

A PRECIOUS HERITAGE



**RAPID BIODIVERSITY SURVEY
OF**

THE KUDAPURA CAMPUS

INDIAN INSTITUTE OF SCIENCE

25-28 JUNE 2011

BY

**CENTRE FOR ECOLOGICAL SCIENCES
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BANGALORE**



PREFACE

The idea to survey the biodiversity of the new IISc campus at Kudapura near Challakere came first from Prof KPJ Reddy of Aerospace Engineering, who was keen that this large and relatively unspoiled arid landscape should not suffer the inevitable consequence of development: the destruction of its original flora and fauna. With some sensitivity and knowledge, he argued, it should be possible to develop the new campus without obliterating the dignity or the original character of this landscape and its current inhabitants.

But a landscape that is an abstract caricature on a map has not much appeal and it was over a year before a few of us decided to visit the area together with KPJ in early January 2011. All of us who made this visit were quite unprepared for, and deeply impressed by, this lovely, silent landscape with views stretching to the horizon. Given the rarity of unspoiled scrub and grassland areas in India, this was a revelation and surely an ecologist's delight.

That first visit gave the impetus to survey the flora and fauna of this area and a team of volunteers from CES finally came together to do this in the last week of June this year. The team was diverse in its interests and experience, from veterans like Prof. Sankara Rao, whose energy and passion put the rest of us to shame, to two young undergraduates who came along for the experience. We had people with a specialised knowledge of mammals, birds, reptiles, amphibians, plants and insects.

The survey was short, just three to four days, and could not be highly quantitative, but was sufficient to produce a first sketch of the rich biodiversity of the place. Each team had its own ways and schedules, from early morning for the bird and mammal groups, through the day and into the night for the reptile and insect surveys. We walked and walked, for miles it seemed, crisscrossing the campus and getting endlessly lost, in spite of survey maps and GPS technology. Some drove around and punctured the jeep tires a record number of times on the thorny scrub so plentifully spread around. But, in the end, we had comprehensive lists of species, pictures of interesting plants and animals, memories of beautiful plants and animals encountered and, most importantly, a feeling for the landscape, that only comes from walking through it, looking and listening, at all hours of the day and night.

This account seeks to share some of these sights and memories with all who care to know, and it is hoped that it will inspire others in the campus community to visit and experience it for themselves, to understand the precious nature of this heritage and to work to protect it with thoughtful and sensitive development in the future.



BLACKBUCK

Surely the most spectacular and elegant inhabitants of our new campus are the blackbuck. We had heard rumours and anecdotes from people who spoke to people who claimed that there were blackbuck there, from others who claimed they had seen them around, but we ecologists, with our usual cynicism and arrogance, dismissed these accounts. 'Just rumours! They must have seen chital and thought they were blackbuck!'

Why the cynicism? Because the blackbuck is now so rare: it is a highly endangered species of antelope, driven to the verge of extinction from the loss of grassland and scrub habitats to agriculture and development. Unfortunate, for the blackbuck, apart from being spectacularly beautiful, is the quintessentially Indian antelope. Found nowhere outside India, it perhaps evolved here and, in Mughal times, there were vast herds of them on the Indian subcontinent, and their major predators were cheetahs. Today, the cheetahs are gone forever, and the blackbuck cling to the small pockets of grassland and scrub still available to them. Hopefully we will not let them go the way of the cheetah through our insensitivity and ignorance.



So imagine our surprise when we saw real blackbuck on our first morning out! All the survey groups, whether walking or driving, early morning or evening, saw blackbuck jumping across the paths or looking at us warily from a distance. This means they are common and in relatively large numbers on our campus: a rare privilege and a big responsibility! They appear to be all over the campus (see map) and they need to move large distances, so walls and fences would surely restrict them.



Blackbuck show unusually flexible and interesting social behaviour. Males and females are remarkably different in appearance: males are strikingly coloured in black and white with a magnificent pair of spiral diverging horns, whereas females are brown and white and hornless. Some populations show the rare and extraordinary lek mating system, in which males cluster together in open areas, fight intensely and defend tiny territories, perform elaborate displays, and create enormous scent marks with their dung to attract females seeking a mate. We did see some of these interesting dung piles, which indicate the presence of territorial males. In fact, on one occasion, we crouched beside a dung pile for a while and first the male, and then a female, appeared from behind the trees and watched us, obviously resenting our intrusion into their territory! Perhaps there's a message there.... we need to figure out how to leave them in peace.

