

A review of the faunal diversity of the Fergusson College campus, Pune, India

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Abstract

This study attempt to document the past and present faunal diversity of Fergusson College campus in Pune from 2011 to 2014. Four vertebrate classes (Amphibia, Reptilia, Aves, Mammalia) and two invertebrate classes (Arachnida: Araneae and Lepidoptera: Papilionoideae) were investigated. Our effort resulted in the documentation of 90 spider (28 families), 93 butterfly (8 families), 5 amphibian (3 families), 26 reptile (9 families), 137 bird (52 families) and 19 mammal (13 families) species. A decreasing trend in terms of species richness was observed for most faunal groups over years caused primarily due to habitat degradation.

Introduction

It is now, a well-established fact that biodiversity or 'the variability of life' (Savard *et al.* 2000) is being eroded on a global scale due to various anthropogenic activities (Magurran 2004; Pereira *et al.* 2010). Criteria such as species richness, representation and rarity form an important component in assigning biodiversity value to a terrestrial site which in turn provides a scientifically defensible framework for conservation (Regan *et al.* 2007).

Increasing urbanization is one of the key reasons for declining biodiversity in the form of alteration of habitats and fragmentation of natural vegetation (Tratalos *et al.* 2007). With the increase in global urban population, urban ecosystems have emerged as a subject of much research in recent years due to the ecosystem services provided by them (Savard *et al.* 2000). Biodiversity data is crucial for conservation (Gardner *et al.* 2008) and thus it is necessary to first understand the existing diversity in order to monitor and maximize it.

Pune city in western Maharashtra is the eighth largest metropolis in India and encompasses numerous educational and research institutes, the campuses of which house significant biodiversity. Several studies focussing on diversity of specific taxa in and around the city have been conducted till date (Underwood 1948; Vartak 1958; Chopra 1964b; Tikader 1963b; Goel 1976; Paranjape & Mulherkar 1979; Nalavade 1999; Thakur & Gour-Broome 2000-01; Yardi & Korad 2000-01; Pachpor *et al.* 2000-01; Padhye *et al.* 2002; Korad & Yardi 2004a; Sondhi 2006; Gole 2007). A broad city-level assessment (Dixit *et al.* 2000-01) does not provide adequate locality specific details which could be useful for undertaking regional conservation measures. Fragmentary studies on

some taxa are also available from one such educational institute: The Fergusson College campus, but a unified and updated faunal diversity report of the campus was not available till date.

Hence, we undertook the task of assessing and reviewing the faunal diversity of the Fergusson college campus. Our aim was to evaluate the past, present and probable species richness, ecological notes and threats for the taxa.

Study Area

The Fergusson College with its 109 acre campus is located centrally in the Pune city in the state of Maharashtra, India (18°31'17.75" N; 73°50'20.17" E). The main campus consists of century old gothic-styled buildings and can be considered as a well-wooded urban ecosystem. The campus supports a rich diversity of plants including several rare as well as notable exotic as well as native species (Vartak 1958; Nerlekar *et al.* 2016).

The Fergusson hill was connected to the larger Vetal hill complex until the Senapati Bapat road was constructed in the 1960's which resulted in the fragmentation of the native habitat hindering animal movement (Nalavade 2001). Thus, when the hill was a part of the larger Vetal-hill complex, it supported an array of wildlife. The original vegetation type in the area was Tropical southern dry mixed deciduous (Type 5A/C3) as classified by Champion & Seth (1968). The underlying rock in the entire study area is basalt.

Methods

Both direct and indirect methods were employed to understand the diversity of selected taxa (spiders, butterflies, reptiles, amphibians, birds and mammals) within the campus. Indirect methods included extensive literature surveys along with contacting selected ex-students of the college those who were/are involved in allied research activities.

In general, for all taxa those have been actively assessed, the authors carried out intensive surveys as a team during regular intervals per month from June 2011 to June 2014. For the first two academic years (2011-2013), the surveys were carried out in

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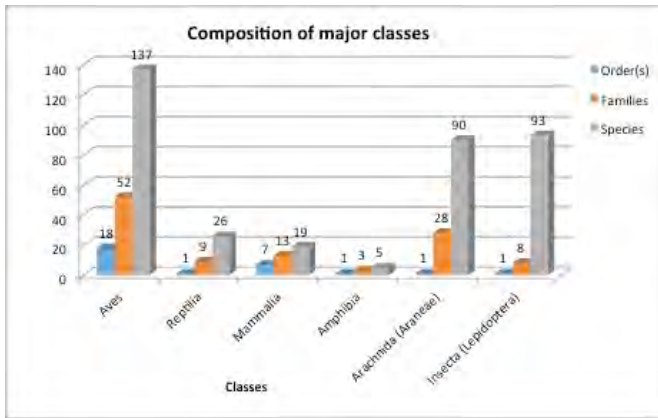


Fig 1. Composition of major classes analysed. Four vertebrate classes and two invertebrate classes are represented. Data for order lepidoptera is partly after Kumar (1984).

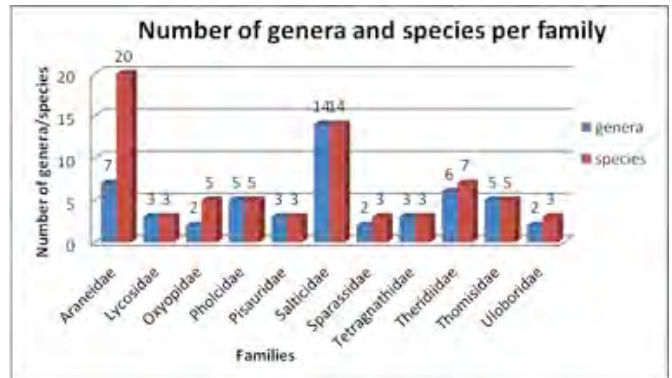


Fig 2. Composition of dominant families of spiders recorded till date. (Families with 3 or more species included in graph)

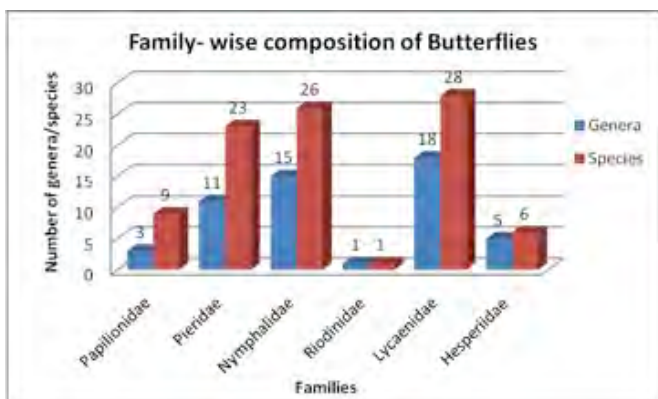


Fig 3. Species and family-wise composition of the butterfly families. Data for all species recorded till date from campus has been analysed (93 species). Recent nomenclature changes have been followed for merging families as per Kunte *et al.* (2015)

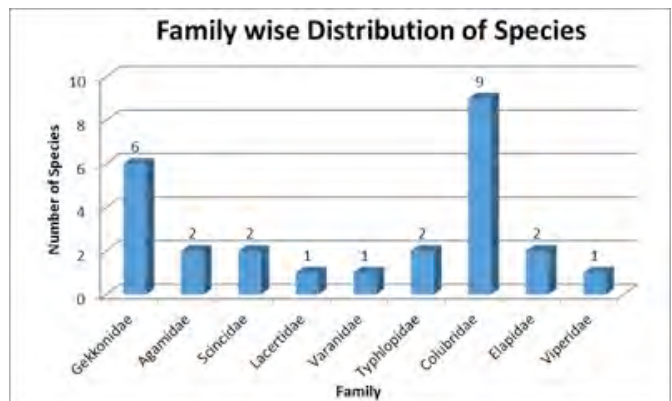


Fig 4. Species richness of the reptilian families recorded from the campus

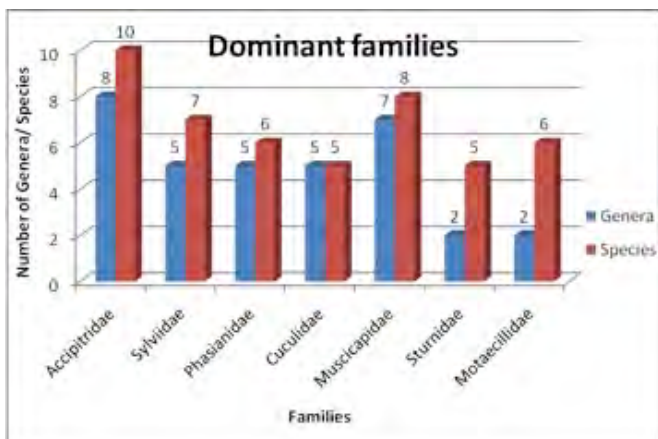


Fig 5. Representation of the most species-rich families of birds (those including 4 or more species have been shown here)

an opportunistic manner but covered all the seasons and habitats with a total effort of approximately 600+ hours. During 2013-2014, a typical field work session lasted for 4 hours on an average and was conducted for 6 days a week (thus total effort= 288 hrs). During some of these field work sessions,

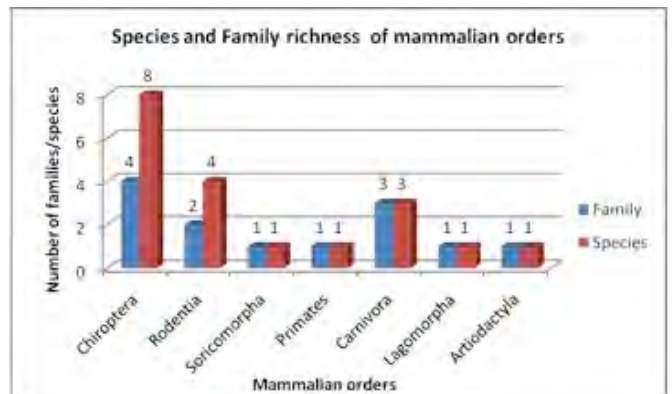


Fig 6. Species and family-wise composition of the mammalian orders recorded

experts of respective taxa (acknowledged) were also invited to confirm the identification.

