

FAUNAL BIO-DIVERSITY OF PAKISTAN

Mian Muhammad Shafiq¹

Pakistan lies at the western end of the South Asian (Indian) subcontinent and its flora and fauna represents of a blend of palaearectic and Indomalayan elements, with some forms of the Ethiopian region, Pakistan can be divided in a formal sense into the following biogeographical provinces. Pamir Karakoram and Himalayan highlands, bordering Anatolia-Iranian Desert, Indus Monsoon forest and Thar Desert (Udvardy, 1975). The palaearectic species contain a mixture of those common to a large part of Eurasia, and with those with affinities to the Middle East, Western Asia, Central Asia and Tibet. The rate of endemism is relatively low (5% for plants, 4% for mammals, none for birds, 10% for reptiles and 11% for fish) but the blending of elements from different origins has ensured a diverse and interesting flora and fauna.

Bio-diversity encompasses all species of plants, animals micro-organisms, the ecosystem and ecological process to which they belong. It is usually considered at three different levels; Genetic diversity, Species diversity and Ecosystem diversity. Genetic diversity is a sum total of genetic informations contained in the genes of all living organisms. Species diversity refers to the variety of living organism on the earth and Ecosystem diversity relates to the variety of habitat, biotic communities and ecological processes in the biosphere as well as the tremendous diversity in the ecosystem (McNelly *et al.* 1990).

At the time of partition Pakistan inherited a rich variety of wildlife in the form of beautiful mammals, birds and reptiles in good number. But soon after, indiscriminate hunting of animals and destruction of their habitat was started. Resultantly many forms of animals were reduced to small and fragmented groups while some were completely wiped out. It was only in late sixties that the Govt. of Pakistan realized the situation and initiated some efforts to conserve the wildlife heritage. Such efforts consisted of promulgation of legislation, development of administration structure, creation of special wildlife areas and conduct of scientific surveys and research.

Wildlife plays an important role in ecosystem and preservation of

¹ Assistant Secretary Wildlife, Pakistan Forest Institute, Peshawar.

ecosystem is the key to preserve biodiversity. Without the preservation of habitat animals and birds cannot survive.

The land area is divided into different ecological zones depending upon vegetation type in the respective tract.

ECOLOGICAL ZONES

Pakistan is divided into nine ecological or vegetative zones and eighteen habitat types.

1. Permanent Snowfield and Cold Desert

This vegetation type encompasses the highest areas having elevation of 4,000 m above in Himalaya, Karakoram and Hindukush ranges in northern Hunza, Chitral and Baltistan. The temperature remain is very cold and permanent snow covers are there. The prominent flora and fauna in the area are:

Plants: *Salix denticulata*, *Juniperus communis*, *Mertensia tibetica*.

Wildlife: Snow piegon, Himalayan snow cock (*Letraugullus himalayansis*) Alpine chough (*Marmota bobak*), Ibex (*Capra ibex sibirica*), Snow leopard (*Uncia uncia*), lynx (*Felis lynx*)

2. Alpine Zone

a. Alpine Meadows

These are commonly found in Northern Hazara, Gilgit, Chitral and Swat Kohistan. Where growth of shrubs and trees became stunted.

Plants: Often good growth of grasses and sedges, with forbs such as *Saxifraga sibirica*, *Potentilla* spp., *Primula* spp., *Polygonum* spp.

Wildlife: Snow partridge (*Lerwa lerwa*), (*Capra ibex siberica*), Marmot (*Marmota caudata*) Snow leopard (*Uncia uncia*).

b. Sub Alpine Scrub and Birch Zone

The area consists of narrow belts along stream beds and in ravines including the north eastern corner of Hazara district, Gilgit and Swat Kohistan. The common flora and fauna of this particular zone are:

Plants: *Betula utilis*, *Rhododendron anthogrogon*, *Juniperus communis*, *Poa* grasses with primula.