INDIAN FOX AND BLACK-NAPED HARE

The Indian fox occurs in dry grasslands and is known to be a grassland specialist. This lovely animal makes underground dens with multiple entrances, often at a spot with a commanding view of the landscape. We were fortunate to see these foxes a couple of times, by day and by night, in the open areas to the west of the campus (see map), as well as a den. We also saw black-naped hare, another specialist of open, semi-arid areas. When you see foxes and hares, you know you are dealing with a healthy ecosystem.

Interestingly, both of these species used to be seen on the IISc campus in Bangalore until recently, but the loss of open habitat and building activity on the campus have driven them away and they appear to be gone. We are lucky to now have a new campus where they thrive: it is up to us to ensure that they continue to survive and flourish in spite of our intrusion into their territory.



BIRDS

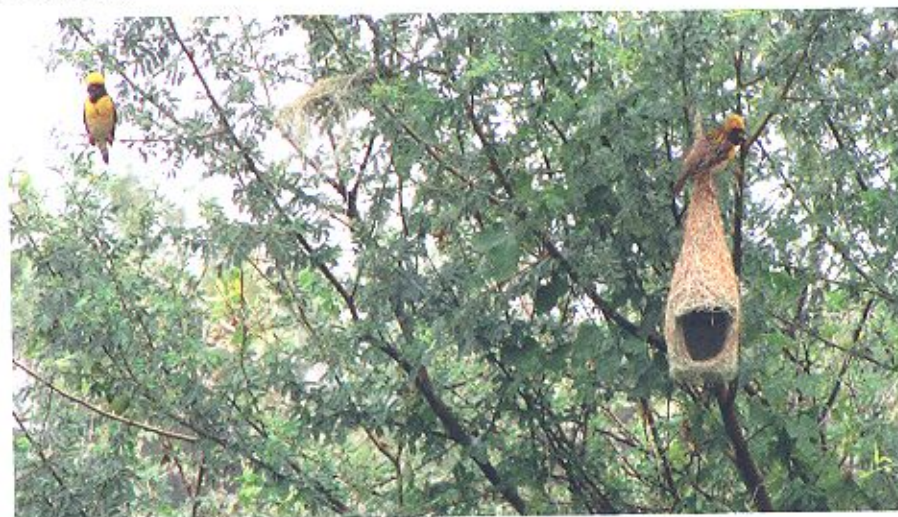
Not birds of paradise, but a paradise of birds! That's surely a fitting description of the new campus, with 80 species of birds spread over 41 families, 34 species of which are specialists of open, grassland habitats (see Appendix 1). And that's with just a few days' survey, not covering the entire campus and not including the winter migrants! With these, we may well have more than 100 species.... Some of the richest birding areas were in the northwest part of the campus and along the dry water beds.

Indian peafowl: Our national bird, whose males sport some of the most elaborate ornaments in the animal kingdom in the form of their dazzling trains of tail feathers. Not only have they inspired us in literature and folklore, but have been used as serious models for tests of Darwin's theory of sexual selection and Zahavi's handicap principle, both of which strive to explain how the peacock got its tail!



Indian roller: State bird of Karnataka, often mistakenly called the blue jay, this beautiful blue and russet bird used to be a common sight in open areas all over India, but its numbers have declined, perhaps due to pesticides and habitat loss.

The baya weaver, as its name implies, weaves an incredibly complicated nest, using just its beak and feet! Males typically weave the nests and females come by to inspect them: if they are satisfied with the male's handiwork, they will settle in with him, otherwise they will move on in search of someone with better home-making skills! You can see two nests in the process of construction. Weavers often make several nests in the same tree and these are typically found near water bodies. Once a common sight around Bangalore, development and urbanization have again taken their toll.....

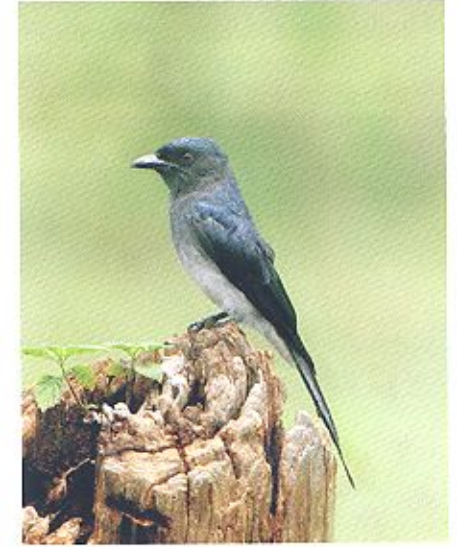


Green bee-eaters: With their iridescent green plumage and metallic voices, these little birds are adept at eating bees, a food source that few would care to compete with them for! They are often found in large flocks on mud banks: you can see them here taking a mud bath. Why a mud bath? Some think it may help rid them of itchy parasites.

