Chapter 3

Tropical Forests Are An Ideal Habitat for Wide Array of Wildlife Species

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.73315

Abstract

Tropical forests are one of the most diverse (1 ha may contain more than 1000 plant species) and highly productive ecosystems on the earth. They cover 15.0% of the earth's surface and harbored 80% terrestrial biodiversity. Tropical forests are home to thousands of endemic, rare, endangered, and threatened wildlife species, which play a significant role in ecosystem functions, such as pest control, pollinators, and seed dispersal. Wildlife species are bioindicators of the tropical forest ecosystems, that is, their presence or absence may provide the information about the habitat dynamics, such as vegetation structure, food resources, productivity, and anthropogenic disturbances. Despite being rich in wildlife resources, tropical forests have been extensively lost and degraded by human intervention, and their destruction is still continuous in a variety of ways. The current information on the tropical forests as an ideal habitat for a wide array of wildlife species is inadequate. It is highly essential to examine with solid grasp the suitability of the tropical forest as attractive habitat for diversity of wildlife species to understand their functional role fragile forest ecosystem and to formulate the better conservation and management strategies in future.

Keywords: tropical forest, diverse, wildlife, ecosystem, habitat, vegetation

1. General background

Tropical forests are located at tropics of Cancer 23°N and Capricorn at 23.5°S to equator (**Figure 1**) [1]. Around 60% of the tropical forest occurs in Latin America, 25% in Asia-Pacific regions, and rest 15% in Africa [2]. These forests covered <5.0% of earth's surface and comprised of 17,000 million ha, which is equal to 44.0% of the world's forest cover and exhibits a higher richness and diversity of flora and fauna species. Tropical forests are rich in vegetation

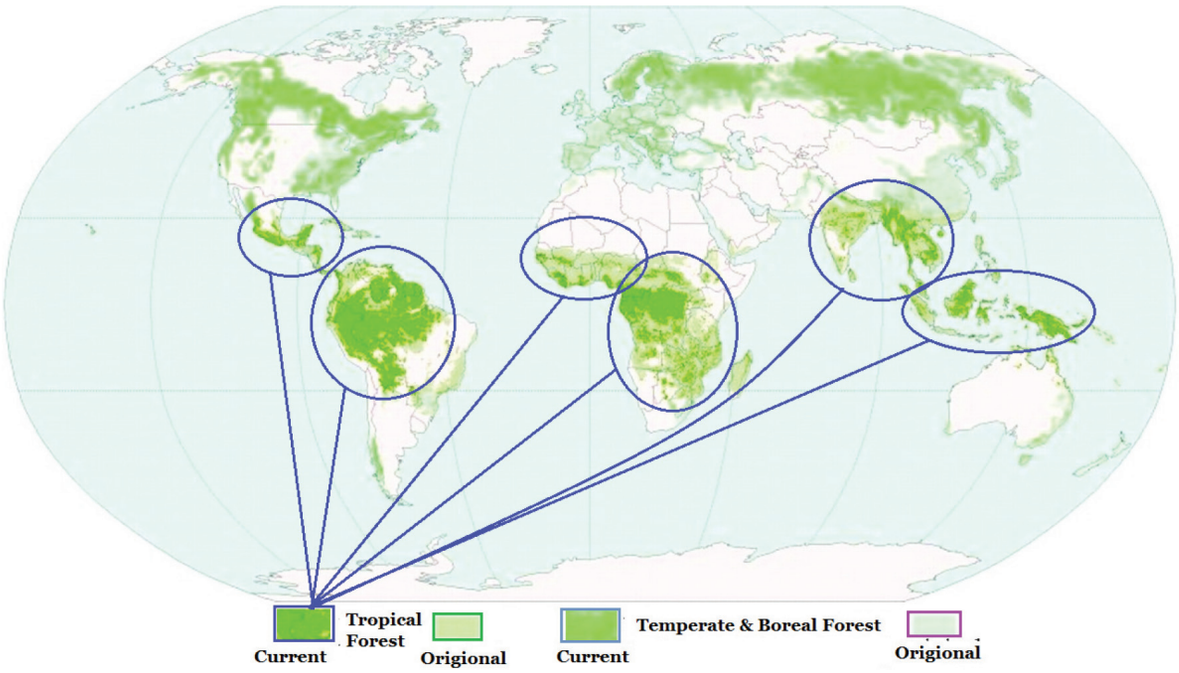

Figure 1. Location map of tropical forest around the world. Source: URL at http://rstb.royalsocietypublishing.org/content/royptb/361/1465/195/F2.large.jpg.

Figure 2. Esthetic view of tropical forest. Source: http://www.oxfordmartin.ox.ac.uk/downloads/briefings/200912-Forest Governance.pdf.

composition and structure (**Figure 2**), which has formulated heterogeneity of habitats to attract the wide array of wildlife species to inhabit and utilize the food resources in order to perform various activities and to increase the numbers of their individuals [3]. The richness and

http://dx.doi.org/10.5772/intechopen.73315

diversity of vegetation could be due to the heterogeneity of topography, site quality, rainfall pattern, and temperature [4–9].

Tropical forests are intact habitats, which are rich in vegetation diversity and food resources that have attracted higher diversity of endemic, rare, threatened, and endangered wildlife species (i.e., such as mammals, birds, reptiles, and amphibians). The wildlife species directly or indirectly depends on tropical forests to perform various activities, such as inhabit, forage, loaf, perch, and breed for their survival and existence. Determining the wildlife population community parameters in the tropical forest habitats is vital important to understand the dynamics of the tropical habitat, ecological processes, and habitat disturbance vital for the occurrence, survival, and conservation of wildlife species.