Details of taxa-specific methodology, relevant literature review and the field guides used for identification are provided in the respective sections. Although quantitative demographic data could be collected only for selected taxa due to logistical constraints, qualitative ecological notes have been provided for most of the taxa examined.

Results

Within the four vertebrate taxa examined for diversity, birds showed maximum richness followed by reptiles, mammals and lastly amphibians. Invertebrates including spiders and butterflies also revealed a significant diversity (Fig 1). Taxa specific results are discussed in the respective sections. It is clear from the literature survey that relatively more literature is available about avifauna in the campus as compared to other taxa.

Araneae

Significant literature is available on diversity and distribution of spiders in Pune city. Studies like Tikader 1962a; 1963a; 1974; 1980; Tikader & Malhotra 1980; Tikader & Bal 1981 deal with the araneae of the Pune region indirectly and works including Tikader 1962b; 1962c; 1963b; 1963c; 1963d; 1965; 1966a; 1966b; 1975; Tikader & Malhotra 1976; Tikader 1977; 1980a,b; Tikader & Bal 1981; Tikader 1981 deal with the same directly. In the recent past Kelkar *et al.* (2006) studied the diversity of spiders in Fergusson campus, in which a total of 72 species were recorded. Warudkar (2013) recorded opportunistic behavioural observation of *Argiope* sp. regarding stabilimenta pattern. Apart from this no spider specific survey has been carried out in the campus.

Field guides used include Sebastian and Peter (2009), Jocqué and Dippenaar-Schoeman (2006). In the enumeration, all the names, families were checked using (World Spider Catalogue 2016). Taxa that were identified only till genus level by Kelkar *et al.* (2006), and cases in which the current survey yielded more than one species for that genus, such morphospecies are excluded.

In the campus, till date total 90 species belonging to 71 genera and 28 families have been reported with the family Araneidae occupying a dominant position (Fig. 2, Table 1). Out of these, 36 species have not been recorded by Kelkar *et al.* (2006), where as 33 species have not been recorded in the present study but have been recorded only by Kelkar *et al.* (2006). A total of 21 species are common in both surveys. Thus a total of 57 species belonging to 46 genera and 21 families have occurred in the present field survey.

A locally uncommon spider *Loxosceles rufescens* Dufour, 1820 was occasionally encountered under the stones on hill side area in the campus. Also a member of Trapdoor spider family *Sason cinctipes* (= *S. robustum*) has been recorded only once by Kelkar *et al.* (2006) and has not been found since then. The ant mimicking *Myrmarachne* sp. was occasionally found in silken retreats on the ventral sides of leaves of *Agave* sp. A single immature specimen of Giant Wood Spider *Nephila* sp. was recorded only once from the surroundings of

Mathematics Department. A white-kneed hackle web spider *Zosis geniculatus* is found seasonally inside a green house (currently not in use) in the vicinity of Mathematics Department.

Butterfly diversity

Efforts to document the butterfly fauna of Pune district are sporadic and restricted to a particular urban area or a forested region (Kunte 2000-01, Rane & Ranade 2003; Padhye *et al.* 2006, Sharma 2009, Nimbalkar *et al.* 2011, Chandekar *et al.* 2014). A compiled inventory for Lepidopterans (Papilionoidea) for the district is not available. Kunte (2000-01) reported a total of 104 butterfly species from a mosaic of habitats from Pune city. The paucity of literature pertaining to moth diversity from the city and surrounding areas leaves the inventory of lepidopterans incomplete.

The only available comprehensive checklist of the butterflies from the Fergusson Campus was compiled by Kumar (1984) which included 90 species belonging to 8 families. Warudkar & Patankar (2013) provided brief remarks about the taxa in the campus. Rest reports like Chhaya *et al.* (2012) record presence of species indirectly from the campus. In the current attempt, periodic observations were carried out during each season in the study tenure and Kehimkar (2008) was referred to for field identification which was further scrutinized and updated following recent nomenclature as per Kunte *et al.* (2015).

Till date, 93 species, 53 genera belonging to 8 families (according to recent classification, the families have been reduced to 6) have been reported so far from the campus (Fig. 3). In the current survey alone, 43 species belonging to 33 genera and 6 families and one super-family: Papilionoidea were recorded from the campus (Table 2). Only three species namely Blue Oak Leaf *Kallima horsfieldi* Kollar, 1844, Common Bush Brown *Mycalesis perseus* Fabricius, 1775 and Common Jay *Graphium doson* Felder & Felder, 1864 were reported as additions to the checklist by Kumar (1984), but 47 species were not recorded currently and solely reported by Kumar (1984).

The presence of *Lantana camara* and *Plumbago zeylanica* bushes in the campus has proven to be of great advantage for some butterflies in terms of nectar. Whereas, activities such as burning leaf litter and lopping of host plants seem to have affected the butterfly diversity negatively.

Amphibian diversity

The amphibian diversity of Pune district was documented by Ghate & Padhye (1996), Padhye & Mahabaleshwarkar (2000-01), Padhye *et al.* (2002), with special reference to the status of amphibians in

Table 1: Spiders recorded till date from the campus.*Reference of past record from Fergusson campus: ¹Kelkar *et al.* (2006)

Sr. no	Family/Scientific name	*Ref.	Current status and Remarks
Sub Order: Mygalomorphae			
Barychelidae			
1	<i>Sason cinctipes</i> (Pocock, 1892) (= <i>S. robustum</i> (O.P.-Cambridge, 1883))	1	Not recorded.
Sub Order: Araneomorphae			
Araneidae			
2	<i>Araneus mitificus</i> Simon, 1886	1	Present, common. Recorded from Pune (Tikader 1963; Tikader & Bal 1981).
3	<i>Argiope aemula</i> Walckenaer, 1841		Present occasionally on hill side in early winter. Recorded from Pune (Pocock 1900).
4	<i>Argiope anasuja</i> Thorell, 1887	1	Present. Documented by Warudkar 2013.
5	<i>Argiope pulchella</i> Thorell, 1881		Present. Found on hill and in gardens in herbs. Occasional.
6	<i>Cyclosa bifida</i> Doleschall, 1859	1	Not recorded.
7	<i>Cyclosa confraga</i> Thorell, 1892	1	Not recorded. Recorded from Pune by Tikader 1963b.
8	<i>Cyclosa hexatuberculata</i> Tikader, 1982		Present, common.
9	<i>Cyclosa insulana</i> Costa, 1834	1	Not recorded.
10	<i>Cyclosa neilensis</i> Tikader, 1977	1	Not recorded.
11	<i>Cyclosa spirifera</i> Simon, 1889		Present, common. Seen on hill-top.
12	<i>Cyrtophora beccarii</i> Thorell, 1878	1	Not recorded.
13	<i>Cyrtophora cicatrosa</i> Stoliczka, 1869	1	Not recorded. Recorded from Pune by Tikader 1963b.
14	<i>Cyrtophora citricola</i> Forsskål, 1775	1	Present, common. Recorded from Pune by Tikader 1963b.
15	<i>Eriovixia poonaensis</i> Tikader & Bal, 1981		Present, common. Recorded from Pune by Tikader & Bal 1981.
16	<i>Eriovixia excelsus</i> Simon, 1889		Present.
17	<i>Neoscona bengalensis</i> Tikader & Bal, 1981		Present.
18	<i>Neoscona mukerjei</i> Tikader, 1980	1	Present, common.
19	<i>Neoscona theisi</i> Walckenaer, 1841		Present. Found in all the gardens.
20	<i>Neoscona vigilans</i> Blackwall, 1865		Present. Recorded only once in Botanical garden.
21	<i>Zygeilla</i> sp.	1	Not recorded.
Clubionidae			
22	<i>Clubiona</i> sp.	1	Present, common. Found retreating in curled leaves.
Corinnidae			
23	<i>Castianeira</i> sp.	1	Present, common. Found under the stones in the gardens.
Eresidae			
24	<i>Stegodyphus sarasinorum</i> Karsch, 1892	1	Present. Recorded from hill only.
Eutichuridae			
25	<i>Cheiracanthium melanostomum</i> Thorell, 1895	1	Present, common. Found in curled leaf retreat.
Gnaphosidae			
26	<i>Drassodes</i> sp.		Present, common. Found under stones everywhere.
Hersiliidae			
27	<i>Hersilia savignyi</i> Lucas, 1836	1	Present. Found on the rough tree bark. Recorded from Pune by Tikader 1963b and Pocock 1900.
Linyphiidae			
28	<i>Neriene</i> sp.		Present, common.
Lycosidae			
29	<i>Hippasa</i> sp.	1	Present. Builds funnel shaped webs in the grasses. Occasionally found in the bamboo garden.
30	<i>Lycosa</i> sp.	1	Present, common. Burrows are found in the open land.
31	<i>Pardosa pseudoannulata</i> Bösenberg & Strand, 1906	1	Not recorded.
Nephilidae			
32	<i>Nephila</i> sp.		Present. Recorded only once.
Oecobiidae			
33	<i>Oecobius putus</i> O. P.-Cambridge, 1876	1	Not recorded. Recorded from Pune by Tikader 1962c.
34	<i>Uroctea</i> sp.		Present. Seen under stones on hill. Recorded from Pune by Pocock 1900.
Oxyopidae			
35	<i>Oxyopes rufisternis</i> Pocock, 1901	1	Not recorded.
36	<i>Oxyopes birmanicus</i> Thorell, 1887		Present, common.
37	<i>Oxyopes kohaensis</i> Bodkhe & Vankhede, 2012		Present.
38	<i>Oxyopes bhadatae</i> Gajbe, 1999		Present.
39	<i>Peuceetia viridana</i> Stoliczka, 1869	1	Not recorded.