Indian nightjar: Beautifully camouflaged during the day, this bird belongs to the Caprimulgidae, one of the few groups of nocturnal birds other than owls. It typically rests on the ground and calls at night. If you walk a forest trail at night and pick up eyeshine on the path, you are probably looking at this bird.



Hawk cuckoo: Also known as the 'brain-fever' bird, this is the voice of the jungle. Its loud, almost hysterical cries of 'brain-fever' can be heard day and night in wild places. Some believe that it is a sentinel announcing the presence of predators such as tigers and leopards.



White-bellied drongo: Drongos are related to crows and the white-bellied drongo is typical of dry scrub habitats. Like most drongos, including its more flamboyant relative, the racket-tailed, the white bellied drongo is an accomplished vocal mimic, imitating the calls of other species.



Ashy-crowned sparrow lark: With their complex melodies, often sung while performing incredibly complicated aerobatic dives and displays, larks are the voice and the soul of the open grasslands.



Eurasian eagle owl or the great horned owl: A rare sight, one of the biggest owls and an arid zone specialist, its sighting points to a rich and healthy ecosystem on our campus.

Why so many bird species? Counterintuitively, perhaps, arid scrub and grassland habitats do tend to support very large numbers of bird species. Exactly how and why is perhaps not completely understood and warrants further study. But one thing is certainly clear: such a large diversity of birds is surely being supported by the availability of large numbers of insects (to feed their ever-hungry offspring!), of fruits, seeds and flowers and, perhaps most importantly, of undisturbed nesting places in the trees, shrubs and rocky areas. The large number of predatory species (hawks, eagles, kites and owls) points to an abundance of small mammals like mice and shrews, indicating a healthy ecosystem.



REPTILES

Our survey of reptiles, especially snakes, is quite inadequate and the numbers of species are likely greatly underestimated. This is because snakes in particular are hard to find and need long-term surveys to get complete species lists. For amphibians, the survey needs to be carried out through the monsoon months, so both of these lists are only a beginning (see Appendix 2). But the enthusiastic lizard, frog and snake hunters literally left no stone unturned in their efforts to unearth these elusive creatures.

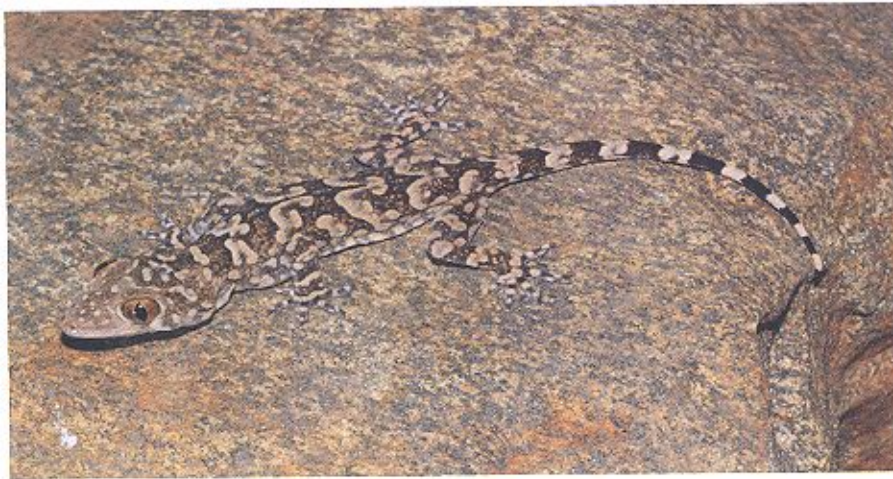


The **common wolf snake** is non-venomous and active at night. Often confused with the highly venomous krait, the wolf snake can be distinguished from the krait. Wolf snakes are brown with yellow bands starting at the neck, while kraits are black, with slender paired white bands across the body.



The **common bronzeback** typically lives in trees and is non-venomous. It can be recognized by its large, round, black eyes and blue tongue. An excellent and agile climber, it can scale vertical surfaces with ease.