2. Types of tropical forests

Tropical forests encompass 60% tropical rainforest, while remaining 40% are comprised of seasonally dry tropical forest, mangroves, tropical freshwater swamp forest, dry forest, open eucalyptus forests, tropical coniferous forest, savannah woodlands, and montane forests [10–12]. The tropical forests have been classified as (i) tropical moist broadleaf forests, (ii) tropical dry broadleaf forest, and (iii) tropical coniferous forest. The detail of each forest type has been given below:

2.1. Tropical moist broadleaf forests

These forests are the huge area located at equatorial belts between the tropics of Cancer and Capricorn dominated with semi-evergreen and evergreen deciduous tree species. They receive >200 cm rainfall annually [13]. The tree canopy is multilayered, that is, upper story (emergent crown), medium layer, lower canopy, shrub layer, and understory. These forests are home for more than 50% of world wildlife species. The occurrence of higher number of wildlife species is due to diversity of vegetation (i.e., >1000 plant species/km^2) and multilayered vegetation structure. For example, upper story is suitable habitats for apes, monkeys, flying squirrels, and birds (i.e., flycatchers), the understory layer harbored diversity of mammals (big cats) and avian species, (i.e., babblers, bulbuls, and pittas, etc.), while undergrowth vegetation is ideal habitat for gorillas, deer, amphibians, snakes, and lizards.

2.2. Tropical dry broadleaf forests

Tropical dry broadleaved forest is characterized with warm temperature and seasonal rainfalls that enable flora to withstand in rainy season as well as dry season to conserve water and shedding their leaves. These forests are located at tropical and subtropical latitudes, such as southern Mexico, Africa, the Lesser Sunda Islands, Central India, Indochina, Madagascar, New Caledonia, Eastern Bolivia and Central Brazil, Caribbean, North Andes, Ecuador, and Peru. They cover about 6 million km^2 or 4% of the Earth's surface [14] and are dominated by teak, ebony, bamboo, and fig trees [15]. The soil is highly productive, and tree canopy may attain 10–30 m tall. Tropical dry broadleaved forest is suitable habitat for mammals (white-fronted capuchin monkeys, mantled howler monkeys, shrews, bats, coyotes, foxes, ringtails, raccoons,

badgers, bobcats, and mountain lions), birds (crested guan, magpie jay, hawks, and bull finches), snakes, lizards, etc.

2.3. Tropical coniferous forests

These forests occur in humid climate region at Nearctic and Neotropical Ecozones from Mid-Atlantic states to Nicaragua, the Greater Antilles, Bahamas, and Bermuda [16]. They are characterized by diverse coniferous species whose needles have adjusted to deal with low precipitation (around 2.4″ or 60 mm) and moderate temperature (18 or 64°C or higher). These forests are dominated by *Pinus caribaea, P. tropicalis, P. chiapensis*, *P. tecunumanii*, *P. ayacahuite*, *P. maximin*, *Byrsonima crassifolia, Colpothrinax wrightii, Chrysobalanus icaco, Quercus cubana, Calophyllum pinetorum, Erythroxylum minutifolium, Phania cajalbanica, Vaccinium cubense, Hyperbaena columbica, Clusia rosea, Aristida* spp., *Andropogon* spp., *Quercus corrugata*, *Q. skinneri*, *Q. oleoides*, *Q. candicans*, *Q. acatenangensi*, *Q. brachystachys*, *Q. peduncularis*, *Q. polymorpha*, and *Q. conspersa*. The crown canopy is close and thick, the understory is rich in shrubs and small trees, while the ground is dominantly covered with ferns and grasses. These forests has harbored wide array of mammals (such as *Cervus unicolor, Muntiacus muntjak, Sus scrofa, Selenarctos thibetanus, Capricornis sumatraensis, Rafuta* spp.) and bird species (i.e., *Polyplectron chalcurum, Pericrocotus miniatus, Chloropsis venusta, Myophonus melanurus, Niltava sumatrana, Cinclidium diana, Pycnonotus leucogrammicus, P. tympanistrigus, Hypsipetes virescens, Zosterops atricapillus, Garrulax palliatus, Napothera rufipectus*, etc.).

3. Ecological importance of tropical forests

Tropical forests provide diverse ecosystem services, such as play major role in water cycle, that is, they return around 90.0% precipitation into the atmosphere in the form of water vapors, increase the life span of dams through reducing the sediments into rivers, mitigate the disasters through reducing soil erosion and land sliding, and reduce the intensity and severity of floods [17]. Tropical forests are vital important for human well-being, that is, they contribute major proportion in food security (i.e., around global crops and one-third food supply depend on wild pollinators), regulate weather condition, reduce the negative effects of climate change by acting pollution filters, and serve as storage biodiversity. It has been stated that tropical forest may harbor >50.0% of world's terrestrial animal species [18]. Tropical forests play a crucial role in climate change, that is, the vegetation of tropical forest stored a huge amount of carbon taking from the atmosphere and stored in their various parts of the body (i.e., in leaves, stems, and roots, etc.) and serves as mega carbon storehouse or sinks (e.g., 25% store of world's carbon). It has been known that tropical forest can store huge amount of carbon compared to those they release back into atmosphere, slow down the rate of carbon dioxide accumulation in the atmosphere, and reduce the effect of climate change. Hence, this indicated that tropical forests play a significant role to reduce the effects of climate change and reduce 12% emission of greenhouse gases into the atmosphere. Wildlife species are the essential component of the tropical forest ecosystem, that is, they play a major role, that is, pest control, pollination, and seed dispersal in tropical forest ecosystem [19]. At habitat level, the occurrence and richness of wildlife species represent a powerful tool to examine the current status of

particular ecosystem. This could be that wildlife species are ecologically specialized in habitat use, diet, and highly sensitive to habitat and microclimate alteration [20–22].