Sr. no	Family/Scientific name	*Ref.	Current status and Remarks
	Philodromidae		
40	<i>Philodromus bhagirathai</i> Tikader, 1966	1	Not recorded.
41	<i>Thanatus ketani</i> Bhandari & Gajbe, 2001		Present.
	Pholcidae		
42	<i>Artema atlanta</i> Walckenaer, 1837	1	Not recorded. Recorded from Pune by Pocock 1900; Tikader 1963.
43	<i>Crossopriza lyoni</i> Blackwall, 1867	1	Present, common. Recorded from Pune by Tikader 1963b.
44	<i>Pholcus phalangioides</i> Fuesslin, 1775	1	Not recorded.
45	<i>Physocyclus globosus</i> Taczanowski, 1874	1	Not recorded.
46	<i>Smeringopus elongatus</i> Vinson, 1863 (= <i>S. pallidus</i> Blackwall, 1858)	1	Present, common.
	Pisauridae		
47	<i>Perenethis sindica</i> Simon, 1897 (= <i>P. indica</i> Pocock, 1900)	1	Not recorded. Recorded from Pune by Pocock 1900.
48	<i>Pisaura</i> sp.	1	Not recorded.
49	<i>Thalassius phipsoni</i> F.O.P.-Cambridge, 1898 (= <i>Nilus phipsoni</i> F.O.P.-Cambridge, 1898)	1	Not recorded.
	Psechridae		
50	<i>Psechrus alticeps</i> Pocock, 1899 (= <i>P. torvus</i> O. P.-Cambridge, 1869)	1	Not recorded.
	Salticidae		
51	<i>Carrhotus viduus</i> C.L. Koch, 1846		Present.
52	<i>Chrysilla macrops</i> Simon, 1901 (= <i>Phintella macrops</i> Simon, 1901)	1	Not recorded.
53	<i>Cyrba ocellata</i> Kroneberg, 1875		Present.
54	<i>Harmochirus</i> sp.		Present. Found in tree barks and under stones.
55	<i>Hasarius adansoni</i> Audouin, 1826	1	Present, common. Found under stones.
56	<i>Hyllus semicupreus</i> Simon, 1885		Present, common. Found all over.
57	<i>Marpissa mandalii</i> Tikader, 1974 (= <i>Plexippus paykulli</i> Audouin, 1826)	1	Not recorded. Recorded from Pune by Tikader 1974.
58	<i>Menemerus bivittatus</i> Dufour, 1831	1	Present, common. Seen on stone walls.
59	<i>Myrmarachne</i> sp.	1	Present. Present on leaves.
60	<i>Phidippus</i> sp.	1	Not recorded.
61	<i>Phintella vittata</i> C.L. Koch, 1846	1	Present, common. Seen in gardens.
62	<i>Plexippus petersi</i> Karsch, 1878	1	Not recorded.
63	<i>Rhene</i> sp.		Present.
64	<i>Telamonia dimidiata</i> Simon, 1899	1	Present, common.
	Scytodidae		
65	<i>Scytodes pallida</i> Doleschall, 1859		Present, common.
66	<i>Scytodes thoracica</i> Latreille, 1802		Present. Recorded from Pune by Tikader 1963b.
	Sicariidae		
67	<i>Loxosceles rufescens</i> Dufour, 1820		Present, common. Seen on hill under the stones.
	Sparassidae		
68	<i>Heteropoda venatoria</i> Linnaeus, 1767	1	Not recorded.
69	<i>Heteropoda</i> sp.		Present, common. Seen on tree barks and walls all over the campus.
70	<i>Thelcticopis</i> sp.	1	Not recorded.
	Tetragnathidae		
71	<i>Eucta javana</i> (= <i>Tetragnatha javana</i> Thorell, 1890)	1	Not recorded.
72	<i>Leucauge decorata</i> Blackwall, 1864		Present, common. Seen on hill.
73	<i>Tetragnatha mandibulata</i> Walckenaer, 1841	1	Not recorded. Recorded from Pune by Tikader 1963b
	Theridiidae		
74	<i>Argyrodes argentatus</i> O.P.-Cambridge, 1880	1	Not recorded.
75	<i>Argyrodes fissifrons</i> O.P.-Cambridge, 1869	1	Not recorded.
76	<i>Chryso</i> sp		Present, rare.
77	<i>Latrodectus hasseltii</i> Thorell, 1870	1	Not recorded. Recorded from Pune by Pocock 1900.
78	<i>Parasteatoda mundula</i> L. Koch, 1872		Present, common. Seen all over.
	Theridiidae		
79	<i>Steatoda</i> sp.		Present. Found under stones.
80	<i>Theridion</i> sp.		Present.
	Thomisidae		
81	<i>Misumena chrysanthemii</i> Sebastian & Peter, 2009		Present. Seen on Flowers.
82	<i>Oxytate virens</i> Thorell, 1891		Present, common. Found in dry leaf-litter.
83	<i>Runcinia</i> sp.		Present, common.
84	<i>Thomisus</i> sp.	1	Present, common. Seen on flowers.
85	<i>Xysticus kashidi</i> Tikader, 1963	1	Not recorded.

Sr. no	Family/Scientific name	*Ref.	Current status and Remarks
	Titanoecidae		
86	<i>Pandava laminata</i> Thorell, 1878		Present, common.
	Uloboridae		
87	<i>Uloborus krishnae</i> Tikader, 1970		Present, common.
88	<i>Uloborus</i> sp.	1	Present, occasional.
89	<i>Zosis geniculata</i> Olivier, 1789	1	Present, common.
	Zodariidae		
90	<i>Lutica deccanensis</i> Tikader & Malhotra, 1976	1	Not recorded. Recorded from Pune (Tikader 1981; Tikader & Malhotra 1976)

and around Pune city. They listed 31 species distributed into 5 families from the district, out of the 43 species reported from the state, while 14 species belonging to 4 families were reported from the city and the outskirts adding 3 and 6 more species to the lists provided by Yazdani & Mahabal (1976) and Paranjape & Mulherkar (1979) respectively. Paranjape & Mulherkar (1979) mention Fergusson College campus as one of the collection localities for their work and fragmentary species records like Padhye *et al.* (2002) are available for the amphibians of the study area.

For the field documentation of amphibians of Fergusson College campus, standard literature (Daniel 2002; Daniels 2005) was referred to for on field identification. This led to the documentation of 5 anuran species belonging to 3 families (Table 3). The non-functional reservoirs in the botanical garden might have been important breeding places for species like *Hoplobatrachus tigerinus* (Daudin, 1802), *Euphlyctis cyanophlyctis* (Schneider, 1799), *Euphlyctis hexadactylus* (Lesson, 1834) and *Sphaerotheca breviceps* (Schneider, 1799). The unwarranted large-scale collection of the Indian Bull Frog *Hoplobatrachus tigerinus* has severely affected their population inside the campus. In Pune district, barring another location in the outskirts of the city, *Duttaphrynus stomaticus* (Lutken 1862) has been reported only from the Fergusson College campus (Padhye *et al.* 2002).

The probable reasons for the limited amphibian diversity inside the campus could be urbanization, loss of habitat and loss of breeding grounds. Barring the two small seasonal artificial puddles which the common Indian toads use for breeding purposes, there are no perennial water bodies inside the campus which can serve as potential breeding grounds for amphibians.

Reptilian diversity

Attempts at documenting the reptiles in Pune city date back to the pre-independence period. Underwood (1948) surveyed the Pashan region of Pune city, and reported 26 reptilian species, including 12 snake species. Wadadekar (1999) gives a preliminary account of snakes found in the Pune University campus. Chopra (1964a) listed 12 species of lizards belonging to 6 families. Khaire & Khaire

(1985) documented 23 snake species, belonging to 6 families from the city and outskirts, almost twice the number of the species listed by Underwood (1948). Ghatpande *et al.* (1990) and Khaire & Khaire (1993) added a total of 5 species in subsequent years. A latest list was provided by Thakur and Gour-Broome (2000-01), which comprised of 52 species that included 32 snake species, adding 4 new species to the earlier lists of snakes of the city. Several other opportunistic records are available with respect to Pune (such as Khaire & Khaire 1993 and Bauer *et al.* 2005).

The available knowledge about the herpetofaunal diversity within the Fergusson College campus is restricted to fragmentary records, some of which are cited above. Standard literature like Daniel (2002), Smith (1935; 1943) was consulted for field identification. Whitaker & Captain (2008) was consulted specifically for snakes. The scientific names, synonyms, taxonomical revisions were checked using Uetz & Hosek (2014) and corrected further with recent references.

This resulted in the documentation of 26 reptilian species: 12 belonging to the suborder Sauria represented by 5 families; and the remaining 14 belonging to the suborder Serpentes, represented by 4 families (Table 4). Within sub-order Sauria, family gekkonidae showed highest species richness, while Colubridae was the most species rich family among the sub-order serpents (Fig. 4). More than half of the species found in the city have been reported from the campus. Among the 26 species documented in the present study 14 species are not assessed for the IUCN threat status, 11 species are Least Concern, 1 species *Platyceps gracilis* (Gunther, 1862) is Data Deficient (IUCN 2014). Out of the total species, 6 are endemic to India (Table 4).

Population of *Ptyas mucosa* Linnaeus, 1758, one of the most common snakes found in the campus, has suffered due to the large scale unwarranted collection of this species for museum specimens in the past by the zoology department. The slender racer *Coluber gracilis* (Zambre *pers. comm.*) and the Beddome's lacertid *Ophisops beddomei* (Jerdon, 1870) were reported previously from the hill (Chopra 1964a), but were not seen during the surveys. *Hemidactylus gracilis*, which has been documented from the nearby

Table 2: Butterfly diversity recorded only in the present survey. (Remaining data from Kumar (1984) has not been reproduced).