The giant rock gecko, as the name implies, is restricted to rocky areas and is found only in southern India. Like all geckos, it is active at night. This species was found only in one single group of boulders in the northeast part of the campus, where a number of them were found together.



The fan-throated lizard is typical of arid scrub and grasslands and is active in the day. Males develop a bright blue and orange fan-throat in the breeding season, which is used for displaying. This species sometimes adopts a bipedal gait when running.

PLANTS

Our botanists, Prof. Sankara Rao and Navendu Page, with their typical enthusiasm and passion, found a number of interesting plants in this arid landscape. They have so far identified 81 species of plants, including 35 species of trees and shrubs, 16 species of climbers and 30 species of herbs (see Appendix 3 for plant species list). Of these 81 species, only three were exotic! This is quite remarkable because arid scrub regions in India are mostly highly degraded, have lost much of their original flora and are usually taken over by exotic and invasive species. Many of the species on our campus are specialists of dry regions and some have interesting life histories. A small fraction of these are described in detail below.

1. *Ceropegia juncea*

Family: Asclepiadaceae

Common name: Lantern flower



The new campus has a few individuals of a species of *Ceropegia*, a genus commonly known as lantern flower. *Ceropegia juncea* is widely distributed across arid regions of south India. Its curious flower shape can be attributed to an intricate pollination mechanism. These flowers are pollinated largely by flies. The slits or the windows on the dome of these flowers serve as entry points for the flies. Once it enters the flower, the insect is drawn to the base of the flower, which is the source of nectar. To reach the base, the insect has to make its way through the long narrow constricted tunnel or neck of the flower. This passage is lined with a series of downwardly pointing stiff hairs which allow only one-way access to the base of the flower tube. Once the insect acquires the nectar present at the base of the flower, it cannot escape unless it returns the favor by pollinating the flower. This is only achieved if the insect has already carried the pollen received from its previously visited flower. If not, the pollinator is trapped inside until the flower wilts.

2. *Caralluma* sp.

Family: Asclepiadaceae

Common name: Carrion flower



Another group of interesting plants that can be seen occasionally in rocky areas of the campus are the Carallumas. The name refers to 'rotting flesh' in Arabic. These plants present another beautiful example of extreme floral adaptation to ensure pollination. Like the *Ceropegia*, these depend on flies as pollen carriers. To attract flies, *Caralluma* produce a range of odors resembling that of carrion and sweat. Also, the ornamentation on the flowers makes them look like a decaying furry animal. These adaptations make the flowers extremely attractive to flies. There are two species of this group that are found in the new campus (shown above). They are restricted to rocky areas or among boulders — habitats that should be left undisturbed.

3. *Carissa carandas*

Family: Apocynaceae

Common names: English - Christ's thorn, Hindi - Karonda



This hardy drought-resistant shrub is a member of the milkweed family. This species produces fragrant white flowers during the summer. The flowers open at night and attract a wide range of insect visitors which come to feed on the floral nectar. The fruits of these species are commonly used as condiments and in pickles.

4. *Asparagus* sp.

Family: Asparagaceae

Common Name: Hindi - Shatavari



This plant, along with its distant relatives such as onion and garlic, was classified as belonging to the lily family. Currently, however, it is placed under its own family Asparagaceae. Although perennial, this plant remains dormant for most of the dry season. The shoots start coming out from the underground tubers by the end of the dry season and burst into flower with the onset of the monsoon. Many species of this genus are used as spring vegetables and its soup is a highly sought after delicacy.

5. *Citrullus colocynthis*

Family: Cucurbitaceae

Common name: Colocynth



Commonly known as colocynth, bitter apple or bitter cucumber, it is very closely related to the watermelon. Unlike its cultivated counterpart, however, the fruits of this plant are extremely bitter and have many important medicinal properties.

6. *Leptadenia reticulata*

Family: Asclepiadaceae

Local name: Sanskrit – *Jivanti*



This species is distributed mainly in Punjab and Uttar Pradesh in the north, and in the south, it occurs throughout the Deccan peninsula. Although widely distributed, this climbing species can be seen only occasionally, growing over other shrubs. This species was seen only once during the three day survey of the new campus.

7. *Cassia auriculata*

Family – Caesalpinaceae

Common names: Tanners cassia, Kannada – *Avaragida*



This densely branched shrub has an Indo-Malaysian distribution and occurs in most scrub and grasslands of India. Because of its bright, showy flowers, which are present throughout the year, it is cultivated in the tropics as an ornamental.