Being rich in biodiversity, the tropical forests have been vanished and altered due to anthropogenic activities [23–25], habitat destruction and fragmentation, invasive species, overexploitation, and climate change [26–28].

4. Threats to tropical forests

Currently, tropical forests are facing severe potential threats due to human interventions, such as extensive habitat loss and degradation, isolation, and fragmentation due to heavy exploitation and conversions into agricultural fields and residential areas [29–31], which create a complex spatial disturbance [32–34]. More than 50% of the tropical forest areas have been lost during the past two decades through extensive deforestation for timber, fuelwood, agricultural expansion, and human-induced fire [35–37].

It has been stated that habitat loss and fragmentation of tropical forest is a major threat for wildlife species composition, relative abundance, species richness, and density, that is, it increases higher predation risk, reduced food occurrence and diversity, and genetic variability of birds, mammals, amphibians, and reptiles [38–43]. This may alter habitat thus makes it less productive and attractive thus caused the shift of wildlife species into human-dominated landscape that might be unsuitable and less productive for them [44–48]. However, the consequence of habitat loss and degradation may vary from species to species depending upon the nature and extent of habitat alteration, availability of food resources, and the rate of predation and parasitism [49, 50].

In addition, climate change is an important factor, which has effects on wildlife species phenology, geographic distribution, physiology, vegetation composition, and food resources [51, 52]. Thus, it ultimately exerts negative effects on the population community parameters of the species, i.e., some becomes endangered, vulnerable, and threatened [53–55]. This might be that the climate change may cause the rising of temperature and declining of the precipitation, which make the tropical forest dry and highly susceptible to fire and prone them into shrub lands, grassland, and savannah. The alteration in microclimate may alter the vegetation species composition, richness, and diversity [56, 57].

5. Wildlife fauna of tropical forests

5.1. Birds of tropical forests

Tropical forests are more diverse in vegetation structure and composition, which offer higher habitat complexity, that is, provide a diversity of nesting sites, greater protection from predators and harsh weather, and also plenty of food resources [58]. The vegetation climax and diversity had attracted a wide array of avian species, which are habitat and diet specialist in nature. For example, Black-naped Monarch—*Hypothymis azurea*—often prefers canopy and foraged on flying insects, Blue-headed Pitta—*Pitta baudii*—prefers to utilized the ground

vegetation of evergreen broadleaved forest and prey on caterpillars of insects occurs in grasses, and Scarlet-rumped Trogon—*Harpactes duvaucelli*—is middle story bird often associated with evergreen broadleaved vegetation (**Figures 3–5**). They prefer to utilize old mature trees (large diameter and height) for foraging and nesting [59, 60]. Avian species often play a crucial role in forest ecosystem functions, that is, they pollinate the flowers and disperse the seeds from one

Figure 3. Black-naped monarch—*Hypothymis azurea.*

Figure 4. Blue-headed pitta—*Pitta baudii.*

Figure 5. Scarlet-rumped Trogon—*Harpactes duvaucelii.*

part of the forest to another [61–63] and control the pest such as rodents, insects, and squirrels, which may cause damage to the forest foliage.

Tropical forest birds are vulnerable to habitat loss, fragmentation, and changes in land use patterns [64–67]. This could be that habitat loss and fragmentation may alter the vegetation structure and composition, reduce the food resources, increase predation and brood parasitism risk, and enhance the competition for food and space [68–71]. It has been illustrated that in Southeast Asia, tropical forests are facing highest rate of habitat destruction [72–76], which exerts immense pressure on the habitat use, foraging behavior, and breeding success of avian species (**Table 1**).

Family	Scientific name	Common name	Reference
Accipitridae	*Haliastur indus*	Brahminy kite	[76]
	Spilornis rufipectus	Sulawesi serpent eagle	[76]
	Accipiter trinotatus	Spot-tailed goshawk	[76]
	Ictinaetus malayensis	Black eagle	[76]
Bucerotidae	*Penelopides exhartus*	Sulawesi dwarf hornbill	[76]
Bucerotidae	*Rhyticeros cassidix*	Knobbed hornbill	[76]
Campephagidae	*Coracina bicolor*	Pied cuckooshrike	[76]
	Coracina leucopygia	White-rumped cuckooshrike	[76]
	Coracina morio	Sulawesi cicadabird	[76]
Cardinalidae	*Cyanocompsa parellina*	Blue bunting	[77]
	Passerina cyanea	Indigo bunting	[77]
	Granatellus sallaei	Gray-throated chat	[77]
	Habia fuscicauda	Red-throated ant tanager	[77]
	Piranga roseogularis	Rose-throated ant tanager	[77]
	Piranga rubra	Summer tanager	[77]
Columbidae	*Ducula aenea*	Green imperial pigeon	[76]
	Ducula forsteni	White-bellied imperial pigeon	[76]
	Ducula luctuosa	Sliver-tipped imperial pigeon	[76]
	Macropygia amboinensis	Brown cuckoo-dove	[76]
	Treron griseicauda	Gray-checked green pigeon	[76]
	Ptilinopus melanospila	Black-naped fruit dove	[76]
	Turacoena manadensis	Sulawesi black pigeon	[76]
	Patagioenas flavirostris	Red-billed pigeon	[77]
	Columbina passerina	Common ground dove	[77]
	Columbina talpacoti	Ruddy ground dove	[77]
	Leptotila verreauxi	White-tipped dove	[77]
	Leptotila jamaicensis	Caribbean dove	[77]
Corvidae	*Corvus typicus*	Piping crow	[76]
	Psilorhinus morio	Brown jay	[77]

