

The Eastern Ghats

EPTRI - ENVIS Newsletter

Aquatic Faunal Diversity in Eastern Ghats



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Foreword

Eastern Ghats region, is a habitat for a variety of rare species. However, most of the aquatic habitats are in threat due to anthropogenic impacts and therefore there is a need for immediate attention towards their conservation. The main emphasis of both the issues pertinent to conservation of Aquatic Faunal Diversity of ecologically sensitive Eastern Ghats region.

In this context, the present issue covers articles on the Rehabilitation of Crocodiles from Scientists of A.P Forest Department; the aquatic faunal diversity of Nagarjunasagar Srisaileam Tiger Reserve, the largest tiger reserve in India by Scientists of Department of Zoology, Osmania University; a short notes on Dolphin Population in Eastern Ghats by a researcher from EPTRI and Aquatic Faunal resources of Eastern Ghats Region by Scientists from Andhra University.

ENVIS Coordinator

The forthcoming issue would be on *Biodiversity of the Eastern Ghats*. Articles, write-ups and news items on the theme are invited from our readers.

The readers are requested to kindly intimate by e-mail any change of postal (or e-mail) address. The names and contact details of others who may be interested in receiving a copy of the Newsletter may please be furnished to ENVIS, EPTRI.

Note: The views expressed in the article/s are of the Authors



Gavialis gangeticus



Crocodylus palustris



Crocodylus porosus



Happy New Year
&
Seasons Greetings



Gayathri Ramachandran, I.A.S.
Director General
Ex-Officio Special Chief Secretary
Government of Andhra Pradesh

Crocodile the endangered Apex Predator of Aquatic Eco-System and its Rehabilitation in India

K. Thulsi Rao

Project Tiger, Srisailam-518102

E-mail: thulsirao@yahoo.co.in

There are 23 living crocodylian species recognized, and they're found in over 90 of the world's countries and islands. Crocodylians are generally found in the tropical regions, being unable to survive and reproduce successfully in cold climates. However, the American and Chinese alligators are the most cold-tolerant and are both found in the highest latitudes of any species. Following is the list of crocodiles found in the world.

List of Crocodiles in the World

Alligatoridae :

Alligator mississippiensis - American Alligator

Alligator sinensis - Chinese Alligator

Caiman crocodilus (crocodylus) - Spectacled Caiman

Caiman c. apaporiensis - Rio Apaporis Caiman

Caiman c. fuscus - Brown Caiman

Caiman latirostris - Broad-snouted Caiman

Caiman yacare - Yacare Caiman

Melanosuchus niger - Black Caiman

Crocodylidae :

Crocodylus acutus - American Crocodile

Crocodylus cataphractus - Slender-snouted
Crocodile

Crocodylus intermedius - Orinoco Crocodile

Crocodylus johnstoni - Australian Freshwater
Crocodile

Crocodylus mindorensis - Philippine Crocodile

Crocodylus moreletii - Morelet's Crocodile

Crocodylus niloticus - Nile Crocodile

Crocodylus novaeguineae - New Guinea Crocodile

Crocodylus palustris - Mugger / Marsh Crocodile

Crocodylus porosus - Estuarine / Saltwater
Crocodile

Crocodylus rhombifer - Cuban Crocodile

Crocodylus siamensis - Siamese Crocodile

Osteolaemus tetraspis - Dwarf Crocodile

Tomistoma schlegelii - False Gharial / Gavial

Gavialidae :

Gavialis gangeticus - Gharial / Gavial

Alligators and caimans (the family Alligatoridae) are found almost exclusively in North, Central and South America. The sole exception is the Chinese alligator which is found in eastern China. There are a handful of members from the family Crocodylidae (true crocodiles) in the Americas, but the majority is found throughout Africa, India and Asia. The single member of the family Gavialidae (Indian Gharial) is found in India and adjacent countries.