8. *Euphorbia* sp.

Family: Euphorbiaceae

Common name: Indian spurge



These xerophytic plants resemble cacti but belong to a completely different family. This species exudes white sap which can irritate the eyes and skin and is therefore used for protective hedges. The clumps of *Euphorbia* are a crucial microhabitat for twining plants such as the *Ceropegia juncea* and *Sarcostemma* sp. which are seen only in association with the *Euphorbia*. This thorny and unpalatable shrub provides safe resting and nesting sites for a number of reptile and bird species. Protecting areas with high densities of *Euphorbia* should thus be a priority.

CONCLUSIONS

Even a short, preliminary, incomplete biodiversity survey of the new campus revealed it to be extraordinarily rich in vertebrate and plant species. From the spectacular and highly endangered blackbuck to small mammals such as foxes and hares, from the rich diversity of raptors (birds of prey) to the tiny minivets and sunbirds and the large number of native plant species, all these point to a rich, relatively undisturbed natural ecosystem. There is much that can be learned from studying species of plants and animals that have evolved to thrive in arid landscapes and, in a world where fresh water is becoming an increasingly rare resource, preserving these species and studying their special adaptations to arid environments should surely be a high priority.

Many of the plant and animal species found here are specialists of arid scrub and grassland — ecosystems that have essentially vanished from the Indian subcontinent, or if present, are mostly highly degraded and taken over by exotic, invasive species. The rich diversity of native scrub specialists revealed by this survey, together with the highly endangered status of the blackbuck, found in large numbers on our campus, places upon us a special responsibility to ensure the continued survival of these original inhabitants of our campus.



The picture above is a view showing the IISc campus in the context of the surrounding landscape. The green belt in the centre is within the campus, the brown areas are outside of it. The wall and road on the right mark the boundary of the DRDO campus adjacent to IISc. Our campus is revealed as an oasis in a denuded landscape.

RECOMMENDATIONS

How do we ensure that the development of the campus can proceed without too much adverse effect on its current rich biodiversity? Although any development is likely to have a detrimental effect, at least well-planned and careful development and land use could minimize the adverse effects. Since the area of the campus is large, we suggest a two-pronged approach.

First, to identify some areas that are particularly rich in plant and animal species, and put them aside as protected preserves on the campus. These areas should be left undisturbed and no development should be allowed there. Although more work needs to be done, we have indicated two such areas from our survey. The northeast part of the campus has some of the best vegetation structure, high densities of blackbuck and many rocky outcrops that provide special habitats to a number of plant and reptile species. This area is also contiguous with a community forest outside the campus and could be kept aside without development (Area 1, map). The second area to the centre (Area 2, map) has a lot of grassland and a number of stream beds and is incredibly rich in bird life, as well as blackbuck. We suggest that these two areas should be spared any development. A buffer zone should also be maintained along all stream beds and water bodies.



The second, perhaps equally important, approach is to pursue ecologically sensitive development.

This includes a number of measures. We suggest:

1. Building a peripheral road around the campus, with buildings and development progressing serially along it, leaving the central parts undisturbed, with few roads.
2. Avoiding fences and walls around buildings to give animals such as blackbuck that are highly mobile the freedom and area to roam around and move about as they require to.
3. Avoiding the introduction of exotic plant species, which may not only spread and compete with the local flora, but are likely to require large amounts of water to maintain. We should surely be able to identify local trees and shrubs that are suitable for horticulture.
4. Keeping special microhabitats such as rocky outcrops and *Euphorbia* patches intact so that the associated flora and fauna are preserved. Natural rock formations should not be quarried for building material.
5. Protecting the current flora, especially trees, from being cut down and removed, either by local people or contractors carrying out building work. In this context, the boundary, particularly along the Ramadurga village, needs to be protected, perhaps with a green fence such as a *Euphorbia* hedge.
6. Ensuring, from the start, a proper garbage disposal system, with organic waste being recycled, and plastics and any toxic waste being treated or removed. This would, for example, prevent the place being taken over by stray dogs, of which there are currently very few. It would also prevent the soil and water from getting contaminated with toxic chemicals.
7. Reviving the streams and other water bodies on campus so that they serve as focal points to attract birds and also provide a water source.