Family	Scientific name	Common name	Reference
	Cyanocorax yncas	Green jay	[77]
	Cyanocorax yucatanicus	Yucatan jay	[77]
Cuculidae	*Surniculus lugubris*	Drongo cuckoo	[76]
	Centropus celebensis	Bay coucal	[76]
	Piaya cayana	Squirrel cuckoo	[77]
	Dromococcyx phasianellus	Pheasant cuckoo	[77]
Dicaeidae	*Dicaeum aureolimbatum*	Yellow-sided flowerpecker	[76]
	Dicaeum celebicum	Gray-sided flowerpecker	[76]
Dicruridae	*Dicrurus hottentottus*	Hair-crested drongo	[76]
Emberizidae	*Arremonops rufivirgatus*	Olive sparrow	[77]
	Arremonops chloronotus	Green-backed sparrow	[77]
Fringillidae	*Euphonia affinis*	Scrub euphonia	[77]
	Euphonia hirundinacea	Yellow-throated euphonia	[77]
Furnariidae	*Dendrocincla anabatina*	Twany-winged woodpecker	[77]
	Dendrocincla homochroa	Ruddy woodpecker	[77]
	Sittasomus griseicapillus	Olivaceous woodpecker	[77]
	Xiphorhynchus flavigaster	Ivory-billed woodpecker	[77]
Icteridae	*Dives dives*	Melodious blackbird	[77]
	Molothrus aeneus	Bronzed cowbird	[77]
	Icterus prosthemelas	Black-cowled oriole	[77]
	Icterus cucullatus	Hooded oriole	[77]
	Icterus chrysater	Yellow-backed oriole	[77]
	Icterus mesomelas	Yellow-tailed oriole	[77]
	Icterus auratus	Orange oriole	[77]
	Icterus gularis	Altamira oriole	[77]
	Amblycercus holosericeus	Yellow-billed cacique	[77]
Mimidae	*Melanoptila glabrirostris*	Black catbird	[77]
	Dumetella carolinensis	Gray catbird	[77]
Momotidae	*Momotus momota*	Amazonian motmot	[77]
	Eumomota superciliosa	Turquoise-browed motmot	[77]
Monarchidae	*Hypothymis azurea*	Black-naped monarch	[76]
Nectariniidae	*Nectarinia aspasia*	Black sunbird	[76]
Odontophoridae	*Dactylortyx thoracicus*	Singing quail	[77]
Oriolidae	*Oriolus chinensis*	Black-naped oriole	[76]
Parulidae	*Vermivora cyanoptera*	Blue-winged warbler	[77]
	Oreothlypis peregrina	Tennessee warbler	[77]
	Setophaga americana	Northern parula	[77]

Family	Scientific name	Common name	Reference
	Setophaga magnolia	Magnolia warbler	[77]
	Setophaga caerulescens	Black-throated blue warbler	[77]
	Setophaga virens	Black-throated green warbler	[77]
	Setophaga dominica	Yellow-throated warbler	[77]
	Mniotilta varia	Black-and-white warbler	[77]
	Setophaga ruticilla	American redstart	[77]
	Seiurus aurocapilla	Ovenbird	[77]
	Geothlypis trichas	Common yellowthroat	[77]
	Setophaga citrina	Hooded warbler	[77]
Pellorneidae	*Trichastoma celebense*	Sulawesi babbler	[76]
Phasianidae	*Gallus gallus*	Red junglefowl	[76]
Picidae	*Mulleripicus fulvus*	Ashy woodpecker	[76]
	Melanerpes aurifrons	Golden-fronted woodpecker	[77]
	Picoides scalaris	Ladder-backed woodpecker	[77]
	Veniliornis fumigatus	Smoky-brown woodpecker	[77]
	Colaptes rubiginosus	Golden-olive woodpecker	[77]
	Dryocopus lineatus	Lineated woodpecker	[77]
Pittidae	*Pitta erythrogaster*	Blue-breasted pitta	[76]
Polioptilidae	*Ramphocaenus melanurus*	Long-billed gnat wren	[77]
	Polioptila caerulea	Blue-gray gnatcatcher	[77]
	Polioptila plúmbea	Tropical gnatcatcher	[77]
Psittacidae	*Tanygnathus sumatranus*	Blue-backed parrot	[76]
	Aratinga nana	Olive-throated parakeet	[77]
	Amazona albifrons	White-fronted parrot	[77]
	Trichoglossus ornatus	Ornate lorikeet	[76]
	Prioniturus platurus	Golden-mantled racquet-tailed parrot	[76]
Stenostriridae	*Culicicapa helianthea*	Citrine flycatcher	[76]
Sturnidae	*Aplonis panayensis*	Asian glossy starling	[76]
	Basilornis celebensis	Sulawesi-crested myna	[76]
	Streptocitta albicollis	White-necked myna	[76]
Thamnophilidae	*Thamnophilus doliatus*	Barred antshrike	[77]
Thraupidae	*Eucometis penicillata*	Gray-headed tanager	[77]
	Cyanerpes cyaneus	Red-legged honeycreeper	[77]
	Sporophila torqueola	White-collard seedeater	[77]
	Tiaris olivaceus	Yellow-faced grassquit	[77]
	Saltator coerulescens	Grayish saltator	[77]
	Saltator atriceps	Black-headed saltator	[77]