*Reference of past record from Fergusson campus: ¹Kumar (1984), ²Warudkar & Patankar (2013), ³Chhaya *et al.* (2012)

Sr. no.	Family/Scientific name	Common name	*Ref.	Present record
	Papilionidae			
1	<i>Graphium agamemnon</i> Linnaeus, 1758	Tailed jay	1, 2	Common.
2	<i>Graphium doson</i> Felder & Felder, 1864	Common jay	2	
3	<i>Pachliopta aristolochiae</i> Fabricius, 1775	Common rose	2	Common.
4	<i>Papilio demoleus</i> Linnaeus, 1758	Northern lime swallowtail	1, 2	Common.
5	<i>Papilio polymnestor</i> Cramer, 1775	Indian blue mormon	1, 2	Reported from Pune City (Kunte, 2000-01).
6	<i>Papilio polytes</i> Linnaeus, 1758	Common mormon	1, 2	Common.
	Pieridae			
7	<i>Appias indra</i> Moore, 1857	Plain puffin	1	Reported from Pune City (Kunte, 2000-01).
8	<i>Catopsilia pomona</i> Fabricius, 1775	Common/ Lemon emigrant	1	Common.
9	<i>Catopsilia pyranthe</i> Linnaeus, 1758	Mottled emigrant	1	Common.
10	<i>Cepora nerissa</i> Fabricius, 1775	Common gull	1	Common.
11	<i>Delias eucharis</i> Drury, 1773	Indian jezebel	1	Common.
12	<i>Eurema blanda</i> Boisduval, 1836	Three spot grass yellow	1	Common.
13	<i>Eurema hecabe</i> Linnaeus, 1758	Common grass yellow	1	Common.
14	<i>Eurema laeta</i> Boisduval, 1836	Spotless grass yellow	1	Common.
15	<i>Leptosia nina</i> Fabricius, 1793	Psyche	1, 2	Common.
16	<i>Pareronia hippia</i> Fabricius, 1787	Indian wanderer	1	Common.
	Nymphalidae			
17	<i>Acraea terpsicore</i> Linnaeus, 1758	Tawny coster	2	Common.
18	<i>Ariadne Merione</i> Cramer, 1777	Common castor	1	Common.
19	<i>Charaxes solon</i> Fabricius, 1793	Black rajah	1	
20	<i>Danaus chrysippus</i> Linnaeus, 1758	Plain tiger	1	Common.
21	<i>Danaus genutia</i> Cramer, 1779	Striped tiger	1, 2	
22	<i>Euploea core</i> Cramer, 1780	Indian common crow	1	Common.
23	<i>Euthalia aconthea</i> Cramer, 1777	Baron	1, 2	Common.
24	<i>Hypolimnas bolina</i> Linnaeus, 1758	Great eggfly	1	Common.
25	<i>Hypolimnas missipus</i> Linnaeus, 1764	Danaid eggfly	1, 2	Common.
26	<i>Junonia lemonias</i> Linnaeus, 1758	Lemon pansy	1, 2	Common.
27	<i>Junonia orithya</i> Linnaeus, 1758	Blue pansy	1	
28	<i>Kallima horsfieldii</i> Kollar, 1844	Sahyadri blue oakleaf		Reported from Pune City (Kunte, 2000-01).
29	<i>Melanitis leda</i> Linnaeus, 1758	Common evening brown	1, 2	Common
30	<i>Mycalesis perseus</i> Fabricius, 1775	Common bush brown		Reported from Pune City (Kunte, 2000-01).
31	<i>Neptis hylas</i> Linnaeus, 1758	Common sailer	1	Common.
32	<i>Parantica aglea</i> Stoll, 1782	Glassy tiger	1, 2	Common.
33	<i>Tirumala limniace</i> , Cramer, 1775	Blue tiger	1, 2	Common.
	Lycaenidae			
34	<i>Castalius rosimon</i> Fabricius, 1775	Common pierrot	1, 2	Common.
35	<i>Chilades lajus</i> Stoll, 1780	Lime blue	1	Common.
36	<i>Chilades pandava</i> Horsfield, 1829	Plains cupid	1, 2	Common.
37	<i>Euchrysops cnejus</i> Fabricius, 1798	Gram blue	1, 2	Common.
38	<i>Jamides celeno</i> Cramer, 1775	Common cerulean	1	Common.
39	<i>Lampides boeticus</i> Linnaeus, 1767	Pea blue	1, 3	Common.
40	<i>Leptotes plinius</i> Fabricius, 1793	Zebra blue	1	Common.
41	<i>Prosotas nora</i> Felder, 1860	Common lineblue	2	Common.
42	<i>Talicauda nyseus</i> Guérin-Ménéville, 1843	Red pierrot	1, 2	Common.
	Hesperiidae			
43	<i>Udaspes folus</i> Cramer, 1775	Grass demon	1	Common.

hill of the city, it was not observed in the present survey.

A small population of *Cnemaspis cf. mysoriensis* Jerdon 1853 exists in the campus. The individuals were seen to prefer damp walls, and were restricted to specific well-wooded spaces in the campus. A

voucher specimen (BNHS 2414) has been deposited at the Bombay Natural History Society, Mumbai. This genus was not reported earlier from the Pune city limits and the possibility of it being introduced cannot be ruled out. In that case, the present observation also highlights the ability of these geckos to naturalize in urban environments.

Avifaunal diversity

Pune and its environs have been a magnet for ornithologists and numerous records of avifaunal diversity are available from the region owing to its rich birdlife (Betham 1899; 1902a; 1902b; Trevenen 1922; Suter 1950; Abdulali 1961; Stairmand 1971; Goel 1976; Gole 1977; Khanna 1977; Gole 1980; Mundkur 1981; Bapat 1982; Mundkur 1983; Gole 1984; Mundkur 1984a,b,c; Singh 1984; Gole 1985; Mundkur 1986; Ara 1987; Mahabal & Lamba 1987; Ingalthalikar et al. 1988; Wadadekar 2000; Sondhi 2006; Gole 2007; Ingalthalikar et al. 2000-01; Ghaskadbi 2010). Ingalthalikar et al. (2000-01) enumerate 332 species in the vicinity on Pune and Prasad (2003) provide exhaustive records around the city.

Avifaunal studies specific to the Fergusson College campus (Nilakanta 1965; Nalavade 1999; 2001; 2012) also indicate a reasonable diversity at least in the past. Two of the authors (AN & GG) investigated the diet and ethogram of the Spotted owlet in the campus (Nerlekar et al. 2014a,b). Kamath (2004) and Raut et al. (2012) undertook extensive field surveys and recorded several uncommon species, though some of the data generated remained unpublished until now. The campus was also considered a sector for the latest Pune bird count (The Ecological Society 2010) and regular transects were walked since 2007 by Rangers Eco club. The college is registered as a hotspot on ebird, also participated in the annual national Campus Bird Count 2015 conducted as a sub-event under the Great Backyard Bird Count (GBBC).

Typical field visits included spending about 3 hours during dawn or dusk in different areas. Opportunistic sightings by past students/ birders were also taken into consideration. Ali (2002) and Grimmett et al. (1998) were referred for field identification and names (both, scientific and common) were standardized using Birdlife International (2014). The analysis has been performed on the total number of birds recorded till date from the campus and not on the current findings alone.

A total of 137 bird species belonging to 102 genera and 52 families representing 18 orders have been reported from the college campus till date, out of these, 53 species were recorded only in the past, 71 species were recorded in the past as well as during the current survey, while 13 species were recorded only during the current survey and through Ebird (2016). Thus, a total of 84 birds were recorded in the current effort (Table 5). In the Campus Bird count 2015, The Fergusson College campus ranked third in the country in terms of both, species (62) and effort (181 checklists) (Bird count India 2016). The total species recorded in the campus through

ebird can be viewed at <http://ebird.org/ebird/hotspot/L3148022>.

Family Accipitridae was the most species rich family (10 species), while the Family Muscipidae was represented by 8 species (Fig 5). Fergusson College campus is home to 115 resident species, while 22 species are migrants. Of the total number of species recorded, 132 species belong to Least Concern category, 3 species (painted stork, red-headed falcon and laggar falcon) are Near Threatened, Egyptian vulture is Endangered and red-headed vulture is Critically Endangered and is possibly extinct from the Western parts of the state (Bird Life International 2014). Two species rock bush-quail and grey junglefowl are Endemic to India. Insectivorous birds are the most dominant (45), followed by omnivores (44) and carnivores (29), while frugivores are represented by 9 species, granivores by 7, nectarinivores by 2 and vegetarians by 1 (Indian spot-billed duck).

A comparison of the current species richness (84 species) to that of Nalavade (1999) (90 species) indicates a decline of over 6 birds observed over years. Flocks of chestnut-tailed starling along with several other species were found to feed on the silk-cotton trees (*Bombax ceiba* L.) during the flowering season. It was observed that the little swifts nested either in association with the roosts of Egyptian free-tailed bats or individually in pipes. The black kites and the jungle Crow, and shikra were observed to feed on Egyptian free-tailed bats and Schneider's leaf-nosed bats respectively.

Loss of suitable habitat can be considered as the sole major threat that the avifauna today faces in the campus as rightly pointed out by Nalavade (2001). Depleting grasslands seem to have greatly affected quails and francolins and the yellow-wattled lapwings. Aquatic birds have more or less disappeared after the canal stopped functioning in the 1970s. Barn owls have been rescued a couple of times from the Geology Department and their numbers also have reduced.

Mammalian diversity

The mammalian diversity recorded in the campus till date is represented by 7 orders and 19 species (Fig 6). Most number of species belongs to the order chiroptera followed by rodentia (Table 6).

Order Artiodactyla

The four-horned antelope *Tetracerus quadricornis* de Blainville, 1816, a typical inhabitant of the dry deciduous biotope was occasionally found on the hill in the 1960's (Nalavade 2000-01). Poaching, hunting, habitat loss and feral dogs have exterminated the population from the study area.

Table 3: List of Amphibians occurring within the college campus. Common names as per Daniels (2005) and classification as per IUCN (2014).

*Reference of past record from Fergusson campus: ¹Padhye *et al.* (2002)

Sr. no.	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Bufonidae			
1	<i>Duttaphrynus melanostictus</i> (Schneider 1799)	Common Indian toad	-	Present, common. Seen commonly in monsoons, and rarely even in dry seasons.
2	<i>Duttaphrynus stomaticus</i> (Lutken 1862)	Marbled toad	1	Not recorded.
	Dicroglossidae			
3	<i>Hoplobatrachus tigerinus</i> (Daudin 1802)	Indian bull frog	-	Present. Seen during and after rains in monsoon.
4	<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	Skipper frog	-	Present. In the abandoned quarry on the hill.
	Ranidae			
5	<i>Hylarana malabarica</i> (Tschudi, 1838)	Fungoid frog	-	Not recorded. Used to be seen on the hill (Nalavade <i>pers comm.</i>).