If all of the above measures are implemented, then there is some hope that we will not totally destroy this beautiful landscape and ecosystem, of which we are now the custodians. Interestingly, our campus and those that have recently been allocated to other government organizations such as DRDO, stand as islands of natural vegetation in a sea of agriculture and denuded wasteland (see picture on previous page).

The land for these campuses has recently been taken over from the local people, for whom this was a grazing commons, and the healthy state of the ecosystem shows us that the local grazers and farmers have been wise custodians of this landscape.

We should ensure that we do not play the role of thoughtless destroyers of so precious a heritage.



ACKNOWLEDGMENTS

This survey could not have been carried out without help and support from so many people. Many thanks to..... KPJ Reddy, for his gentle persistence in getting us to go out there and carry out this survey; to Professors Balaram and Raghunandan for permitting us to carry it out; to Mr Jagadeesh and Aruna for making arrangements. Special thanks to the wonderful team of volunteers from CES, from ages of eighteen to over seventy, including faculty, students and staff, for their enthusiasm and hard work in surveying this landscape; to Prof. Sankara Rao, Navendu, Harish Bhat, Ishan, Roy, Kavita, Sandhya and Chaitanya for providing photographs and information; to Samira Agnihotri for compiling and editing the bird list, and to Monisha Bhattacharya for help with InDesign. Last, but not least, a special word of thanks to the wonderful local staff at the new campus, not only for keeping us well-fed and providing endless cups of tea at odd hours, but for accompanying us into the field in the early mornings and late at night, with initial good-humoured curiosity transforming to enthusiasm and excitement.



The survey team (June 2011, left to right, clockwise): Roy, Ishan, Chaitanya, Harish Bhat, Navendu, Prof. Sankara Rao, Das, Siddharth, Megha, Rohini, Sandhya, Abhijya



The reconnaissance team (16 January 2011, left to right): KPJ Reddy, NV Joshi, Praveen Karanth, Gopal Hegde, Siddhartha Sarma, Nalini Sekaran

APPENDIX 1

Checklist of birds of the Kudapura campus, IISc

Common Name	Scientific Name
Ashy-crowned Sparrow Lark*	<i>Eremopterix nigriceps</i>
Ashy Prinia*	<i>Prinia socialis</i>
Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>
Barn Owl	<i>Tyto alba</i>
Bay-backed Shrike*	<i>Lanius vittatus</i>
Black Drongo	<i>Dicrurus macrocercus</i>
Black Kite	<i>Milvus migrans</i>
Black-shouldered Kite	<i>Elanus caeruleus</i>
Brahminy Kite	<i>Haliastur indus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Common hawk cuckoo	<i>Hierococcyx varius</i>
Brown Shrike	<i>Lanius cristatus</i>
Common Babbler*	<i>Turdoides caudatus</i>
Common Grey Hornbill	<i>Ocyrcas birostris</i>
Common Iora	<i>Aegithina tiphia</i>
Common Kestrel	<i>Falco chicquera</i>
Common Myna	<i>Acridotheres tristis</i>
Common Tailorbird	<i>Orthotomus sutorius</i>
Common Woodshrike*	<i>Tephrodornis pondicerianus</i>
Coppersmith Barbet	<i>Megalaima haemacephala</i>
Eurasian Collared Dove*	<i>Streptopelia decaocto</i>
Eurasian Eagle Owl	<i>Bubo bubo</i>
Eurasian Golden Oriole	<i>Oriolus oriolus</i>
Great Grey Shrike*	<i>Lanius excubitor</i>
Great Tit	<i>Parus major</i>
Greater Coucal	<i>Centropus sinensis</i>
Grey Francolin*	<i>Francolinus pondicerianus</i>
Hoopoe*	<i>Upupa epops</i>
House Crow	<i>Corvus splendens</i>
House Sparrow	<i>Passer domesticus</i>
Indian Nightjar*	<i>Caprimulgus asiaticus</i>
Indian Peafowl*	<i>Pavo cristatus</i>
Indian Roller*	<i>Coracias benghalensis</i>
Jungle Babbler	<i>Turdoides striatus</i>
Jungle Bush Quail*	<i>Perdica asiatica</i>
Large-billed Crow	<i>Corvus macrorhynchos</i>
Jungle Myna	<i>Acridotheres fuscus</i>
Large Cuckooshrike	<i>Coracina macei</i>