Wildlife: Snow pieogn, Chukor (*Alectoris chukar*) Tragopan (*Tragapan melamocephalus*) Monal Pheasant (*Lophophorus impejanus*) Stone Martin, Musk Deer (*Moschus moschiferus*) Snow Leopard (*Uncia uncia*) and Markhor (*Capra falconeri*).

3. Montare forest

a. Dry Temperate Coniferous Zone

These are generally found on the drier and inner ranges of the Himalaya where the influence of monsoon is less. The upper Kaghan valley, Dir, Swat, Chillas and Gilgit are the major areas falling under this category. The flora and fauna found in the area are:

Plants: *Picea smithiana*, *Pinus wallichiana* and *Cedrus deodara* with an understorey of *Indigofera gerardiana*, *Sambucus ebulus*.

Wildlife: Chukor (*Alectoris chukar*) Western Tragopan (*Tragapan melanocephalus*) Koklas Pheasant (*Pucrasia mecrolopha castanea*) Kaleej Pheasant (*Lophura leucomelana hamiltonii*) Monal Pheasant, (*Lophophorus impejanus*) Black Bear (*Selenarctos thibltanus*) Markhor (*Capra falconeri*).

b. Himalayan Moist Temperate Zone

Typical examples of this type can easily be found in areas such as Galis, Lower Kaghan valley, Shogran, Naleem valley in Azad Kashmir, having mixed deciduous and coniferous forest and high rainfall during monsoon season. The

prominent vegetation and wildlife species found in the area are:

Plant: *Pinus wallichiana*, *Acer caesium*, *Populus ciliata* with a dense understorey of *Beberis* spp, *Lonicera alpigena*, *Viburnum nervosum* and *Skimmia laureola*.

Wildlife: Koklas Pheasant (*Pucrasia macrolopha castanea*) Kaleej Pheasant (*Lophura leucumelena hamiltonii*) Gray Goral (*Naemorhedus goral*) Himalayan Black Bear (*Selenarctos tibetanus*) Leopard cat (*Felis bengalensis*) Gray Langur (*Presbytis entellus*).

4. Sub tropical Pine Zone

A fairly narrow zone of sub tropical pine forest is confined between 900 m and 2000 m along the Himalaya. This zone can be typified by areas of Batrasi Pass, Buner, Swat and Ghora Gali.

Plants: *Pinus roxburghii*, *Quercus incana* with undershrubs of *Berberis heteropoda*, *Berberis lycium*, *Carissa* spp.

Wildlife: Chukor (*Alectoris chukar*) Kaleej pheasant (*Lophura leucomelana hamiltonii*) Gray Goral (*Neomorhedus goral*) Common leopard (*Panthera pardus*), Palm civet.

5. Tropical Deciduous Zone

These forests are found in the form of a very narrow band in Jhelum valley, Rawalpindi foot hills and Margalla Hills. It is typified by Kahuta and Lehrtrar and Nurpur Shahan. Early summer and spring is hot and dry but there is much rain in late summer. The commonly found plants and wildlife are:

Plants: *Acacia modesta*, *Olea ferruginea*, *Banhinia variegata*, *Cassia fistula*, *Ficus carica*.

Wildlife: Kaleej pheasant (*Lophura leucomelana hamiltonii*) Barking deer (*Muntiacus muntjak*) Common leopard (*Panthera pardus*) Yellow throated martin (*Martes flavigula*) Wildboar (*Sus scrofa*).

6. Alpine Dry Steppe Zone

a. Steppe Forest Zone in Northern Latitude

Steppe forests zone are characterized by scattered growth of trees and shrubs which are typified by side valleys of lower Chitral parts of Gilgit, Kohistan and Dir.

Plants: *Juniperus macropoda*, *Juniperus polycarpus*, *Pistacia integerrima*, *Pinus wallichiana*, *Ephedra intermedia* and *Berberis* spp.

Wildlife: Markhor (*Capra falconeri*) Royles Pika (*Ochotona rolei*) Stone marten (*Martes foina*) and field mouse (*Apodemus sylvaticus*).

b. Steppe Forest Zone in Intermediate Latitude

Typified by Takht-i-Suleman, Toba Kakkar Range, Fort Sandeman, parts of Safed Koh, Malakand and Swat.