Order Carnivora

About a decade ago, the common palm civet *Paradoxurus hermaphroditus* Pallas, 1777 was known to have been occasional in the city and has been recorded in the study area in the past (Nalavade 2000-01). A couple of opportunistic direct sightings (Nalavade 2012; T. Simlai, *pers. comm.*) have also been reported in the recent past from the Amphitheatre and Geology Departments in the campus. After the renovation of old wooden ledges, it is unlikely that this species still exists in the campus. Scavengers like the striped hyaena *Hyaena hyaena* Linnaeus, 1758 have been recorded on the neighbouring Vetal hill (Nalavade 2000-01) and also on the Fergusson hill (Nalavade 2001) when the aforementioned hills were connected. Currently, only the Vetal hill complex supports a meagre declining population of this species.

The grey mongoose *Herpestes edwardsii* E. Geoffroy Saint-Hilaire, 1818 is fairly common in the campus and is seen to find refuge in old pipes behind the mathematics department and boys hostel. It has been sighted about 20 times in the past two years.

Order Chiroptera

The bat fauna in and around Pune city has been fairly explored (Yardi & Korad 2000-01; Korad & Yardi 2001; Korad & Yardi 2002a; Korad & Yardi 2004a,b; Korad 2009; Korad *et al.* 2010). Within Maharashtra, Korad (2014) reports maximum species richness (54%) from Pune division. Yardi & Korad (2000-01) recorded the presence of 24 bat species in the Pune city region. The chiropteran diversity within Fergusson college campus is represented only through few studies such as Korad & Yardi (2001), Korad & Yardi (2004a, b) and Nalavade (2012). Field identification was carried out referring Bates & Harrison (1997), Prater (2005) and Menon (2014). Colony counts were undertaken following the 'direct roost count' and 'nightly dispersal counts' methods described by Kunz *et al.* (1996). Total effort was 120 hrs (3 hrs per day per species and four such species

monitored in consecutive 10 days for each). Eight species of bats (two Megachiroptera and six Microchiroptera) belonging to four families have been identified in the current survey and past records. All eight species are 'Least Concern' Molur *et al.* (2002) and one (*Hipposideros speoris* Schneider 1800) is endemic to the Indian subcontinent. All species are resident except *Pteropus giganteus* Brunnich, 1782 which is observed to use the campus only as a foraging ground. A summary of the diversity of species has been provided in Table 6. Population data of the four resident species has been provided in Table 7.

From the preliminary demographic data of four resident bats (Table 7), it is clear that *H. speoris* is the most abundant bat followed by *Pipistrellus ceylonicus* Kelaart, 1852, *Tadarida aegyptiaca* E. Geoffroy Saint-Hilaire, 1818 and *Cynopterus sphinx* Vahl, 1797. A recent exploration by one of the authors (AW) at the Chaturshingi hill colony (Korad & Yardi 2002a) revealed a decreasing population trend in the *H. speoris* colony, hence it is probable that the F.C. campus is now housing the only remaining large colony of this species in the city. Two additional species, *Pipistrellus coromandra* Gray, 1838 and *Falsistrellus affinis* Dobson, 1871 could also possibly be present (V.S. Korad *pers. comm.*), but were not located in the current survey.

Some of these species of bats are prone to multiple threats and potential dangers in the campus. Almost all the known colonies of *T. aegyptiaca* and *P. ceylonicus* are located in the slit behind notice boards, wooden ledges or tree hollows. Thus removal of these boards, renovation and replacement of old structures constitute the key threats for these species (Gaikwad *et al.* 2012). *H. speoris* use the defunct water reservoir on the hill as a roosting site hence the destruction of this structure can have a negative impact on the population of this endemic species. Protection of old structures (Refer Korad & Yardi 2002b) and creating awareness through local

Table 4: Checklist of Reptiles of Fergusson College.

*Reference of past record from Fergusson campus: ¹Thakur & Gour-Broome (2000-01), ²Nalavade (2012), ³Chopra (1964b), ⁴Nalavade (2000-01), ⁵Nalavade pers. comm., ⁶Zambre pers. comm.,

Sr. no.	Family/Scientific name	Common name	*Ref.	Present record
Gekkonidae				
1	<i>Hemidactylus cf. murrayi</i> Gleadow, 1887	Murray's house gecko	1, 2	Present, common. Considered as <i>H. brookii</i> in earlier works.
2	<i>Hemidactylus flaviviridis</i> Rüppell, 1835	Northern house gecko		Present, common.
3	<i>Hemidactylus leschenaultii</i> Duméril & Bibron, 1836	Common bark gecko		Present. Found specifically on the fissured barks of trees.
4	<i>Hemidactylus frenatus</i> Schlegel, 1836	Southern house gecko	2	Not recorded.
5	<i>Hemidactylus maculatus</i> Duméril & Bibron, 1836	Rock gecko	2	Not recorded. Endemic to India (Uetz & Hosek 2014). Doubtful record.
6	<i>Cnemaspis cf. mysoriensis</i> Jerdon, 1853	Dwarf gecko		Present. New record. Possibly introduced. Endemic to India (IUCN 2014).
Agamidae				
7	<i>Calotes versicolor</i> (Daudin, 1802)	Common garden calotes	1, 2	Present, common.
8	<i>Sitana laticeps</i> Deepak & Giri, 2016	Broad headed fan-throated Lizard	2	Earlier identified as <i>Sitana ponticeriana</i> . Currently absent.
Scincidae				
9	<i>Eutropis carinata</i> (Schneider, 1801)	Keeled grass skink	1	Present.
10	<i>Lygosoma lineata</i> (Gray, 1839)	Lined supple skink		Present. Found once near staff quarters. Endemic to India (Uetz & Hosek 2014).
Lacertidae				
11	<i>Ophisops beddomei</i> (Jerdon, 1870)	-	3	Not recorded. Endemic to India (Uetz & Hosek 2014).
Varanidae				
12	<i>Varanus bengalensis</i> (Daudin, 1802)	Bengal monitor	4	Not recorded.
Typhlopidae				
13	<i>Indotyphlops braminus</i> (Daudin, 1803)	Brahminy worm snake	1, 2	Present, Common. Prefers moist microhabitats, under tiles, rocks.
14	<i>Grypotyphlops acutus</i> (Duméril & Bibron, 1844)	Beaked worm snake	1	Present. Endemic to India (Whitaker & Captain 2008).
Colubridae				
15	<i>Ahaetulla nasuta</i> (Bonnaterre, 1790)	Green vine snake	5	Not recorded. Released on hill. Survival doubtful.
16	<i>Coluber gracilis</i> (Günther, 1862)	Slender racer	1, 6	Not recorded. Endemic to India (Whitaker & Captain 2008).
17	<i>Coelognathus helena</i> (Daudin, 1803)	Common trinket snake	1	Present.
18	<i>Lycodon aulicus</i> (Linnaeus, 1758)	Common wolf snake	1, 2	Present.
19	<i>Oligodon arnensis</i> (Shaw, 1802)	Common kukri snake	1	Not recorded.
20	<i>Ptyas mucosa</i> (Linnaeus, 1758)	Indian rat snake	1, 2	Present.
21	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	Buff-striped keelback	1	Not recorded.
22	<i>Macropisthodon plumbicolor</i> (Cantor, 1839)	Green keelback	1	Present, common. Common in gutters in the post monsoon period.
23	<i>Xenochrophis piscator</i> (Schneider, 1799)	Checkered keelback	1	Not recorded. Might be present when the canal was active and the reservoirs were functional.
Elapidae				
24	<i>Bungarus caeruleus</i> (Schneider, 1801)	Common krait	5	Present.
25	<i>Naja naja</i> (Linnaeus, 1758)	Spectacled cobra	2	Not recorded.
Viperidae				
26	<i>Echis carinatus</i> (Schneider, 1801)	Saw-scaled viper	4	Not recorded. Earlier reported from the hill.

public- participatory activities (similar to Yardi & Korad 2003) would ensure their long term survival. Counts were taken for 10 consecutive days in March 2014 for each species. Some of the colonies marked as individual colonies could also be sub-colonies that

constitute a larger colony and are considered distinct purely for the monitoring convenience.

Order Lagomorpha

The Indian hare *Lepus nigricollis* F. Cuvier, 1823 was frequently sighted in the past on the Fergusson hill

Table 5: Avifaunal diversity from the Fergusson Campus. Only those species recorded exclusively through the GBBC initiative have been provided with the reference Ebird (2016).