*denotes scrub and grassland specialists

Common name	Scientific name
Large Grey babbler*	<i>Turdoides malcolmi</i>
Large Woodshrike	<i>Tephrodornis gularis</i>
Laughing Dove*	<i>Streptopelia senegalensis</i>
Black-rumped flameback	<i>Dinopium benghalense</i>
Oriental White-eye	<i>Zosterops palpebrosus</i>
Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>
Pied Bushchat	<i>Saxicola caprata</i>
Pied Crested Cuckoo	<i>Clamator jacobinus</i>
Plain Prinia*	<i>Prinia inornata</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Pond Heron	<i>Ardeola grayii</i>
Purple-rumped Sunbird	<i>Nectarinia zeylonica</i>
Purple Sunbird*	<i>Nectarinia asiatica</i>
Rain Quail*	<i>Coturnix coromandelica</i>
Red-rumped Swallow	<i>Hirundo daurica</i>
Red-vented Bulbul*	<i>Pycnonotus cafer</i>
Red-wattled Lapwing*	<i>Vanellus indicus</i>
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>
Rock Pigeon	<i>Columba livia</i>
Rose-ringed Parakeet	<i>Psittacula krameri</i>
Rufous-tailed Lark*	<i>Ammonomanes phoenicurus</i>
Rufous Treepie	<i>Dendrocitta vagabunda</i>
Shikra	<i>Accipiter badius</i>
Short-toed Snake Eagle*	<i>Circaetus gallicus</i>
Singing Bushlark*	<i>Mirafra cantillans</i>
Green Bee Eater*	<i>Merops orientalis</i>
Small Minivet*	<i>Pericrocotus cinnamomeus</i>
Spotted Dove	<i>Streptopelia chinensis</i>
Scaly-breasted Munia*	<i>Lonchura punctulata</i>
Spotted owl*	<i>Athene brama</i>
White-bellied Drongo*	<i>Dicrurus caerulescens</i>
White-browed Wagtail	<i>Motacilla maderaspatensis</i>
White-eyed Buzzard*	<i>Butastur teesa</i>
White-naped Woodpecker	<i>Chrysocolaptes festivus</i>
White-rumped Munia*	<i>Lonchura striata</i>
White-throated Kingfisher	<i>Halcyon smyrnensis</i>
White-browed Bulbul*	<i>Pycnonotus luteolus</i>
Yellow-billed Babbler*	<i>Turdoides affinis</i>
Wire-tailed Swallow	<i>Hirundo smithii</i>
Yellow-eyed Babbler	<i>Chrysomma sinense</i>
Yellow-wattled Lapwing*	<i>Vanellus malabaricus</i>
Weaver Bird (Baya)	<i>Ploceus philippinus</i>

APPENDIX 2

Checklist of reptiles and amphibians of the Kudapura campus, IISc

Scientific Name	Common Name
LIZARDS	
Family: Agamidae	
1 <i>Calotes versicolor</i>	Indian Garden Lizard
2 <i>Psammophilus dorsalis</i> *	South Indian Rock Agama
3 <i>Sitana ponticeriana</i>	Fan-throated Lizard
Family: Gekkonidae	
4 <i>Hemidactylus cf. brookii</i>	Brook's Gecko
5 <i>Hemidactylus frenatus</i>	Southern House Gecko
6 <i>Hemidactylus giganteus</i> *	Giant Rock Gecko
7 <i>Hemidactylus leschenaulti</i> +	Bark Gecko
8 <i>Hemidactylus reticulatus</i> *	Reticulated Ground Gecko
9 <i>Hemidactylus triedrus</i>	Termite-hill Gecko
10 <i>Hemiphyllodactylus aurantiacus</i> *	Southern Worm Gecko
Family: Lacertidae	
11 <i>Ophisops jerdoni</i>	Punjab-Snake-eyed Lacerta
Family: Scincidae	
12 <i>Eutropis beddomii</i> +	Beddome's Grass Skink
13 <i>Eutropis carinata</i>	Common Grass Skink
14 <i>Lygosoma punctata</i>	Common Snake Skink
SNAKES	
Family: Colubridae	
15 <i>Coleognathus helenae</i>	Variegated Kukri Snake
16 <i>Dendrelaphis tristis</i>	Common Bronzeback
17 <i>Lycodon aulicus</i>	Common Wolf Snake
18 <i>Oligodon taeniolaus</i>	Common Trinket Snake
19 <i>Ptyas mucosa</i>	Indian Rat Snake
AMPHIBIANS	
Family: Bufonidae	
20 <i>Bufo melanostictus</i>	Common Toad
21 <i>Bufo</i> sp.	
Family: Ranidae	
22 <i>Euphlyctis cyanophlyctis</i>	Skittering Frog
23 <i>Fejervarya</i> sp.	Cricket Frog
24 <i>Sphaerotheca</i> sp.	Burrowing Frog
Family: Rhacophoridae	
25 <i>Polypedates maculatus</i>	Common Tree Frog