The species with the widest distribution is the estuarine crocodile (India to Vanuatu), the species which covers the greatest area is the Nile crocodile (throughout Africa and parts of Madagascar), although the most numerous is probably the fecund spectacled caiman (Central and South America, with feral populations in Cuba, Puerto Rico and Florida). Asia, including India, Indonesia, Malaysia and Australia, is the stronghold of the family Crocodylidae. Eight species occur in this region, including the only member of Gavialidae family. A ninth species (the Chinese alligator) is the only member of the Alligatoridae family outside of the Americas, and is found only in a very restricted area in eastern China. From Iran to Bangladesh and Sri Lanka is the Mugger or marsh crocodile, whose range overlaps much of the Indian gharial (family Gavialidae) which is still known to occur from Pakistan, through India to Nepal.



A captive Mugger crocodile (female) jealously guarding its nests

The next species, the estuarine crocodile, has a very large distribution from India and Sri Lanka, all the way through Indonesia, Malaysia, Australia to Vanuatu and the Solomon Islands. The false gharial (family Crocodylidae) is found further east of the Indian gharial's range, in Indonesia and Malaysia. Its range partly overlaps that of the siamese crocodile, which also occurs in areas around Thailand. The Philippine crocodile is restricted to a few small islands in the Philippines. The New Guinea crocodile is restricted to Irian Jaya (Indonesia) and Papua New Guinea. Finally, the Australian freshwater crocodile is endemic to the northern parts of Australia.

Reproduction

Crocodiles are unisexual and polygamous. Mating occurs in water and lasts for about 1-3 minutes. Usually mating season is between December to February. *C. palustris* and *C. porosus* attain maturity after 6 to 8 years where as *G. gangeticus* at the age of about 10 years.

Egg laying takes place during the months of March and April. The female (gharial and mugger) comes out of water and dig the ground with fore limbs at 8-10m away from the shore to lay eggs then covers the hole. The salt water crocodile prepares a nest like those of birds with twigs, small dried sticks and mud.



Croc eggs are collected for captive hatching

The number of eggs laid by a crocodile depends upon its age and size and varies between 8 and 97. They lay between 8 and 11 eggs during their early years of breeding.

The eggs are milky white, oval and double shelled (outer hard and inner porous) and measures from 36 x 60 mm to 47 x 80 mm, and weighs from 65 to 95g. The female cares for the nest until hatching from any foreign intruders. The optimum temperature for incubation of egg is $30^{\circ}\text{C} \pm 1^{\circ}\text{C}$. However, they will be able to hatch within a range of 27°C to 35°C . The incubation period is about 60 to 80 days. The period of incubation for Gharial is 60 to 70 days; Mugger is 63 to 72 days saltwater crocodiles is 78 to 80 days.



Crocodile assisting in accelerating the hatching process

After incubation, they make the fact known by emitting crocking sounds from inside the eggs. Hatching occurs during June and July in gharials and muggers and July and August in salt water crocodiles. The process of hatching is marked by appearance of a slit made by the developed embryo through which snout comes out first and slowly the body and finally the tail, as the hatchlings emerge, they make periodically short barely audible grunts. Then the mother with great care excavates them from the nest with her front teeth and jaw and take them to water. The hatchling measure about 30 to 35 cm and weighs 60 to 90 g. The mother guards the hatchlings until the next breeding season. Ninety per cent of the off-springs will die before they attain maturity, due to hunting and predation and other natural calamities.

Importance of Crocodiles

They maintain the quality of the water in which they live, by consuming the coarse and scale less fishes and the carcasses which cause a considerable damage to the quality of the table fishes of that water body.



One meter long croc yearlings selected for release into the wild.

Threat

Their skin is an attractive foreign exchange earner. 4m length skin of crocodile costs about Rs. 8000/- which it attains within 4 to 5 years. Of the three Indian species, *C. porosus*' skin is very expensive because of its small scales. An oil of immense medicinal value is extracted from their body. Their gall bladder is also of same medicinal importance. The meat of 1 kg. of crocodile costs about Rs. 50/-. In fact each and every part of the body of crocodiles is economically important. It is due to their economic importance they are being ruthlessly killed by human beings and they were put at the verge of extinction. In early 70's when all the three crocodiles of India were at the verge of extinction, our late prime minister Mrs. Indira Gandhi taken appropriate conservation measures to restock them back into their original home range in India.