Family	Scientific name	Common name	Reference
Tityridae	*Pachyramphus major*	Gray-collared becard	[77]
	Pachyramphus aglaiae	Rose-throated becard	[77]
	Tityra semifasciata	Masked tityra	[77]
	Tityra inquisitor	Black-crownedt Tityra	[77]
Troglodytidae	*Pheugopedius maculipectus*	Spot-breasted wren	[77]
	Thryothorus ludovicianus	Carolina wren	[77]
	Uropsila leucogastra	White-bellied wren	[77]
Trogonidae	*Trogon melanocephalus*	Black-headed trogon	[77]
	Trogon caligatus	Gartered trogon	[77]
Turdidae	*Hylocichla mustelina*	Wood thrush	[77]
Turdidae	*Turdus grayi*	Clay-colored thrush	[77]
Tyrannidae	*Camptostoma imberbe*	Northern beardless tyrannulet	[77]
	Myiopagis viridicata	Greenish elaenia	[77]
	Elaenia flavogaster	Yellow-bellied elaenia	[77]
	Oncostoma cinereigulare	Northern bentbill	[77]
	Tolmomyias sulphurescens	Yellow-olive flatbill	[77]
	Platyrinchus cancrominus	Stub-tailed spadebill	[77]
	Contopus virens	Eastern wood pewee	[77]
	Contopus cinereus	Tropical pewee	[77]
	Empidonax minimus	Least flycatcher	[77]
	Attila spadiceus	Bright-rumped attila	[77]
	Myiarchus yucatanensis	Yucatan flycatcher	[77]
	Myiarchus tuberculifer	Dusky-capped flycatcher	[77]
	Myiarchus tyrannulus	Brown-crested flycatcher	[77]
	Pitangus sulphuratus	Great kiskadee	[77]
	Megarynchus pitangua	Boat-billed flycatcher	[77]
	Myiozetetes similis	Social flycatcher	[77]
	Tyrannus melancholicus	Tropical kingbird	[77]
	Tyrannus couchii	Couch's kingbird	[77]
Vireonidae	*Vireo griseus*	White-eyed vireo	[77]
	Vireo pallens	Mangrove vireo	[77]
	Vireo flavifrons	Yellow-throated vireo	[77]
	Hylophilus decurtatus	Lesser greenlet	[77]
	Cyclarhis gujanensis	Rufous-browed pepper shrike	[77]
Zosteropidae	*Zosterops celebense*	Pale-bellied white-eye	[76]

Table 1. List of bird species occurring in tropical forests.

http://dx.doi.org/10.5772/intechopen.73315

5.2. Mammals of tropical forests

Mammals are crucial element of tropical forest ecosystems [78, 79]. They exhibit a wide range of niches, exploit diverse tropical forest resources, and play a crucial role in vegetation composition and ecosystem functions, i.e., they forage on the grasses, control weed, pollinate flowers especially bats, and disperse seed from one area to another area after consuming in the form of pallets [63, 80–83].

Mammals are considered the third most threatened and endangered animals, for example, Mantled Hawler Monkey—*Alouatta palliata*—and Amazonian Tapir—*Tapirus terrestris*—(**Figures 6** and **7**) due to habitat loss and destruction, illegal hunting, and trapping [84–86]. It has been stated that >30% mammal species are threatened and their population is still declining day by day through a variety of ways [87] (**Table 2**).

Figure 6. Mantled Hawler monkey—*Alouatta palliata.*

Figure 7. Amazonian tapir—*Tapirus terrestris.*

Family	Scientific name	Common name	Reference
Atelidae	*Alouatta palliata*	Mantled howler monkey	[87]
Bovidae	*Cephalophus harveyi*	Harvey's duiker	[88]
	Cephalophus spadix	Abbott's duiker	[88]
	Neotragus moschatus	Suni	[88]
	Syncerus caffer	African buffalo	[88]
Bradypodidae	*Bradypus variegatus*	Brown-throated slot	[87]
Canidae	*Lycalopex culpaeus*	Andean fox	[87]
Cebidae	*Cebus aequatorialis*	Ecuadorian capuchin	[87]
Cercopithecidae	*Cercocebus sanjei*	Sanje mangabey	[88]
	Papio cynocephalus	Yellow baboon	[88]
	Procolobus gordonorum	Udzungwa red colobus	[88]
	Colobus angolensis	Angolan colobus	[88]
Cuniculidae	*Cuniculus paca*	Lowland paca	[87]
Dasyproctidae	*Dasyprocta punctata*	Central American agouti	[87]
Didelphidae	*Didelphis marsupialis*	Common opossum	[87]
Elephantidae	*Loxodonta africana*	African elephant	[88]
Erinacaeidae	*Echinosorex gymnura*	Moon rat	[89]
Felidae	*Herpailurus yagouaroundi*	Eyra cat	[87]
	Leopardus pardalis	Ocelot cat	[87]
	Puma concolor	Cougar	[87]
	Panthera pardus	Leopard	[88]
Herpestidae	*Herpestes brachyurus*	Short-tailed mongoose	[89]
Herpestidae	*Bdeogale crassicauda*	Bushy-tailed mongoose	[88]
	Mungos mungo	Banded mongoose	[88]
Hystricidae	*Hystrix africaeaustralis*	Cape porcupine	[88]
Macroscelidida	*Rhynchocyon cirnei*	Checkered elephant shrew	[88]
	Rhynchocyon udzungwensis	Gray-faced elephant shrew	[88]
	Petrodromus tetradactylus	Four-toed elephant shrew	[88]
Megalonychidae	*Choloepus hoffmanni*	Hoffmann's two-toed slot	[87]
Muridae	*Leopoldamys sabanus*	Long-tailed giant rat	[89]
	Maxomys baeodon	Small spiny rat	[89]
	Maxomys ochraceiventer	Chestnut-bellied spiny rat	[89]
	Maxomys rajah	Rajah spiny rat	[89]
	Maxomys surifer	Red spiny rat	[89]
	Maxomys whiteheadi	Whitehead's spiny rat	[89]
	Niviventer cremoriventer	Dark-tailed tree rat	[89]