Plants: *Juniperus macropoda*, *Pinus gerardiana*, *Artemesia maritima*, *Rheum emodi*.

Wildlife: Markhor (*Capra falconeri*) Collared Pika (*Ochotona rufescens*) Stone marten (*Martes foina*).

c. Steppe Forest Zone in Southern Latitude

Typified by the higher mountain ranges of northern Kalat, Chiltan, Takhatu, Zarghun and Kali Phata mountain ranges including the higher parts of the Suleman hills.

Plants: Stunted *Juniperus macropoda*, *Pistacia khinjak*, *berberis baluchistanii*, *Rossa Webbiana*, *Tulip* spp.

Wildlife: In extreme south Persian Wild goat (*Capra hircus*) further north straight horned markhor (*Capra falconeri jerdoni*) elsewhere stone marten (*Martes foina*) collared Pika (*Ochotona rufescens*).

7. Arid Sub-tropical Habitat

The habitat is generally composed of rocky and hilly areas right from sea level to around 900 m elevation.

a. Monsoon Influenced Arid Sub-tropical

This sub-type is marked with humid summers, mild but dry winters, typified by Karachi environs, Malir, Lakhi hills, Sindh Kohistan, Kirther and Lasbella.

Plants: *Euphorbia caducifolia*, *Zizyphus nummularia*, *Acacia senegal*, *Commiphora mukul*.

Wildlife: Indian fox (*Vulpes bengalensis*) Desert cat (*Felis libyca*) Chinkara (*Gazella gazella*) Hyæna (*Hyaena hyaena*) Sindh Ibex (*Capra hercus*), Pangolin (*Manis crassicaudata*) Parcopine (*Hystrix indica*), Hedgehog.

b. Less Pronouned Monsoon Influenced

Typified by Salt range, Kala Chitta hills and the eastern or outer hills of Waziristan.

Plants: *Acacia modesta*, *Olea cuspidata*, *Monutheca buxifolia*, *Withania coagulans*.

Wildlife: Urial (*Ovis orientalis*) Chinkara (*Gazella gazella*) Desert Fox (*Vulpes vulpes*) Parcopine (*Hystrix indica*) Hyæna (*Hyaena hyaena*) Caracal (*Felis caracal*).

c. Balochistan Desert Scrub

Typified by Northern Kalat, the lower parts of the Suleman hills, most of the Balochistan valley, Kurram valley, Waziristan.

Plants: *Reptonia buxifolia*, *Haloxylon ammodendron*, *Pistacia interregim*, *Olea cuspidata*.

Wildlife: Hill fox (*Vulpes vulpes griffithi*) Balochistan black bear (*Selenarcotes thibetanus gedrosianus*) Hyanea (*Hyanea hyanea*) Common leopard (*Panthera pardus*) Caracal cat (*Felis caracal*) Urial (*Ovis orientalis*) Goitered gazelle (*Gazella subgutturosa*) Parcopine (*Hystix indica*).

8. Tropical Thorn Forest Zone

a. Indus Plains

Typical areas may be found between Jhang, and Shorkot Road, around Kasur on the border of India and in Sindh on the right bank of Indus around Kashmore.

Plants: *Prosopis Spicigera*, *Tamarix aphylla*, *Capparis decidua*.

Wildlife: Jungle cat (*Felis chaus*) Wild boar (*Sus scrofa*) Desert wolf (*Canis lupus pallipes*) Mongoose (*Herpestes edwardsi*).

b. Sand dunes

Typified by Thal desert, Cholistan and Thar desert.

Plants: *Calligonum polygonoides*, *Alhagi camelorum* *Acacia jaequemontii*, *Prosopis spieigera*, *Tamarix articulata*.