Conservation Programme

The action of Government of India taken in the management of Indian crocodilian resources is laudable. Several sanctuaries and special crocodile breeding and management centres were setup. A Central Crocodile Breeding and Management Training Institute was started on 4th December, 1978 at Hyderabad, Andhra Pradesh. This Institute provided training to the in-service forest personnel of all states in India from where the author was graduated in Crocodile Breeding and Sanctuary Management. This type of institute is first of its kind in the World.



Dr. Bustard and Mr. Thulsi Rao releasing the first crocodile into the river Krishna (wild).

The crocodiles have been categorized in schedule-I of the Wildlife (Protection) Act, 1972. Shooting of these animals in any part of the country is banned officially through legislation. The Government of India through the State Governments, with the collaboration of UNDP and FAO established a crocodile conservation programme under the stewardship of Dr. Bustard in 1975. The eggs of all the three crocodiles were collected from the former home ranges of the stray animals and are artificially hatched through "Battery farming or Artificial farming".

Battery Farming: The nesting sites are located with the help of local fisherman and native tribes and their eggs are collected and transported to the hatchery. Eggs are transported to the hatcheries in their original nest positions' and are kept in an improvised hatchery. Artificial pools were made for nursing the hatchlings till they are fit to be released into the protected sanctuaries. After attaining a size of one meter the yearlings of all the three crocodiles were released into the wild and restocked all the rivers of India. This was the most successful conservation attempt by the Forest Department in the country. The author had actively involved in this programme in Andhra Pradesh. About 2,093 crocodiles were released till the end of 1984 in all the rivers of India from crocodile conservation centres of the thirteen states. This programme went on successfully and many more crocodiles were further rehabilitated.

Aquatic Faunal Diversity of Nagarjunasagar Srisailam Tiger Reserve

*P. Venkateshwarlu, C. Srinivasulu, Arsid Rajesh and C.A.N. Rao**

Department of Zoology, Osmania University, Hyderabad – 500 007, Andhra Pradesh

*Freshwater Biology Station, Zoological Survey of India, Hyderabad – 500 020, Andhra Pradesh

[This write-up is derived from a report submitted to the Zoological Survey of India, Kolkata]

India is endowed with varied ecosystems/geographical habitats including snow covered mountains, high mountain ranges, tropical rain forests, grass lands, vast freshwater and marine wetlands, semi arid regions and deserts. Due to this diversity in habitats and climates, India is home to a rich and varied floral and faunal diversity. Among numerous biodiversity hot-specks in India, the Nallamala Hills in the Eastern Ghats are unique in having diverse flora and fauna. In the past decade, research studies in the Nallamala Hills, especially the Nagarjunasagar Srisailam Tiger Reserve has led to documentation of hitherto unknown species of flora and fauna.

The Nagarjunasagar Srisailam Tiger Reserve (15°53'N to 16°43'N and 78°30'E to 79°28'E), the largest of the Tiger Reserves in the country is spread over five districts of the state of Andhra Pradesh namely Kurnool, Prakasam, Guntur, Nalgonda and Mahboobnagar. It is spread over an area of 3,568 sq km and the forest expanse includes five forest divisions including 11 revenue mandals.

The Nallamala Hills are an unbroken chain of steep hill ranges with an elevation ranging from 100 m (River Krishna valley) up to 917 m (Durgamkonda in Markapur Reserve Forest). The River Krishna flows through nearly 130 km of the Tiger Reserve dividing it into two halves namely the right (or south) bank and the left (or north) bank. Two massive dams [one at Nagarjunasagar and another at Srisailam] have been constructed to harness the power of the River Krishna.

Identified as a major chunk of moist deciduous and dry deciduous forest encompassing five districts, this forest area was a major foothold to the populations of tigers and hence was declared a wildlife sanctuary in the year 1978, and was upgraded to the status of the Tiger Reserve in 1983. The Tiger Reserve is also referred to as 'Rajiv Gandhi Wildlife Sanctuary' (named so in 1992, a name less frequently used).

This small note puts on record the aquatic faunal diversity that had been recorded by earlier researchers from Zoological Survey of India or by numerous surveys carried out in Nagarjunasagar Srisailam Tiger Reserve by researchers from Department of Zoology, Osmania University, Hyderabad.