Family	Scientific name	Common name	Reference
	Rattus exulans	Polynesian rat	[89]
	Rattus rattus	Black rat	[89]
	Rattus tiomanicus	Malayan field rat	[89]
	Sundamys muelleri	Muller's giant sunda rat	[89]
Mustelidae	*Eira barbara*	Tayra	[87]
	Lontra longicaudis	Neotropical otter	[87]
	Mellivora capensis	Honey badger	[88]
Myrmecophagidae	*Tamandua mexicana*	Northern tamandua	[87]
Nandiniidae	*Nandinia binotata*	African palm civet	[88]
Nesomyidae	*Cricetomys gambianus*	Giant pouched rat	[88]
Procaviidae	*Dendrohyrax arboreus*	Tree hyrax	[88]
	Nasua narica	White–nosed coati	[87]
	Potos flavus	Kinkajou	[87]
Sciuridae	*Sciurus granatensis*	Red–tailed squirrel	[87]
	Simosciurus stramineus	Guayaquil squirrel	[87]
	Glyphotes simus	Sculptor squirrel	[89]
	Sundasciurus brookei	Brooke's squirrel	[89]
	Sundasciurus hippurus	Horse-tailed squirrel	[89]
	Lariscus hosei	Four–striped ground squirrel	[89]
	Sundasciurus lowii	Low's squirrel	[89]
	Sundasciurus tenuis	Slender squirrel	[89]
	Paraxeus vexillarius	Tanganyika mountain squirrel	[88]
Suidae	*Potamochoerus larvatus*	Bush pig	[88]
Tayassuidae	*Pecari tajacu*	Collard peccary	[87]
Tupaiidae	*Tupaia gracilis*	Slender tree shrew	[89]
	Tupaia minor	Pygmy tree shrew	[89]
	Tupaia tana	Large tree shrew	[89]
Viverridae	*Civettictis civetta*	African civet	[88]

Table 2. List of mammal species occurring in tropical forests.

5.3. Amphibians of tropical forests

Amphibians are most abundant vertebrate in tropical forests, that is, they vary in color, behavior, habitat selection, size, and population density. Tropical amphibians are widely distributed and habitat specialist animals, that is, they often prefer the riparian areas of tropical forests (**Figure 8**). Amphibians depend on multiple environmental gradients and are closely

Figure 8. Silver long-fingered frog—*Cardioglossa leucomystax*.

associated with habitat types, such as riparian, forest, streams, and path or road edge. Amphibian community structure was influenced by habitat heterogeneity, stream turbidity, river size, water depth, occurrence of aquatic vegetation, and density of understorey vegetation [90]. They are closely associated with habitat structure, food resources, and microclimate variables, that is, temperature and precipitation.

The loss of amphibians seriously disturbed ecological function of tropical food chain and food web. This could be that they are important component in tropical food web, that is, have occupied diverse niches from planktivore to carnivore and often serves as major sources of food for wildlife species in tropical forest. From the ecological point of view, they are best indicators of habitat fragments, ecosystem stress, and aquatic pollution, etc. In addition, amphibians have been used in ecological, embryological, physiological, and genetic research purposes.

One-third populations of amphibian species had been listed as threatened and endangered due to human intervention [91, 92]. Habitat characteristics [93], habitat fragments due to forest logging [94–98], habitat loss and degradation [99–101], environment variables [102], invasive predator species [103], diseases [104], and leaf litter [105] are major driven factors which effect on amphibian assemblages and population parameters. However, the effect of these driven factors may vary depending on the nature of the habitat disturbance, change in microclimate, and alteration in food resource. This could be that the leaf litter, canopy cover, tree size, stream size, availability of river, and refuge areas are highly essential for their survival and reproduction (**Table 3**) [106, 107].

5.4. Reptiles of tropical forests

Tropical forest is diverse and complex ecosystem which harbors most abundant and diverse reptile species [112]. Reptiles are primary consumers, that is, they prey on many animal species, such as birds, mammals, and amphibians (**Figure 9**). They provide ecological services into tropical forest ecosystem, such as control the population of pest (i.e., insects, rodents,

Family	Scientific name	Common name	Reference
Arthropleptidae	*Cardioglossa leucomystax*	Silver long-fingered frog	[108]
	Leptopelis hyloides	African tree frog	[108]
	Leptopelis occidentalis	Tai forest tree frog	[108]
	Leptopelis macrotis	Big-eyed forest tree frog	[108]
Astylosternidae	*Astylosternus occidentalis*	Western night frog	[108]
Bufonidae	*Rhinella marina*	Cane toad	[109]
	Incilius nebulifer	Coastal-plain toad	[109]
	Ansonia muelleri	Muller's toad	[111]
	Chaunus marinus	Cane toad	[110]
	Ollotis marmorea	Marbled toad	[110]
Ceratobatrachidae	*Platymantis corrugatus*	Rough-backed forest frog	[111]
Craugastoridae	*Craugastor decoratus*	Adorned robber frog	[109]
	Craugastor mexicanus	Mexican robber frog	[110]
	Craugastor hobartsmithi	Pygmy robber frog	[110]
Dicroglossidae	*Limnonectes magnus*	Mindanao-fanged frog	[111]
Eleutherodactylidae	*Eleutherodactylus longipes*	Long-footed chirping frog	[109]
	Eleutherodactylus verrucipes	Big-eared chirping frog	[109]
	Eleutherodactylus modestus	Blunt-toed chirping frog	[110]
	Eleutherodactylus nitidus	Spiny peeping frog	[110]
Hylidae	*Ecnomiohyla miotympanum*	Small-eared tree frog	[109]
	Smilisca baudinii	Baudin's tree frog	[109]
	Trachycephalus typhonius	Warty tree frog	[109]
	Exerodonta smaragdina	Emerald tree frog	[110]
	Pachymedusa dacnicolor	Mexican leaf frog	[110]
	Smilisca baudinii	Mexican tree frog	[110]
	Smilisca fodiens	Lowland burrowing tree frog	[110]
	Tlalocohyla smithii	Dwarf Mexican tree frog	[110]
	Trachycephalus venulosus	Veined tree frog	[110]
	Triprion spatulatus	Shovel-nosed tree frog	[110]
Hyperoliidae	*Hyperolius concolor*	Hallowell's sedge frog	[108]
	Hyperolius guttulatus	Dotted reed frog	[108]
	Hyperolius picturatus	Tanzania reed frog	[108]
	Hyperolius sylvaticus	Bobiri reed frog	[108]
	Hyperolius zonatus	Nimba reed frog	[108]
	Hyperolius fusciventris	Lime reed frog	[108]
	Hyperolius chlorosteus	Sierra Leone reed frog	[108]