*Reference of past record from Fergusson campus: ¹Kamath (2004), ²Nalavade (1999), ³Raut *et al.* (2012), ⁴Nalavade (2012), ⁵Nilakantha (1965), ⁶Nalavade (2001), ⁷Nerlekar *et al.* (2014a,b), ⁸Ebird (2016)

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Phalacrocoracidae			
1	<i>Phalacrocorax fuscicollis</i> Stephens, 1826	Indian cormorant	1	Present, common.
	Ardeidae			
2	<i>Ardea cinerea</i> Linnaeus, 1758	Grey heron	1	Present.
3	<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle egret	1, 2, 3	Present, common.
4	<i>Ardeola grayii</i> (Sykes, 1832)	Indian pond-heron	1, 3	Present. Botanical garden.
5	<i>Nycticorax nycticorax</i> Linnaeus, 1758)	Black-crowned night-heron	1, 2	Not recorded.
	Ciconiidae			
6	<i>Mycteria leucocephala</i> (Pennant, 1769)	Painted stork	1	Not recorded. Near Threatened (Birdlife International, 2014).
7	<i>Anastomus oscitans</i> (Boddaert, 1783)	Asian openbill	1	Not recorded.
8	<i>Ciconia episcopus</i> (Boddaert, 1783)	Asian woollyneck	1	Present. Vulnerable (Birdlife International, 2014).
	Anatidae			
9	<i>Anas poecilorhyncha</i> Forster, 1781	Indian spot-billed duck	1	Not recorded.
	Accipitridae			
10	<i>Pernis ptilorhynchus</i> (Temminck, 1821)	Oriental honey-buzzard	1	Present.
11	<i>Elanus caeruleus</i> (Desfontaines, 1789)	Black-shouldered kite	1, 2, 4	Present on hill. Nested in trees near Amphitheatre (Nalavade 2012).
12	<i>Milvus migrans</i> (Boddaert, 1783)	Black kite	1, 2, 3, 5	Present, common.
13	<i>Neophron percnopterus</i> (Linnaeus, 1758)	Egyptian vulture	5, (not specified species) 1	Not recorded currently. Endangered (Birdlife International, 2014). A pair regularly used to perch on main building/ library. Sometimes seen soaring (Kamath 2004).
14	<i>Sarcogyps calvus</i> (Scopoli, 1786)	Red-headed vulture	5 (not specified species), 1	Not recorded currently. Critically Endangered, possibly locally extinct (Birdlife International, 2014). Once seen soaring on campus. Ambiguous record (Kamath 2004).
15	<i>Circaetus gallicus</i> (Gmelin, 1788)	Short-toed snake-eagle	1	Not recorded.
16	<i>Accipiter badius</i> (Gmelin, 1788)	Shikra	1, 2, 3, 5	Present, common.
17	<i>Butastur teesa</i> (Franklin, 1831)	White-eyed buzzard	1	Not recorded.
18	<i>Aquila rapax</i> (Temminck, 1828)	Tawny eagle	1	Not recorded.
19	<i>Aquila fasciata</i> (Vieillot, 1822)	Bonelli's eagle	1	Present on nearby hills, sometimes soars over the college campus.
	Falconidae			
20	<i>Falco tinnunculus</i> Linnaeus, 1758	Common kestrel	1, 2, 5	Present.
21	<i>Falco chicquera</i> Daudin, 1800	Red-headed falcon	1	Not recorded. Near Threatened (Birdlife International, 2014).
22	<i>Falco jugger</i> J.E. Gray, 1834	Laggar falcon	2, 6	Not recorded. Near Threatened (Birdlife International, 2014). A pair nested in rock quarry till 1985 (Nalavade 2001).
23	<i>Falco peregrinus</i> Tunstall, 1771	Peregrine falcon	1	Not recorded
	Phasianidae			
24	<i>Francolinus pictus</i> (Jardine & Selby, 1828)	Painted francolin	1, 6	Not recorded. Was found on the hill (Nalavade 2001).
25	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	Grey francolin	1, 2, 6	Not recorded. Was found on the hill (Nalavade 2001).

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Phasianidae			
26	<i>Coturnix coromandelica</i> (Gmelin, 1789)	Rain quail	2	Not recorded.
27	<i>Perdica argoondah</i> (Sykes, 1832)	Rock bush-quail	2, 6	Not recorded. Endemic to India. Was found on the hill (Nalavade 2001).
28	<i>Gallus sonneratii</i> Temminck, 1813	Grey junglefowl	1	Not recorded, doubtful record. Endemic to India (Birdlife International 2014).
29	<i>Pavo cristatus</i> Linnaeus, 1758	Indian peafowl	2, 6	Not recorded currently. Was found on the hill and once at 'Kimaya' (Nalavade 1999).
	Turnicidae			
30	<i>Turnix suscitator</i> (Gmelin, 1789)	Barred buttonquail	1, 6	Not recorded. Hunting has led to population decline (Nalavade 2001).
	Rallidae			
31	<i>Amaurornis phoenicurus</i> (Pennant, 1769)	White-breasted waterhen	1, 2	Was seen in the abandoned quarry. Not recorded.
	Charadriidae			
32	<i>Vanellus malarbaricus</i> (Boddaert, 1783)	Yellow-wattled lapwing	1, 2	Not recorded.
33	<i>Vanellus indicus</i> (Boddaert, 1783)	Red-wattled lapwing	1, 2, 3	Present, common.
	Scolopacidae			
34	<i>Actitis hypoleucos</i> Linnaeus, 1758	Common sandpiper	2	Not recorded. Used to be regular when the canal was functional (Nalavade 1999).
	Columbidae			
35	<i>Columba liva</i> Gmelin, 1789	Blue rock pigeon	1, 2, 3, 4, 5	Present, common. Nesting in rafter and wind holes of Amphitheatre (Nalavade 2012).
36	<i>Spilopelia senegalensis</i> (Linnaeus, 1766)	Laughing dove	1, 2, 3, 4	Present, common. Nesting in Amphitheatre (Nalavade 2012).
37	<i>Spilopelia suratensis</i> (Gmelin, 1789)	Western spotted dove	1, 3	Present, occasional.
38	<i>Treron phoenicopterus</i> (Latham, 1790)	Yellow-footed green-pigeon	2	Not recorded.
	Psittacidae			
39	<i>Loriculus vernalis</i> (Sparman, 1787)	Vernal hanging-parrot	2	Not recorded. One straggler bird reported.
40	<i>Psittacula eupatria</i> (Linnaeus, 1766)	Alexandrine parakeet	2, 3, 5	Present, common. Most probably escaped cage birds (Nalavade <i>pers. comm.</i>).
41	<i>Psittacula krameri</i> (Scopoli, 1769)	Rose-ringed Parakeet	1, 2, 3, 4, 5	Present, common. Nesting in holes below ceiling of Amphitheatre (Nalavade 2012).
42	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)	Plum-headed parakeet	1, 2, 5	Present.
	Cuculidae			
43	<i>Clamator jacobinus</i> (Boddaert, 1783)	Pied crested cuckoo	1, 2	Not recorded. Was occasional on the hill.
44	<i>Hierococcyx varius</i> (Vahl, 1797)	Common hawk-cuckoo	1, 2, 5	Present.
45	<i>Cacomantis passerinus</i> (Vahl, 1797)	Grey-bellied cuckoo	1, 2	Not recorded. Used to be heard on the hill.
46	<i>Eudynamis scolopaceus</i> (Linnaeus, 1758)	Western koel	1, 2, 3, 5	Present, common.
47	<i>Centropus sinensis</i> (Stephens, 1815)	Greater coucal	1, 2, 3, 5	Present, common.
	Tytonidae			
48	<i>Tyto alba</i> (Scopoli, 1769)	Barn owl	2, 3, 4	Present. Nesting in Amphitheatre (Nalavade 2012).
	Strigidae			
49	<i>Bubo bengalensis</i> (Franklin, 1831)	Rock eagle owl	2	Not recorded.
50	<i>Athene brama</i> (Temminck, 1821)	Spotted owlet	1, 2, 3, 4, 7	Present, common. (Nerlekar <i>et al.</i> 2014a).
	Caprimulgidae			
51	<i>Caprimulgus asiaticus</i> Latham, 1790	Common Indian nightjar	2	Not recorded.
	Apodidae			
52	<i>Apus affinis</i> (Gray, 1830)	Little swift	2, 3, 4, 5	Present, common. Nesting in Amphitheatre veranda (Nalavade 2012).

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Apodidae			
53	<i>Cypsiurus balasiensis</i> (Gray, 1829)	Asian palm-swift	8	Present, first time seen in February 2016.
	Alcedinidae			
54	<i>Alcedo atthis</i> (Linnaeus, 1758)	Common kingfisher	2	Not recorded currently. Used to be regular when the canal was functional (Nalavade 1999).
55	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	White-breasted kingfisher	1, 2, 3, 5	Present.
	Meropidae			
56	<i>Merops orientalis</i> Latham, 1802	Asian green bee-eater	1, 2, 3, 5	Present, common. Use wires for perching.
	Coraciidae			
57	<i>Coracias benghalensis</i> (Linnaeus, 1758)	Indian roller	2, 5	Not recorded.
	Upupidae			
58	<i>Upupa epops</i> Linnaeus, 1758	Common hoopoe	2, 5	Present.
	Bucerotidae			
59	<i>Ocyrceros birostris</i> (Scopoli, 1786)	Indian grey hornbill	1, 2, 3	Present, common.
	Megalaimidae			
60	<i>Psilopogon haemacephalus</i> (P.L.S Muller, 1776)	Coppersmith barbet	1, 2, 3, 5	Present, common.
	Picidae			
61	<i>Jynx torquilla</i> Linnaeus, 1758	Eurasian wryneck	2	Not recorded.
62	<i>Leiopicus mahrattensis</i> (Latham, 1801)	Yellow-crowned woodpecker	1, 2, 5	Not recorded.
	Pittidae			
63	<i>Pitta brachyura</i> (Linnaeus, 1766)	Indian pitta	1, 2	Not recorded currently. Seen at Shirole bungalow (2013). Straggler, Injured, rescued. (Kamath 2004).
	Alaudidae			
64	<i>Mirafra erythroptera</i> Blyth, 1845	Indian lark	1	Not recorded.
65	<i>Eremopterix griseus</i> (Scopoli, 1786)	Ashy-crowned sparrow-lark	1, 2, 5	Not recorded.
66	<i>Ammomanes phoenicura</i> (Franklin, 1831)	Rufous-tailed lark	1	Not recorded.
	Hirundinidae			
67	<i>Hirundo concolor</i> Sykes, 1832	Dusky Crag-martin	1, 2, 3, 4, 5	Present, common. Nesting in Amphitheatre (Nalavade 2012). Nests currently on Life- sciences building.
68	<i>Hirundo smithii</i> Leach, 1818	Wire-tailed swallow	2, 5	Absent.
69	<i>Hirundo rustica</i> Linnaeus, 1758	Barn swallow	8	Nearly 20 individuals observed on 15 th November 2015.
70	<i>Hirundo daurica</i> Linnaeus, 1771	Red-rumped swallow	1, 2, 5	Not recorded. Was seen around the hill.
	Motacillidae			
71	<i>Anthus hodgsoni</i> Richmond, 1907	Olive-backed pipit	8	Present.
72	<i>Anthus rufulus</i> Vieillot, 1818	Paddyfield pipit	1, 2	Present.
73	<i>Anthus trivialis</i> (Linnaeus, 1758)	Tree pipit	8	Present, common.
74	<i>Motacilla flava</i> Linnaeus, 1758	Yellow wagtail	2	Present.
75	<i>Motacilla cinerea</i> Tunstall, 1771	Grey wagtail		Present, seen at the Botanical garden pond.
76	<i>Motacilla madaraspatensis</i> Gmelin, 1789	White browed- wagtail		Present. Rare on hill and campus.
	Campephagidae			
77	<i>Coracina melanoptera</i> (Rupell, 1839)	Black-headed cuckooshrike	1	Not recorded.
78	<i>Pericrocotus cinnamomeus</i> (Linnaeus, 1766)	Small minivet	1, 2, 3	Present, common.