Among the many insects that depend on water for their lifecycle and true aquatic insects, odonates – dragonflies and damselflies, are easy to observe, document and collect. As many as 13 species of odonates have been recorded from NSTR (Table 1). The ichthyofaunal diversity is represented by as many as 58 species belonging to six orders (Rajesh *et al.*, *in press*) (Table 2). The herpetile diversity is represented by as many as 19 species of amphibians belonging to four families (Srinivasulu *et al.*, 2006a) and 7 species of reptiles belonging to four families (Srinivasulu *et al.*, 2006b) (Table 3). A total of 91 species of birds belonging to 22 families (including both true aquatic and wetland-dependent species) have been recorded in Nagarjunasagar Srisailam Tiger Reserve. No true aquatic mammals are found in the Eastern Ghats, but semi-aquatic species like otter (*Lutra perspicillata*) and fishing cat (*Prionailurus viverrinus*) have been recorded in past. There are no new sighting records of these species.

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← *Kaloula taprobanica*

Table 1

List of Dragonflies and damselflies recorded from
Nagarjunasagar Srisailam Tiger Reserve

Order Odonata

1. *Agriocnemis pygmaea* (Rambur)
2. *Agriocnemis* sp.
3. *Ceriagrion cerinorubellum* (Brauer)
4. *Ceriagrion coromandelianum* (Fabricius)
5. *Copera marginipus* (Rambur)
6. *Vestalis gracilis* (Rambur)
7. *Ictinogomphus rapax* (Rambur)
8. *Brachythemis contaminata* (Fabricius)
9. *Diplacodes trivialis* (Rambur)
10. *Potomacha congener* (Rambur)
11. *Ryothemis variegata* (Linnaeus)
12. *Trithemis festiva* (Rambur)
13. *Urothemis signata* (Rambur)

Table 2

List of fishes recorded from Krishna River and different
waterbodies in Nagarjunasagar Srisailam Tiger Reserve

Order Osteoglossiformes

Family Notopteridae

1. *Notopterus notopterus* (Pallas)

Order Cypriniformes

Family Cyprinidae

2. *Salmostoma bacaila* (Ham)
3. *Salmostoma boopis* (Day)
4. *Salmostoma clupeoides* (Bloch)
5. *Aspidoparia morar* (Ham)
6. *Barilius barna* (Ham)
7. *Barilius bendelisis* (Ham)
8. *Chela cachiis* (Ham)
9. *Chela laubuca* (Ham)
10. *Esomus barbatus* (Jerdon)
11. *Esomus danricus* (Ham)
12. *Danio aequipinnatus* (McClelland)
13. *Danio devario* (Ham)
14. *Brachydanio rerio* (Ham)
15. *Rasbora daniconius* (Ham)
16. *Amblypharyngodon micropelis*
17. *Amblypharyngodon mola*
18. *Tor mussulah* (Sykes)
19. *Rohtee ogilbii* Sykes
20. *Osteobrama cotio* (Ham)
21. *Osteobrama neilli* (Day)
22. *Osteobrama vigorsii* (Sykes)
23. *Puntius amphibius* (Val)
24. *Puntius dorsalis* (Jerdon)
25. *Puntius filamentosus* (Val)
26. *Puntius gelius* (Ham)
27. *Puntius melanostigma* (Day)
28. *Barbodes sarana* (Ham)
29. *Puntius ticto* (Ham)
30. *Cirrhinus fulungee* (Sykes)

31. *Cirrhinus reba* (Ham)
32. *Catla catla* (Ham)
33. *Labeo ariza* (Ham)
34. *Labeo calbasu* (Ham)
35. *Labeo fimbriatus* (Bloch)
36. *Labeo rohita* (Ham)
37. *Garra mullya* (Sykes)
38. *Crossocheilus latius* (Ham)

Order Siluriformes

Family Bagridae

39. *Rita kuturnee* (Sykes)
40. *Mystus cavasius* (Ham)
41. *Mystus gulio* (Ham)
42. *Aorichthys aor* (Ham)

Family Siluridae

43. *Ompok bimaculatus* (Bloch)
44. *Wallago attu* (Block and Schn)

Family Schilbeidae

45. *Eutropiichthys goongwaree* (Sykes)