* Indicates endemic to India, + endemic to peninsular India and Sri Lanka

APPENDIX 3

Checklist of plants of the Kudapura campus, IISc

Trees and Shrubs	Climbers
1 <i>Acacia leucophloea</i>	<i>Aristolochia indica</i>
2 <i>Acacia nilotica</i>	<i>Capparis sepiaria</i>
3 <i>Albizia amara</i>	<i>Ceropegia juncea</i>
4 <i>Anogeissus latifolia</i>	<i>Cissua quadrangularis</i>
5 <i>Balenites aegyptiaca</i>	<i>Citrullus colocynthis</i>
6 <i>Cadaba indica</i>	<i>Coccinia grandis</i>
7 <i>Calotropis gigantia</i>	<i>Jasminum auriculatum</i>
8 <i>Calotropis procera</i>	<i>Leptadenia reticulata</i>
9 <i>Carissa carandas</i>	<i>Maerua oblongifolia</i>
10 <i>Cassia auriculata</i>	<i>Pentatropis</i> sp
11 <i>Catunaregam spinosa</i>	<i>Rivea hypocrateriformis</i>
12 <i>Chloroxylon sweetenia</i>	<i>Sarcostemma brevistigma</i>
13 <i>Dicrostachys cineraria</i>	<i>Sarcostemma intermedium</i>
14 <i>Diospyros melanoxylon</i>	<i>Tylophora indica</i>
15 <i>Dodonea angustifolia</i>	<i>Vattakaka volubilis</i>
16 <i>Dolichandrone crispum</i>	<i>Asparagus</i> sp
17 <i>Euphorbia</i> sp	
18 <i>Ficus benghalensis</i>	
19 <i>Fluggea leucopyrus</i>	
20 <i>Grewia populifolia</i>	
21 <i>Gymnosporia</i> sp	
22 <i>Hardwickia binata</i>	
23 <i>Jatropha heterophylla</i>	
24 <i>Mundulea sericea</i>	
25 <i>Phoenix sylvestris</i>	
26 <i>Plectronia parviflora</i>	
27 <i>Pongamia pinnata</i>	
28 <i>Prosopis juliflora</i> *	
29 <i>Prosopis spicigera</i>	
30 <i>Rhus</i> sp	
31 <i>Wrightia tinctoria</i>	
32 <i>Zizyphus xylopyrus</i>	
33 <i>Salvadora oleoides</i>	
34 <i>Acacia</i> sp	
35 <i>Acacia catechu</i>	

* Exotic species

APPENDIX 3 (contd.)

Checklist of plants of the Kudapura campus, IISc

Herbs

- 1 *Aerva lanata*
- 2 *Allmania nodiflora*
- 3 *Anisomelis indica*
- 4 *Aristolochia bracteata*
- 5 *Barleria buxifolia*
- 6 *Boerhavia diffusa*
- 7 *Buchnera hispida*
- 8 *Caralluma adscandens*
- 9 *Caralluma umbellata*
- 10 *Cassia obtusa*
- 11 *Cassia uniflora*
- 12 *Croton bonplandianum**
- 13 *Cynotis* sp
- 14 *Enicostemma hyssopifolia*
- 15 *Evolvulus alsinoides*
- 16 *Fagonia cretica*
- 17 *Heliotropium marifolium*
- 18 *Justicia* sp
- 19 *Kedrostis foetidissima*
- 20 *Martynia annua**
- 21 *Ocimum americanum*
- 22 *Opuntia* sp
- 23 *Phyla nodiflora*
- 24 *Polygala* sp
- 25 *Ruellia* sp
- 26 *Solanum surettense*
- 27 *Tribulus terrestris*
- 28 *Tricodesma indica*
- 29 *Tridax procumbens*
- 30 *Zornia diphylla*

* Exotic species



CREDITS

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Blackbuck (cover), roller, baya weavers, nightjar, eagle owl: Chaitanya Krishna

Indian fox: Girish Punjabi

White-bellied drongo, ashy-crowned sparrow lark: Copyright Clement Francis

Common hawk cuckoo: Samira Agnihotri

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