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Campephagidae			
79	<i>Pericrocotus erythropygius</i> (Jerdon, 1840)	White-bellied minivet	2, 3	Present.
80	<i>Tephrodornis pondicerianus</i> (Gmelin, 1789)	Common woodshrike	1	Not recorded.
	Pycnonotidae			
81	<i>Pycnonotus jocosus</i> (Linnaeus, 1758)	Red-whiskered bulbul	1, 2, 3	Present, common.
82	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	Red-Vented bulbul	1, 2, 3, 5	Present, common.
	Aegithinidae			
83	<i>Aegithina tiphia</i> (Linnaeus, 1758)	Common Iora	1, 2, 3	Present, common.
	Laniidae			
84	<i>Lanius vittatus</i> Vallenciennes, 1826	Bay-backed shrike	3	Present.
85	<i>Lanius schach</i> Linnaeus, 1758	Long-tailed shrike	1, 2, 5	Present. Use wires for perching (Nilakantha 1965).
	Timaliidae			
86	<i>Pomatorhinus horsfieldii</i> Sykes, 1832	Indian-scimitar babbler	1	Not recorded. Doubtful record.
87	<i>Dumetia hyperythra</i> (Franklin, 1831)	Tawny-bellied babbler	1	Not recorded.
88	<i>Turdoides malcolmi</i> (Sykes, 1832)	Large Grey babbler	1	Not recorded.
89	<i>Turdoides striata</i> (Dumont, 1823)	Jungle babbler	5	Present, common. Seen on hill and Botanical garden.
	Cisticolidae			
90	<i>Prinia hodgsonii</i> Blyth, 1844	Grey-breasted Prinia	1, 2	Present, common.
91	<i>Prinia sylvatica</i> Jerdon, 1840	Jungle prinia	1	Not recorded.
92	<i>Prinia socialis</i> Sykes, 1832	Ashy prinia	2, 3, 5	Present, common.
93	<i>Prinia inornata</i> Sykes, 1832	Plain prinia	1	Present, common.
	Sylviidae			
94	<i>Acrocephalus dumetorum</i> Blyth, 1849	Blyth's reed-warbler	8	Present.
95	<i>Hippolais caligata</i> (Lichtenstein, 1823)	Booted warbler	8	Present.
96	<i>Orthotomus sutorius</i> (Pennant, 1769)	Common tailorbird	2, 3, 5	Present, common.
97	<i>Phylloscopus collybita</i> (Vieillot, 1817)	Common chiffchaff	8	Present, first reported in February 2016.
98	<i>Phylloscopus griseolus</i> Blyth, 1847	Sulphur-bellied warbler	8	Present.
99	<i>Phylloscopus trochiloides</i> (Sundevall, 1837)	Greenish warbler	2, 3	Present, common.
100	<i>Sylvia curruca</i> (Linnaeus, 1758)	Lesser whitethroat	2	Not recorded.
	Muscicapidae			
101	<i>Monticola solitarius</i> (Linnaeus, 1758)	Blue rock-thrush	2, 5	Present. Observed hunting a skink sp. (Nilakantha 1965).
102	<i>Copsychus saularis</i> (Linnaeus, 1758)	Oriental magpie-robin	1, 2, 3, 4, 5	Present, common. Nesting in Amphitheatre (Nalavade 2012).
103	<i>Copsychus malabaricus</i> (Scopoli, 1786)	White-rumped shama	5	Not recorded currently. Two males once seen fighting. (Nilakantha 1965). Doubtful record.
104	<i>Saxicoloides fulicatus</i> (Linnaeus, 1766)	Indian robin	1, 2, 3, 4, 5	Present, common. Attempted nesting in Amphitheatre (Nalavade 2012).
105	<i>Phoenicurus ochruros</i> (Gmelin, 1774)	Black redstart	2, 5	Present.
106	<i>Saxicola caprata</i> (Linnaeus, 1766)	Pied bushchat	1, 2	Present, common.
107	<i>Ficedula parva</i> (Bechstein, 1792)	Red-breasted flycatcher	2, 3	Present, common.
	Muscicapidae			
108	<i>Cyornis tickelliae</i> Blyth, 1843	Tickell's blue-flycatcher	1	Present, common.

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Monarchidae			
109	<i>Terpsiphone paradisi</i> (Linnaeus, 1758)	Asian paradise flycatcher	1, 2	Present.
110	<i>Hypothymis azurea</i> (Boddaert, 1783)	Black-naped monarch	1	Not recorded. Doubtful record.
	Rhipiduridae			
111	<i>Rhipidura albicollis</i> (Vieillot, 1818)	White-thoated fantail	1, 2, 3	Present, common.
	Paridae			
112	<i>Parus major</i> Linnaeus, 1758	Great tit	1, 2, 3	Present, common.
	Dicaeidae			
113	<i>Dicaeum agile</i> (Tickell, 1833)	Thick-billed flowerpecker	3	Present, common.
114	<i>Dicaeum erythrorhynchos</i> (Latham, 1790)	Pale-billed flowerpecker	1, 2, 3	Present, common.
	Nectariniidae			
115	<i>Nectarinia zeylonica</i> (Linnaeus, 1766)	Purple-rumped sunbird	1, 2, 3	Present, common.
116	<i>Nectarinia asiatica</i> (Latham, 1790)	Purple sunbird	1, 2, 3, 5	Present, common.
	Zosteropidae			
117	<i>Zosterops palpebrosus</i> (Temminck, 1824)	Oriental white eye	1, 2, 3	Present, common.
	Emberizidae			
118	<i>Melophus lathamii</i> (Gray, 1831)	Crested bunting	1	Not recorded.
	Fringillidae			
119	<i>Carpodacus erythrinus</i> (Pallas, 1770)	Common rosefinch	2	Not recorded.
	Estrildidae			
120	<i>Amandava amandava</i> (Linnaeus, 1758)	Red avadavat	8	Present near the base of the hill and on the ground.
121	<i>Lonchura malabarica</i> (Linnaeus, 1758)	White-throated munia	1, 2, 5	Present. Seen on the hill.
122	<i>Lonchura punctulata</i> (Linnaeus, 1758)	Scaly-breasted munia	2	Present, common. Seen on the hill.
	Passeridae			
123	<i>Passer domesticus</i> (Linnaeus, 1758)	House sparrow	1, 2, 3, 4, 5	Present. Nested in Amphitheatre (Nalavade 2012).
124	<i>Petronia xanthocollis</i> (Burton, 1838)	Chestnut-shouldered petronia	2	Not recorded.
	Ploceidae			
125	<i>Ploceus philippinus</i> (Linnaeus, 1766)	Baya weaver	1, 2	Present.
	Sturnidae			
126	<i>Sturnus pagodarum</i> (Gmelin, 1789)	Brahminy starling	2, 3, 4, 5	Present, common. Nesting in Amphitheatre (Nalavade 2012).
127	<i>Sturnus roseus</i> (Linnaeus, 1758)	Rosy starling	2	Not recorded.
128	<i>Sturnus malabaricus</i> (Gmelin, 1789)	Chestnut-tailed starling		Present. Seen around the Botanical garden.
129	<i>Acridotheres tristis</i> (Linnaeus, 1766)	Common myna	1, 2, 3, 4, 5	Present, common. Nesting in gaps between roof and wall of Amphitheatre (Nalavade 2012).
130	<i>Acridotheres fuscus</i> (Wagler, 1827)	Jungle myna	1, 2, 3, 4	Present, common. Nesting in Amphitheatre (Nalavade 2012).
	Oriolidae			
131	<i>Oriolus oriolus</i> Linnaeus, 1758	Eurasian golden oriole	1, 2, 3	Present.
	Dicruridae			
132	<i>Dicrurus macrocercus</i> Vieillot, 1817	Black drongo	1, 2, 3, 5	Present. Uses wires for perch (Nilakantha 1965).
133	<i>Dicrurus caerulescens</i> Linnaeus, 1758	White-bellied drongo	2	Not recorded. One straggler bird reported.
	Dicruridae			
134	<i>Dicrurus leucophaeus</i> Vieillot, 1817	Ashy drongo		Present. Seen on the hill and around Kimaya.

Sr. No	Family/Scientific name	Common name	*Ref.	Current status and Remarks
	Corvidae			
135	<i>Dendrocitta vagabunda</i> (Latham, 1790)	Rufous treepie	1	Not recorded.
136	<i>Corvus splendens</i> Vieillot, 1817	House crow	1, 2, 3, 4, 5	Present, common. Nested in trees near Amphitheatre (Nalavade 2012).
137	<i>Corvus leuallantii</i> Lesson, 1831	Jungle crow	1, 2, 3, 5	Present, common.

(Nalavade 2000-01) but hunting and mortality due to feral dogs has greatly reduced the population. Though a population is still present on the neighbouring Vetal hills, the Fergusson hill has been geographically isolated after construction of the S.B. road thus restricting their movement (Nalavade 2000-01). No sightings of this species have occurred in the recent years and it is feared to have been locally extirpated.

Order Primates

A single species-The South Western Langur *Semnopithecus hypoleucos* Blyth, 1841 (following Brandon-Jones 2009, Pradhan & Talmale 2012 and Nag *et al.* 2014) was occasionally seen in on about 5 instances during the study period. No resident population of the Langur is present in the study area and stray individuals are attracted to the campus probably due to its rich vegetation.