Family	Scientific name	Common name	Reference
	Afrixalus dorsalis	Brown banana frog	[108]
	Afrixalus nigeriensis	Nigeria banana frog	[108]
	Afrixalus vibekae	Nimba banana frog	[108]
	Kassina lamottei	Rainforest running frog	[108]
	Acanthixalus sonjae	Ivory Coast wart frog	[108]
Leptodactylidae	*Leptodactylus melanonotus*	Black-backed frog	[110]
Megophryidae	*Megophrys stejnegeri*	Mindanao-horned frog	[111]
Microhylidae	*Gastrophryne usta*	Two-spaded narrow-mouthed toad	[110]
	Kalophrynus pleurostigma	Narrow-mouthed frog	[111]
Phrynobatrachidae	*Phrynobatrachus gutturosus*	Chabanaud's river frog	[108]
	Phrynobatrachus fraterculus	Macenta river frog	[108]
	Phrynobatrachus guineensis	Guinea river frog	[108]
	Phrynobatrachus phyllophilus	Tai river frog	[108]
	Phrynobatrachus liberiensis	Liberia river frog	[108]
	Phrynobatrachus alleni	Allen's river frog	[108]
	Phrynobatrachus plicatus	Coast river frog	[108]
	Phrynobatrachus taiensis	Rugegewald river frog	[108]
	Phrynobatrachus annulatus	Ringed river frog	[108]
Ranidae	*Lithobates berlandieri*	Rio Grande leopard frog	[109]
	Lithobates johni	Moore's frog	[109]
	Lithobates spectabilis	Showy leopard frog	[109]
	Staurois natator	Rock frog	[111]
	Rana grandocula	Big-eyed frog	[111]
	Lithobates forreri	Forr'ers grass frog	[110]
Rhacophoridae	*Polypedates leucomystax*	Four-lined tree frog	[111]
	Philautus acutirostris	Pointed-snouted tree frog	[111]
	Chiromantis rufescens	African foam-nested tree frog	[108]

Table 3. List of amphibian species occurring in tropical forests.

squirrels, tree shrews, small birds, etc. [113, 114], which are destructive to the vegetation. Likewise, they are also source of food for other animals, such as birds, mammals, amphibians, and even reptiles [115].

Reptiles are facing severe threats due to human activities, that is, habitat loss, and indiscriminate trapping and hunting for their skin and food thus become threatened and endangered [116–118]. The population decline of various reptile species in tropical forest may cause ecological imbalance that effected on the ecological functions (**Table 4**) [119, 120].

http://3.bp.blogspot.com/-G5lG9PEId5E/UXNJ9fn4hFI/AAAAAAAABis/AJwZ6CtO-zE/s1600/Retic.JPG

Figure 9. Reticulated python—*Python reticulatus.*

Family	Scientific name	Common name	Reference
Agamidae	*Gonocephalus semperi*	Mindoro forest dragon	[111]
	Ptyctolaemus gularis	Green fan-throated lizard	[121]
	Gerrhonotus liocephalus	Alligator lizard	[110]
Boidae	*Boa constrictor*	Red-tailed boa snake	[110]
Colubridae	*Boiga dendrophila*	Golden-ringed cat snake	[111]
	Psammodynastes pulverulentus	Common mock viper	[111]
	Oligodon maculatus	Barred short-headed snake	[111]
	Calamaria gervaisii	Philippine dwarf/Gervais' worm Snake	[111]
	Lycodon dumerili	Dumeril's wolf snake	[111]
	Lycodon aulicus	Indian wolf snake	[121]
	Lycodon jara	Twin-spotted wolf snake	[121]
	Lycodon zawi	Zaw's wolf snake	[121]
	Oligodon dorsalis	Gray's kukri snake	[121]
	Oligodon taeniolata	Streaked kukri snake	[121]
	Psammodynastes pulverulentus	Common mock viper	[121]
	Ptyas korros	Indo–Chinese rat snake	[121]
	Ptyas mucosa	Oriental rat snake	[121]
	Rhabdophis subminiatus	Red-necked Keelback snake	[121]