Family Pangasiidae

46. *Pangasius pangasius* (Ham)

Family Sisoridae

47. *Bagarius bagarius* (Ham)
48. *Nangra itchkeea* (Sykes)
49. *Glyptothorax lonah* (Sykes)

Family Clariidae

50. *Clarias batrachus* (Linn)

Order Mugiliformes

Family Mugilidae

51. *Rhinomugil corsula* (Ham)

Order Cyprinodontiformes

Family Aplocheilidae

52. *Aplocheilus lineatus* (Val)
53. *Aplocheilus panchax* (Ham)

Order Perciformes

Family Chandidae

54. *Chanda nama* (Ham)

Family Nandidae

55. *Nandus nandus* (Ham)

Family Cichlidae

56. *Etilopius maculatus* (Bloch)

Family Channidae

57. *Channa orientalis* (Sch.)
58. *Channa punctatus* (Block)

Table 3

List of herpetofauna recorded from Nagarjunasagar
Srisaillam Tiger Reserve

Class Amphibia

Family Bufonidae

1. *Bufo melanostictus* Schneider
2. *Bufo stomaticus* Lutken
3. *Bufo scaber* Daudin

Family Microhylidae

4. *Kaloula taprobanica* (Parker)
5. *Uperodon systoma* (Schneider)
6. *Uperodon globulosus* (Gunther)
7. *Ramanella variegata* (Stoliczka)
8. *Microhyla ornata* (Dumeril & Bibron)
9. *Microhyla rubra* (Jerdon)

Family Rhacophoridae

10. *Polypedates maculatus* (Gray)

Family Ranidae

11. *Euphlyctis cyanophlyctis* (Schneider)
12. *Euphlyctis hexadactylus* (Lesson)
13. *Frejervarya limnocharis*
(Gravenhorst)
14. *Indirana leithii* (Boulenger)
15. *Spherotherca breviceps* (Schneider)
16. *Spherotherca dobsoni* (Boulenger)
17. *Spherotherca rolandae* (Dobson)
18. *Hoplobatrachus tigerinus* (Daudin)
19. *Hoplobatrachus crassus* (Jerdon)

Class Reptilia

Order Crocodylia

Family Crocodylidae

1. *Crocodylus palustris* Lesson

Order Testudines

Family Bataguridae

1. *Melanochelys trijuga* (Schweigger)
2. *Phangsuria tentoria* (Gray)

Family Trionychidae

3. *Aspideretes gangeticus* (Cuvier)
4. *Aspideretes leithii* (Gray)
5. *Lissemys punctata* (Bonnaterre)

Family Colubridae

6. *Aretium schistosum* (Daudin)
7. *Enhydryis enhydryis* (Schneider)

Table 4

List of aquatic avifauna and wetland dependent bird
species recorded from Nagarjunasagar Srisaillam Tiger
Reserve

Family Podicipedidae

1. Little Grebe *Tachybaptus ruficollis* (Pallas)

Family Phalacrocoracidae

2. Little Cormorant *Phalacrocorax niger* (Vieillot)
3. Indian Shag *Phalacrocorax fuscicollis* Stephens
4. Great Cormorant *Phalacrocorax carbo* (Linnaeus)

Family Anhingidae

5. Darter *Anhinga melanogaster* Pennant

Family Ardeidae

6. Little Egret *Egretta garzetta* (Linnaeus)
7. Grey Heron *Ardea cinerea* Linnaeus
8. Purple Heron *Ardea purpurea* Linnaeus
9. Large Egret *Casmerodius albus* (Linnaeus)
10. Median Egret *Mesophoyx intermedia* (Wagler)
11. Cattle Egret *Bubulcus ibis* (Linnaeus)
12. Indian Pond-Heron *Ardeola grayii* (Sykes)
13. Little Green Heron *Butorides striatus* (Linnaeus)
14. Black-crowned Night-Heron *Nycticorax nycticorax*
(Linnaeus)
15. Yellow Bittern *Ixobrychus sinensis* (Gmelin)
16. Chestnut Bittern *Ixobrychus cinnamomeus* (Gmelin)