Wildlife: Desert fox (*Vulpes vulpes pusilla*) Small Indian civit (*Viverricula indica*) Caracal cat (*Felis caracal*) Chinkara (*Gazella gazella*) Desert hare (*Lupus nigracollis dayanus*).

9. Riverine Plain or Indus basin

a. Inundation and Seepage zone, lakes and Swamps

Typified by around the East Nara and Shangor, Ghauspur in Jacobabad district, and Manchar Dadu district, all in Sindh, Trimnu and Bulloki Head works and Lal Sohanra near Bahawalpur all in Punjab.

Plants: *Saccharum spontaneum*, *Phragmites communis*, *Tamarix dioica*, *Typha elephantina*.

Wildlife: Wild boar (*Sus scrofa*) Hog deer (*Axis porcinus*) Smooth coated Indian Otter (*Lutra perspicillata*). Fishing Cat (*Felis viverrina*), Bat.

b. Riverain Tract

The immediate vicinity of the Indus Jhelum, Chenab and Ravi rivers.

Plants: *Tamarix diodica*, *Tamarix aphylla* *Saccharum sportaneum*.

Wildlife: Hog deer (*Axis porcinus*) Smooth coated Indian otter (*Lutra perspicillata*) Wild boar (*Sus scrofa*) Indian civit, Jungle cat, Jackal.

c. Mangrove Forest

Mainly occur in the Indus delta and at a few other points westward along the coast.

Plants: *Avicennia afficinalis*, *Rhizophora conjugata*,

Wildlife: Hog deer (*Axis porcinus*) smoothcoated Indian otter (*Lutra perspicillata*) Fishing cat (*Felis viverrina*) Plumbeous dolphin.

MAMMALS

T. J. Robert (1977) listed 158 species in ten out of the eighteen known orders: Insectivora II species, Chiroptera, 36; Pholidota, 1; Lagomorpha, 6; Rodentia, 43; Primates, 2; Carnivora, 31; Perissodactyla, 1; Artiodactyla, 18; Cetacea 9).

Origin and composition of Mammal fauna

The mammals of Pakistan are composed of Palaearctic and Indomalayan forms with a few species having affinities with the Ethiopian region.

Palaeartic species have reached Pakistan from Iran through Southern Balochistan or from Central Asia through the Himalaya and Hindu Kush. Species which arrived by the northern route include brown bear (*Ursus arctos*), field mouse (*Apodemus sylvaticus*) Ibex (*Capra ibex*). Those species which arrived by the southern route through Balochistan are wild goat (*Capra aegagrus*) marbled polecat (*Vormela peregusna*).

Species with Ethiopian affinities entered Pakistan through the southern coastal belt. They include lion and Cheetah (both now extinct) caracal cat (*Felis caracal*) and long eared hedgehog (*Hemiechinus auritus*).

Indomalayan mammals species also seem to have entered Pakistan by two main routes; one being the coast, mangroves and dry hinterland and the other along the southern slopes of the Himalaya. Species arriving by the southern route include fishing cat (*Felis viverrina*) musk shrew (*Suncus murinus*) Pangolin (*Mains crassicaudata*). The northern route was used by leopard cat (*Felis bengalensis*) and goral (*Nemorhedus goral*).

Tiger (*Panthera tigris*) and Swamp deer (*Cervus duvavceli*) have become extinct in this century, lion (*Panthera leo*) during the last century and the Indian one-horned rhinoceros (*Rhinoceros unicornis*) about 400 years ago. (Rovert, 1977).

Several species have been described as extremely rare or occurring in a very small population on the borders of Pakistan and of these, the Cheetah (*Acinonyx jubatus*) Indian wild ass (*Equus hemionus khur*) and Hangul (*Cervus elaphus hanglec*) are already regarded as being extinct in Pakistan (Khan and Hussain 1985: NCCW, 1978). Black buck (*Antelope cervicapra*) also listed as extinct by NCCW (1978), have been reintroduced in Lal Suhanra National Park and Kalabagh game reserve.