Order Rodentia

A majority of the rodents were recorded opportunistically during the study period. Few species were recorded indirectly through pellets during a study on diet of spotted owl (Nerlekar *et al.* 2014a) in the campus. Talmale & Pradhan (2009) was referred for identification of mammal remains found in owl pellets. Menon (2014) was used for the rest mammals. Four species belonging to two families were identified from the campus.

Order Soricomorpha

Only a single species- *Suncus murinus* Linnaeus, 1766 was reported through direct observation as well as from owl pellets of spotted and barn owls [identified using Talmale & Pradhan (2009)] and by Nalavade (2012).

Miscellaneous Taxa

Order Coleoptera

Aspidomorpha milliaris was collected from the campus by Thorat *et al.* (2012). Beetles of family scarabaeidae were reported by Nerlekar *et al.* (2014a). This order was not actively investigated for its diversity in the current survey due to logistical constraints.

Order Hymenoptera

A few hymenopterans including wasps (*Vespa* sp.) and ants (*Campanotus* sp.) were reported by

Nerlekar *et al.* (2014a) in the diet of the spotted owl. Nalavade (2012) also mention a few like rock bee *Apis dorsata* Fabricius, 1793. This order was not actively investigated for its diversity in the current survey due to logistical constraints.

Order Mantodea

Mantidae members were reported by Nalavade (2012) as well as in the current survey.

Order Neuroptera

Antlions or larvae of insects belonging to the family Myrmeleontidae were observed by us at places with loose soil including the hill, parking and around Amphitheatre. Also reported by Nalavade (2012).

Further, members of orders like Homoptera, Blattodea, Scolopendromorpha, Orthoptera, Isoptera were reported by Nerlekar *et al.* (2014a) as owl prey.

Discussion and Conclusion

The rich faunal diversity in the campus can be attributed to the array of habitats, both macro and micro (such as natural scrub vegetation, exotic planted woodland, old wooden ledges, crevices of old buildings, defunct reservoirs, water pools, leaf litter, etc) that are present currently. It is clear from the results that for most of the taxa, the richness over time has declined. The threats for individual taxa are highlighted in the respective section, but from our preliminary observations we presume that activities like changing land-use in form of constructions around the hills, habitat degradation in form of littering, fires and removal of herbaceous and arboreal vegetation pose a great threat to the fauna. This institute is one of the very few campuses in the city which has a tremendous potential for sustaining diversity and hence ensuring protection of this diversity should be given priority. Activities like conducting field (outdoor) practicals, regular awareness drives in the campus might also serve the cause of conservation of the campus fauna. Such urban green spaces can provide multiple ecosystem services and sometimes in peri-urban ecosystems, the species richness can be greater than the original ecosystem that has been replaced (Dearborn & Kark 2010). As seen from the results, such green campuses can also support a minor percentage of endemic/threatened/locally rare

Table 6: Summary of mammalian fauna in Fergusson College campus (orders arranged alphabetically).

*Reference of past record from Fergusson campus: ¹Nalavade 2000-01, ²Nalavade 2001, ³Nalavade (2012), ⁴Korad & Yardi (2001), ⁵Korad & Yardi (2004a), ⁶Editor-Director (2012), ⁷Korad & Yardi (2004b), ⁸Nerlekar *et al.* (2014a)

Sr. No	Family/Scientific name	Common name	*Past Lit.	Current status and Remarks
Order Artiodactyla				
Bovidae				
1	<i>Tetracerus quadricornis</i> de Blainville, 1816	Four- horned antelope	Past records (1, 2)	Not recorded. Completely exterminated from the area. Vulnerable (IUCN 2014).
Order Carnivora				
Viverridae				
2	<i>Paradoxurus hermaphroditus</i> Pallas, 1777	Common palm civet	1, 2, 3	No recent sightings after Nalavade (2012).
Herpestidae				
3	<i>Herpestes edwardsii</i> E. Geoffroy Saint-Hilaire, 1818	Grey mongoose	1	Common, breeding population observed.
Hyaenidae				
4	<i>Hyaena hyaena</i> Linnaeus, 1758	Striped hyaena	1	Not recorded. Past records till 1970, population exterminated.
Order Chiroptera				
Pteropodidae				
5	<i>Pteropus giganteus</i> Brunnich, 1782	Indian flying fox		Present, common. Recorded from Pune by Yardi & Korad 2000-01; Korad 2014.
6	<i>Cynopterus sphinx</i> Vahl, 1797	Greater short- nosed fruit bat		Present & common. Recorded from Pune by Yardi & Korad 2000-01; Korad 2014). Visitor and colonies.
Molossidae				
7	<i>Tadarida aegyptiaca</i> E. Geoffroy Saint-Hilaire, 1818	Egyptian free- tailed bat	4	Present & common. Use notice boards and wooden ledges for roosting. Colonies seen.
Hipposideridae				
8	<i>Hipposideros speoris</i> Schneider, 1800	Schneider's leaf- nosed bat		Present & common. Endemic (Menon 2014). Recorded on the nearby Chaturshingi hill by Korad & Yardi 2002a in the city. Colonies seen.
Vespertilionidae				
9	<i>Pipistrellus ceylonicus</i> Kelaart, 1852	Kelaart's pipistrelle	3	Present & common. Use boards & tree hollows as roosts. Recorded from Pune by Yardi & Korad 2000-01; Korad 2014. Colonies and visitors seen.
10	<i>Pipistrellus javanicus</i> (Gray, 1838	Javan pipistrelle	5, 6	Not encountered at present. About 20 individuals were occupying the gaps between metallic name-plates and walls (Korad & Yardi 2004a).
11	<i>Pipistrellus kuhlii</i> (Kuhl, 1817)	Kuhl's pipistrelle	6, 7	Not recorded.
12	<i>Pipistrellus savii</i> (Bonaparte, 1837) [= <i>Hypsugo savii</i> (Bonaparte, 1837)]	Savi's pipistrelle	6, 7	Not recorded.
Order Lagomorpha				
Leporidae				
13	<i>Lepus nigricollis</i> F. Cuvier, 1823	Indian hare	Past records (1, 2)	Not recorded. Completely wiped out from the area.
Order Primates				
Cercopithecidae				
14	<i>Semnopithecus hypoleucos</i> Blyth, 1841	South- western langur		Present, rare. Stray population. Vulnerable (IUCN 2014).
Order Rodentia				
Sciuridae				
15	<i>Funambulus pennantii</i> Wroughton, 1905	Five-striped palm squirrel	3	Present, commonly found in the campus.
Muridae				
16	<i>Mus sp.</i>	Mouse	8	Present. Found in owlet pellets.
17	<i>Bandicota indica</i> Bechstein, 1800	Large bandicoot rat		Present, common. Found dead several times in the campus
18	<i>Rattus rattus</i> Linnaeus, 1758	House rat	3	Present, common. A couple of direct sightings.
Order Soricomorpha				
Soricidae				
19	<i>Suncus murinus</i> Linnaeus, 1766	House shrew	3, 8	Present, common. Sighted directly. Also found in owlet pellets.

Table 7: Demographic data of four resident bat species in the campus

Colony no. (marked on map)	<i>Tadarida aegyptiaca</i> (mean bats/site± Std. dev.) Direct roost count	Colony name	<i>Pipistrellus ceylonicus</i> (bats/site) Night dispersal count	Colony name	<i>Cynopterus sphinx</i> (bats/site). Direct roost count	Colony name	<i>Hipposideros speoris</i> (mean bats/site± Std. dev.) Night dispersal count	Colony name
1	5.4± 2.06	Geology	05*	NCC board	10*	Main building roof	641.2± 34.34	Hill tank
2	13.8± 5.80	Chemistry	11*	Ritha hollow	02*	Main building corners		
3	0.7± 0.82	Physics	40**	Boys hostel3,4	02*	Maths garden		
4	0.4± 0.51	Hostel 1	02*	A7 slit				
5	01± 1.49	Hostel 2	06*	Statistics board				
6	2.4± 1.64	Hostel 3	15**	Boys hostel 2				
7	7.4± 1.42	Life sciences						
Mean bats/day at all sites	31.1		79.0***		14.0		641.2	

* Counts resulted in constant values for all 10 days. **Approximate value based on opportunistic observations for 3 days due to logistical constraints. ***Approximate value due to approximate value of colony number 3.

species and thus can also serve as centres for conservation. The present paper provides a baseline document (in terms of presence or absence) for monitoring future changes and also for allied ecological research.

Apart from the obvious disadvantages, urbanization and urban ecosystems can be also viewed from a different perspective: studying these ecosystems can aid in developing a more ecologically informed audience and thus eventually serving conservation by effecting conservation policies (McKinney 2002). First hand outdoor experience about biodiversity is also necessary for its protection and unfortunately, there has been little emphasis on the urban landscape (Dearborn & Kark 2010). Further, educational institutes that have life sciences departments can provide a hands-on practical training platform to the students by constructing such a campus biodiversity database (Dangerfield & Pik 1999) and involve students in protecting the campus diversity (Hongyan 2003). Due to its manifold advantages, replicating such biodiversity studies in other institutes should be given adequate priority.

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References

We are well aware of the fact that some of the references including articles published in the Fergusson College Magazine may not be indexed sources as they are for private circulation and constitute grey literature. Nonetheless, the data published in these sources was valuable and thus necessary to cite. The authors possess digitized versions of all the references cited and may be contacted for the same in case of any ambiguity.

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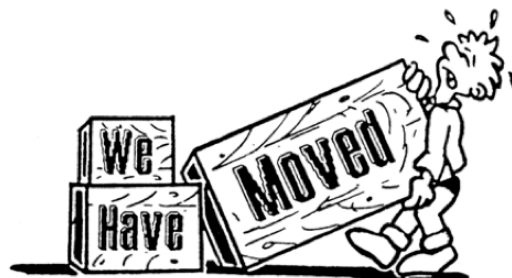
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Announcement



We have moved

Our New Address Is:

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