Family Ciconiidae

17. Painted Stork *Mycteria leucocephala* (Pennant)
18. Asian Openbill-Stork *Anastomus oscitans* (Boddaert)
19. White-necked Stork *Ciconia episcopus* (Boddaert)

Family Threskiornithidae

20. Glossy Ibis *Plegadis falcinellus* (Linnaeus)
21. Oriental White Ibis *Threskiornis melanocephalus*
(Latham)
22. Black Ibis *Pseudibis papillosa* (Temminck)
23. Eurasian Spoonbill *Platalea leucorodia* Linnaeus

Family Anatidae

24. Lesser Whistling-Duck *Dendrocygna javanica*
(Horsfield)
25. Greylag Goose *Anser anser* (Linnaeus)
26. Bar-headed Goose *Anser indicus* (Latham)
27. Brahminy Shelduck *Tadorna ferruginea* (Pallas)
28. Common Shelduck *Tadorna tadorna* (Linnaeus)
29. Comb Duck *Sarkidiornis melanotos* (Pennant)
30. Cotton Teal *Nettapus coromandelianus* (Gmelin)
31. Gadwall *Anas strepera* Linnaeus
32. Eurasian Wigeon *Anas penelope* Linnaeus
33. Mallard *Anas platyrhynchos* Linnaeus
34. Spot-billed Duck *Anas poecilorhyncha* J.R. Forester
35. Northern Shoveller *Anas clypeata* Linnaeus

- 36. Northern Pintail *Anas acuta* Linnaeus
- 37. Garganey *Anas querquedula* Linnaeus
- 38. Common Teal *Anas crecca* Linnaeus
- 39. Red-crested Pochard *Rhodonessa rufina* (Pallas)
- 40. Common Pochard *Aythya ferina* (Linnaeus)
- 41. Ferruginous Pochard *Aythya nyroca* (Guldenstadt)
- 42. Tufted Pochard *Aythya fuligula* (Linnaeus)

Family Accipitridae

- 43. Brahminy Kite *Haliastur indus* (Boddaert)
- 44. Western Marsh-Harrier *Circus aeruginosus* (Linnaeus)

Family Pandionidae

- 45. Osprey *Pandion haliaetus* (Linnaeus)

Family Rallidae

- 46. White-breasted Waterhen *Amaurornis phoenicurus* (Pennant)
- 47. Watercock *Gallixrex cinerea* (Gmelin)
- 48. Purple Moorhen *Porphyrio porphyrio* (Linnaeus)
- 49. Common Moorhen *Gallinula chloropus* (Linnaeus)
- 50. Common Coot *Fulica atra* Linnaeus

Family Jacanidae

- 51. Pheasant-tailed Jacana *Hydrophasianus chirurgus* (Scopoli)
- 52. Bronze-winged Jacana *Metopidius indicus* (Latham)

Family Rostratulidae

- 53. Greater Painted-Snipe *Rostratula benghalensis* (Linnaeus)

Family Charadriidae

- 54. Little Ringed Plover *Charadrius dubius* Scopoli
- 55. Kentish Plover *Charadrius alexandrinus* Linnaeus
- 56. Yellow-wattled Lapwing *Vanellus malabaricus* (Boddaert)
- 57. Red-wattled Lapwing *Vanellus indicus* (Boddaert)

Family Scolopacidae

- 58. Solitary Snipe *Gallinago solitaria* Hodgson
- 59. Common Snipe *Gallinago gallinago* (Linnaeus)
- 60. Black-tailed Godwit *Limosa limosa* (Linnaeus)
- 61. Bar-tailed Godwit *Limosa lapponica* (Linnaeus)
- 62. Common Redshank *Tringa totanus* (Linnaeus)
- 63. Marsh Sandpiper *Tringa stagnatilis* (Bechstein)
- 64. Common Greenshank *Tringa nebularia* (Gunner)
- 65. Green Sandpiper *Tringa ochropus* Linnaeus
- 66. Wood Sandpiper *Tringa glareola* Linnaeus
- 67. Terek Sandpiper *Xenus cinereus* (Guldenstadt)
- 68. Common Sandpiper *Actitis hypoleucos* Linnaeus
- 69. Temminck's Stint *Calidris temminckii* (Leisler)
- 70. Ruff *Philomachus pugnax* (Linnaeus)