Threatened Mammals Species in Pakistan

Listed as endangered by N.C.C.W. (1978):

Order CETACEA

Platanista minor Indus river dolphin

Order CARNIVORA

Balochistan Bear (*Ursus thibetanus gedrosianus*), Fishing cat (*Felis vicerrina*), Golden cat (*Felis temminkei*), Leopard cat (*Felis bengalensis*), Lynx (*Felis lynx*), Snow leopard (*Uncia uncia*).

Order ARTIODACTYLA

Nilgai (*Bosephalus tragocamelus*), Straight horned markhor (*Capra falconeri megaceros*), Marco polo sheep (*Ovis ammon poloi*), Ladakh urial (*Ovis vignei vignei*)).

BIRDS

660 birds species have been recorded in Pakistan (Rovbert, 1991). Breeding birds are a mixture of Palaearctic and Indomalayan forms and the occurrence of many species at one or other geographical limits of their range is illustrative of the diverse origin of the avifauna.

Origins of Avifauna

The palaearctic avifauna is represented by species like Golden eagle (*Aquila chrysaetos*), Magpie (*Pica pica*) Sooty flycatcher (*Hypsipetes madagascarenis*).

Many migrants from central and northern Asia pass through or winter in Pakistan. These include large number of water birds, raptors and passerines.

Threatened Birds species in Pakistan (Coller and Andrew 1988)

Dalmatian pelican (*Pelecanus crispus*), Lesser white fronted goose (*Anser erythropus*), Marbled teal (*Marmaronetta angustirostris*), White headed duck (*Oxyura leucocephala*), Pallas fish eagle (*Haliaeetus leucorhynchus*), Black Vulture (*Aegypius monachus*), Western tragopan (*Tragopan melanocephalus*), Cheer Pheasant (*Catreus wallichii*), Great Indian Bustard (*Ardeotis nigriceps*), Houbara Bustard (*Chlamydotis undulata*), Sociable plover (*Chettusia gregaria*) Wood snipe (*Gallinago nemoricola*), Stoliczka bushchat (*Saxicola macrorhyncha*), Jerdon's babbler (*Moupinia altirostris*).

REPTILES

174 species of reptiles have been recorded in Pakistan to-date. These are made up of 10 turtle (Two marine and eight freshwater), two tortoises, 2 crocodilians, 88 lizards and 72 snakes, (including 14 sea snakes) (Ahmad, 1986).

Threatened Reptile species in Pakistan (IUCN, 1990)

Green turtle (*Chelonia mydos*), Olive Ridley turtle (*Lepidochelys olivacea*), Mugger (*Crocodylus palustris*), Gharial (*Gavialis gangeticus*), Central Asia monitor (*Varanus griseus caspius*), Indian Python (*Python molurus*), Central Asian cobra (*Naja oxiana*).

FISH

Pakistan has 156 native freshwater fish species. There are 17 endemic species (11% of the total) and five endemic subspecies (Mirza, 1975). Also there are 9 species of snow trout or mountains barbels.

INVERTEBRATES

There has been little research on the invertebrates of Pakistan. However, about 700 species of marine invertebrates have been recorded so far from coastal waters, and these are the best known groups, especially crustaceans and molluscs, because of their importances (Ahmad; 1986).

PROTECTED AREAS

In all, so far, 14 National Parks, 98 Wildlife sanctuaries, and 91 Game reserves have been designated in the country. However, one Biosphere Reserve at (Lal Sohanra National Park) and 8 wetlands under the Ramsar convention were established.

The major habitats are represented within the country protected area system. The size and distribution of protected areas do not meet the needs of the ecosystem or plants and animal communities. The creation of most have been haphazard, with their boundaries not drawn according to ecological criteria many of them are too small and wide dispersion makes them separated islands, Weak

legislation and enforcement is a problem resulting in inadequate safeguards against habitat degradation within protected areas.

A complete review of nature conservation in the country and a comprehensive system review are needed to identify and designate the most important ecological areas that need protection; complete the protected areas network and introduction of modern concepts of protect areas management as outleved by international nature conservation agencies.

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