			√				
149.	<i>Cassia absus</i>	Caesalpiniaceae		√				
150.	<i>Cassia tora</i>			√				
151.	<i>Bergiaammannioides</i>	Elatinaceae						√
152.	<i>Mimosa pudica</i>	Mimosaceae		√				
153.	<i>Droseraburmannii</i>	Droseraceae						√
154.	<i>Trianthemadecandra</i>	Aizoceae	√					
155.	<i>Diplocyclospalmatus</i>	Cucurbitaceae				√		
156.	<i>Thalictrumdalzellii</i>	Ranunculaceae	√					
157.	<i>Cymbopogonnardus</i>	Poaceae				√		
158.	<i>Nelumbonucifera</i>	Nelumbonaceae		√				
159.	<i>Argemonemexicana</i>	Papaveraceae	√					
160.	<i>Cleome gynandra</i>	Capparaceae			√			
161.	<i>Cleome monophylla</i>						√	
162.	<i>Polygala javana</i>	Polygalaceae					√	
163.	<i>Polycarpacacorymbosa</i>	Caryophyllanceae					√	
164.	<i>Abelmoschusangulosu</i>	Malvaceae					√	
165.	<i>Biophyiumsensitiveum</i>	Oxalidaceae	√					
166.	<i>Oxalis corniculata</i>						√	
167.	<i>Acalyphamalabarica</i>	Euphorbiaceae					√	
168.	<i>Croton bonplandianus</i>						√	
169.	<i>Partheniumhysterophrus</i>	Asteraceae			√			
170.	<i>PistiaStraliotes</i>	Araceae			√			
171.	<i>Catharanthuspisillus</i>	Apocynaceae	√					
172.	<i>Catharanthusroseus</i>						√	
173.	<i>Asclepiascurassavica</i>	Asclepiadaceae				√		
174.	<i>Canscora decussate</i>	Gentianaceae					√	
175.	<i>Canscoraperfoliata</i>						√	
176.	<i>Ipomoea obscura</i>	Convolvulaceae					√	
177.	<i>Nicandraphysalodes</i>	Solanaceae					√	
178.	<i>Cleome viscosa</i>						√	
179.	<i>Solanumkhasianum</i>				√			
180.	<i>Solanumnigrum</i>				√			
181.	<i>Withaniasomnifera</i>							√
182.	<i>Adhatodavasica</i>	Acanthaceae						√
183.	<i>Adhatodazeylanica</i>							√
184.	<i>Ecboliumviride</i>					√		
185.	<i>Achyranthesaspera</i>	Amaranthaceae						√
186.	<i>Anisochiluscarnosus</i>	Lamiaceae						√
187.	<i>Ocimumamericanum</i>							√
188.	<i>Bacopamonniieri</i>	Scrophulariaceae			√			
189.	<i>Amischophacelus axillaries</i>	Commelinaceae	√					
190.	<i>Amischophacelusculcutta</i>		√					
191.	<i>Cyanotis tuberosa</i>						√	
Twinnings								



192.	<i>Dioscorea oppositifolia</i>	Dioscoreaceae			√			
193.	<i>Gymnemasylvestrae</i>	Asclepiadaceae	√					
194.	<i>Argyriacuneata</i>	Convolvulaceae					√	
195.	<i>Aspidopteryscordate</i>	Malpighiaceae	√					
196.	<i>Teramnus mollis</i>	Papilionaceae			√			
Climbers								
197.	<i>Cissampelos pateriira</i>	Manispermaceae		√				
198.	<i>Cyclea peltata</i>					√		
199.	<i>Smilax perfoliata</i>	Smilacaceae					√	
200.	<i>Hemidesmus indicus</i>	Asclepiadaceae					√	
201.	<i>Hiptage benghalensis</i>	Malpighiaceae					√	

PB-Puralehalli Beat, TB-Thirupathi Beat, JnB-Jannavara Beat, JB-Jajur Beat, NB-Nagapuri Beat, AB-Aggunda Beat

Faunal composition

In the present investigation, 24 species of fauna were identified in their natural habitats (Table-3). However the remaining fauna could not be identified because most of the vertebrates are shy in nature and move away from the vicinity with slightest sound or scent. Thus it is possible to record a few animals by direct observations. The occurrence of most of the fauna were identified through indirect evidences viz., by the presence of pugmarks, patten of disposal of faecal matter, contents of faecal matter and non decaying body parts of dead animals.

Table-3: List of animals recorded from Hirekalgudda state forest

Sl. No.	Common name	Vernacular name	Scientific name	Identification methods
01	Tiger	Huli	Pantheratigris Lin.	Pm + Fr
02	Leopard	Chirathe	Pantherapardus Lin.	Pm + Fr
03	Elephant	Ane	Elephusmaximus Lin.	Pm + Fr
04	Sambar	Kadave	Cervus unicolor Kerr.	Pm + Fr
05	Porcupine	Mulluhandi	Hystrixindica Kerr.	R
06	Jungle cat	Kadubekku	FelischausGuld.	Do
07	Bear	Karadi	Melursusursinus Show.	Pm + Fr
08	Wild dog	Kadunayee	Cuonalpinus Pallas	Pm
09	Langur	Uddabalada	Presbytis entellus Dufresne	Do
10	Squirrel	Alilu	Ratufa indica Var.	Do
11	Indian hare	Mola	LepusnigraculusCuv.	Do + Fr
12	Paddy bird	Kokkare	Ardeacinerea Lin.	Do
13	Peacock	Navilu	Pavocristatus Lin.	Do + Fr
14	Indian myna	Myna	AcridotherestrictisVeli.	Do
15	Pigeon	Parivala	Columba liviaBriss.	Do
16	Jungle fowl	Kadukoli	Falco biarmicusTem.	Do
17	Little cormorant	Neerukage	Phalacrocoraxloiger Lin.	Do
18	Jungle crow	Kadukage	CovusmacrorhynchusDaud.	Do
19	Calotes	Othikatha	Calotesvercicolor Lin.	Do
20	Chameleon	Gosumbe	Chameloncolcaratus Lin.	Do
21	Python	Hebbavu	Python molurusDaud.	Do
22	Naja	Nagarahavu	NajanajaBriss.	Do
23	Flying fox	Bat	PteropusgiganteusCuv.	Do
24	Frog	Kappe	Bufo melanostictus Lin.	Do

Pm-Pugmark, Fr-Faecal remains, Do-Direct observation, Ff-Fallen feathers



Species diversity of fauna showed maximum of Mammalia (12), followed by Avia (7), Reptilia (4) and Amphibia (1).

Mammalian species include *Pantheratigris*, *Pantheropardus*, *Elephusmaximus*, *Hystrixindica*, *Melursusursinus* and *Lepusnigraculus*. Avian species include *Pavocristatus*, *Acridotherestrictis*, *Falco biarmicus*, *Phalacrocoraxoliger* and *Covusmacrorhynchus*.

The present study area is very rich in biodiversity which comprises both lower and higher plants and animals. Now-a-days, biodiversity is under severe ecological stress. Increased human disturbances and encroachment all around the study area by farmers for agricultural activities reduce the biodiversity of the Hirekalgudda state forest.

The concerned authorities should initiate afforestation programs in order to develop green belt in and around the study area. So that lot of greening could be maintained which intern benefits the mankind for ever?

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