Family Recurvirostridae

- 71. Black-winged Stilt *Himantopus himantopus* (Linnaeus)
- 72. Pied Avocet *Recurvirostra avosetta* Linnaeus

Family Burhinidae

- 73. Great Stone-Plover *Esacus recurvirostris* (Cuvier)

Family Glareolidae

- 74. Small Pratincole *Glareola lactea* Temminck

Family Laridae

- 75. Brown-headed Gull *Larus brunnicephalus* Jerdon
- 76. River Tern *Sterna aurantia* J.E. Gray
- 77. Little Tern *Sterna albifrons* Pallas
- 78. Whiskered Tern *Chlidonias hybridus* (Pallas)

Family Rynchopidae

- 79. Indian Skimmer *Rynchops albicollis* Swainson

Family Alcedinidae

- 80. Small Blue Kingfisher *Alcedo atthis* (Linnaeus)
- 81. White-breasted Kingfisher *Halcyon smyrnensis* (Linnaeus)
- 82. Lesser Pied Kingfisher *Ceryle rudis* (Linnaeus)

Family Meropidae

- 83. Small Bee-eater *Merops orientalis* Latham
- 84. Blue-tailed Bee-eater *Merops philippinus* Linnaeus
- 85. Chestnut-headed Bee-eater *Merops leschenaulti* Vieillot

Family Motacillidae

- 86. White Wagtail *Motacilla alba* Linnaeus
- 87. Large Pied Wagtail *Motacilla maderaspatensis* Gmelin
- 88. Citrine Wagtail *Motacilla citreola* Pallas
- 89. Yellow Wagtail *Motacilla flava* Linnaeus
- 90. Grey Wagtail *Motacilla cinerea* Tunstall
- 91. Paddyfield Pipit *Anthus rufulus* Vieillot

*Ceriagrion coromandelianum*

A Rare Dolphin Population in Eastern Ghats: A Short Note

Dr. Mitali Joshi
Project Faculty
EPTRI, Hyderabad.

Well known for their apparent intelligence, friendly behaviour and social interaction “Dolphins” are aquatic mammals. The term Dolphin has a Greek origin from the word “delphis” meaning “with a womb” i.e. “a ‘fish’ with a womb”.

The family Delphinidae is the largest and most diverse family of the cetacean order and includes almost 40 species of dolphin in 17 genera. Among these Irrawaddy dolphins, one of its kind, are found in Chilika Lagoon, Orissa India. Irrawaddy dolphin, identified by Sir Richard Owen in 1866, is one of the only three listed species of cetaceans in India by Indian Wildlife Act (1972 and amended in 1991). Commonly known as snubfin dolphin, these lake dolphins are extremely rare since there are only two places in the world where dolphins live in a lake (a) Chilika lagoon, India and (b) Songkhla lagoon, Thailand (Beasley et al., 2002).

According to an estimate, there are approximately 1,000 Irrawaddy dolphins living in the wild, both in fresh and salt water settings, but the numbers are declining fast and most of the populations have been identified as critically endangered. The species is patchily distributed in South-East Asia, and is primarily found in estuaries and mangrove areas, with freshwater populations occurring in river systems. Its range extends from the Bay of Bengal to New Guinea and Northern Australia. Scientifically termed as *Orcaella brevirostris*, it has been kept under the category of “Data Deficient Species” by IUCN (1988, 1990). A list of relevant literature regarding the species is given in appendix 1. Perceiving an unsustainable demand for Irrawaddy dolphins as captive entertainers across Asia, Thailand proposed a ban on trade in the animal and the thirteenth conference of the parties (COP-13) of the Convention on International Trade in Endangered Species (CITES) in Oct. 2004 at Bangkok and the animal was being ‘uplisted’ to Appendix I (Marwaan Macan-Markar 2006).

These dolphins were first recorded in Chilika in 1915 (Dash 2004) and are mostly seen in the outer channel of the lake near Mahisa, Berhampura, Alupatna, Magarmukh and Rajhans in the southern sector. After the opening of a new mouth in the lake, due to rise in salinity levels, dolphins are also sighted at Balugaon, Nalabana, INS Chilika and Rambha areas. In India there is a small population of approximately 130 individuals only (Panda, 2005). Considering its restricted and habitat specific distribution and that too as a thin population, this species is recommended to be brought under the ‘Rare’ category, particularly in the Indian subcontinent (Dhandapani, 1997).