Family	Scientific name	Common name	Reference
	Dipsas gaigeae	Gaige's thirst snail-eater snake	[110]
	Drymarchon corais	Indigo snake	[110]
	Drymobius margaritiferus	Speckled racer snake	[110]
	Imantodes gemmistratus	Central American tree snake	[110]
	Lampropeltis triangulum	Milk snake	[110]
	Leptophis diplotropis	Pacific Coast parrot snake	[110]
	Masticophis mentovarius	Neotropical whip snake	[110]
	Oxybelis aeneus	Mexican vine snake	[110]
	Senticolis triaspis	Green rat snake	[110]
	Sibon nebulata	Clouded snake	[110]
	Tantilla calamarina	Pacific Coast centipede snake	[110]
	Trimorphodon biscutatus	Western Lyre snake	[110]
Dactyloidae	*Anolis nebulosus*	Clouded anole	[110, 122]
Dipsadidae	*Hypsiglena torquata*	Night snake	[110]
	Leptodeira maculata	South-western cat-eyed snake	[110]
	Manolepis putnami	Ridge-head snake	[110]
	Pseudoleptodeira latifasciata	False cat-eyed snake	[110]
	Leptodeira uribei	Uribe's false cat-eyed snake	[110]
Elapidae	*Naja kaouthia*	Monocled cobra	[121]
	Naja naja	Indian cobra	[121]
	Ophiophagus hannah	King cobra	[121]
	Micrurus distans	West Mexican coral snake	[110]
Eublepharidae	*Coleonyx elegans*	Yucatan-banded gecko	[122]
Gekkonidae	*Gekko mindorensis*	Mindoro narrow-disked gecko	[111]
	Hemidactylus bowringii	Oriental leaf-towed gecko	[121]
	Hemidactylus brookii	Brooke's house gecko	[121]
	Hemidactylus flaviviridis	Yellow-bellied house gecko	[121]
	Hemidactylus frenatus	Pacific gecko	[121]
	Hemidactylus garnotii	Indo-Pacific gecko	[121]
	Hemidactylus platyurus	Flat-tailed house gecko	[121]
	Coleonyx elegans	Yucatan-banded gecko	[110]
	Phyllodactylus lanei	Lane's leaf-toed gecko	[110]
	Hemidactylus frenatus	Pacific gecko	[122]
Geoemydidae	*Rhinoclemmys pulcherrima*	Painted wood turtle	[110]
	Rhinoclemmys rubida	Mexican-spotted wood turtle	[110]
Helodermatidae	*Heloderma horridum*	Mexican-beaded lizard	[110, 122]
Iguanidae	*Ctenosaura pectinata*	Mexican spiny-tailed iguana	[110]

Family	Scientific name	Common name	Reference
	Iguana iguana	Green iguana	[110, 122]
	Phrynosoma asio	Giant-horned lizard	[110]
	Sceloporus horridus	Horrible spiny lizard	[110]
	Ctenosaura pectinata	Mexican spiny-tailed iguana	[122]
Leptotyphiopidae	*Leptotyphlops humilis*	Western thread/Blind snake	[110]
Microhylidae	*Hypopachus variolosus*	Mexican narrow-mouthed toad	[110]
Pareidae	*Pareas monticola*	Common slug snake	[121]
Phrynosomatidae	*Sceloporus melanorhinus*	Black-nosed lizard	[110]
	Sceloporus utiformis	Spiny lizard	[110]
	Urosaurus bicarinatus	Tropical tree lizard	[110, 122]
	Phrynosoma asio	Giant-horned lizard	[122]
	Sceloporus uniformis celaenorrhinus	Yellow–backed Spiny Lizard	[122]
	Phyllodactylus lanei	Lane's leaf-toed gecko	[122]
Plethodontidae	*Chiropterotriton chondrostega*	Gristle-headed splayfoot salamander	[109]
Pythonidae	*Python reticulatus*	Reticulated python	[111, 121]
	Python molurus	Indian/Black-tailed python	[121]
	Loxocemus bicolor	Mexican burrowing python	[110]
Scincidae	*Sphenomorphus variegatus*	Variegated skink	[111]
	Sphenomorphus beyeri	Beyer's sphenomorphus	[111]
	Lipinia pulchella	Yellow-striped slender tree skink	[111]
	Eutropis multicarinata borealis	Philippine mabuya	[111]
	Eutropis englei	Six–striped mabouya	[111]
	Lygosoma bowringii	Bowring's supple skink	[121]
	Lygosoma lineolatum	Striped writhing skink	[121]
	Lygosoma punctata	Dotted writhing skink	[121]
	Sphenomorphus maculatus	Spotted forest skink	[121]
	Takydromus khasiensis	Java grass lizard	[121]
	Plestiodon parvulus	Southern pygmy skink	[110]
	Scincella assatus	Red forest skink	[110]
	Marisora brachypoda	Middle American short-limbed skink	[122]
Teiidae	*Ameiva undulata*	Rainbow amevia lizard	[110]
	Aspidoscelis lineattissimus	Many-lined whiptail	[110]
	Aspidoscelis communis lineattissima	Giant whiptail lizard	[110, 122]
Typhlopidae	*Ramphotyphlops braminus*	Brahminy blind snake	[121]
	Typhlops diardii	Diard's blind snake	[121]
	Typhlops jerdoni	Jerdon's worm snake	[121]
Varanidae	*Varanus bengalensis*	Clouded monitor lizard	[121]

Family	Scientific name	Common name	Reference
	Varanus flavescens	Yellow monitor lizard	[121]
	Varanus salvator	Asian water monitor lizard	[121]
Viperidae	*Tropidolaemus wagleri subannulatus*	Bornean-keeled pit viper	[111]
	Crotalus basiliscus	Basilisk rattle snake	[110]

Table 4. List of reptile species occurs in tropical forest.

6. Conclusion

In conclusion, this review has attempted to highlight that the tropical forests are ideal habitat for a variety of wildlife species, especially birds, mammals, reptiles, and amphibians. This might be due to the occurrence of heterogeneity of vegetation structure and composition, richness and diversity of food resources, safe breeding and nesting sites, and shelter from predators and harsh weather. These forests should be kept intact, preserved, and managed scientifically on a sustainable basis to reduce the human interference and for future generation.

7. Recommendation for future research and conservation

Furthermore, in future, a detailed research on the wildlife ecology should be carried out by investigating the effects of independent environmental variables with respect to the habitat selection and association, vegetation structure and composition, home range and distribution, population parameters, occurrence of food resources and distribution, influence of human interventions on wildlife population, habitat disturbance, etc. This will help to identify the threats facing different wildlife species and their habitats, indicate the current status of wildlife population within the landscape, and determine the productivity of the particular area.

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