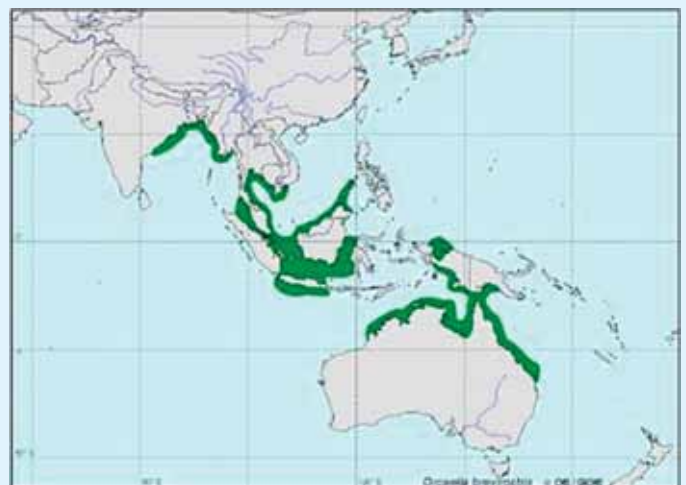
Slaty blue to slaty gray in colour the length varies between 180 to 275 cm and weight is approximately more than 130 kg. The characteristic feature of Irrawaddy dolphin is a bulging forehead, short beak, and 12-19 teeth on each side of each jaw. There is a small dorsal fin, on the posterior end of the back and the pectoral fin is broadly triangular (Cetacean Specialist Group 1996).

These dolphins feed together in groups of usually six to 15, on squid, shrimp, prawns and fish, particularly those that live on the bottom of the ocean. It is believed that to echo-locate the prey the Irrawaddy emits a distinctive clicking noise like other dolphins (Cetacean Specialist Group 1996).

In general, the life of these mammals is reported to be twenty eight to thirty years. The Irrawaddy dolphin reaches sexual maturity at three to four years of age and has a very low rate of breeding. It produces only one baby after every three years with a gestation period of nine to fourteen months. They also lactate for three years once a baby is born and are highly attached to them. At birth the calf is about three feet long and weighs some twenty six pounds. The male grows to about nine feet and the female to about eight and a half feet (Cetacean Specialist Group 1996).

Although the Irrawaddy dolphin is not directly exploited, it is exposed to incidental mortality in fisheries or habitat degradation. In Chilika mechanised fishing trawlers and tourist boats with large propellers are reported to effect the population negatively. Death of 11 dolphins was reported in the year 2001-2002 due to mechanized boats. Whereas since April, 2004 to March 2005 a total of 13 dolphins were reported dead in the lake. There are nearly 10,000 mechanised boats in Chilika lake and have been reported for leakage of fuel and lubricants from the engines into the lake waters for most of the cases. It adversely affects the fish and shrimp populations of the lake on which the dolphins feed and needs to be checked.

Keeping in view the ecological importance of these dolphins in the country and the threat status, some new research initiatives have been taken up recently (Indo-Japanese Project, 2006). As a further step in this direction the State Government has



also decided to declare Satapada in Chilika, as “a dolphin sanctuary” and ban plying of motorised boats in this part of the lake (Indian Express 2005). However, still not much is known about these mammals in India and more efforts are required to explore this interesting creature. Involvement of local community in conservation efforts will definitely be a big step in this direction.

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Aquatic faunal resources of Eastern Ghats region – An overview

K. Henry Jonathan and A. J. Solomon Raju

Department of Environmental Sciences, Andhra University, Visakhapatnam 530 003

E-mail: ajsraju@yahoo.com

The Eastern Ghats region is blessed with natural lakes, large water bodies, and estuaries (Natarajan 1982); with these, the region forms an important habitat for diverse aquatic fauna. The region has an extensive area of wetland cover consisting of different types and formations of productive areas (Singh 1982). The principal river systems of the region are Mahanadi (Orissa), Godavari and Krishna (Andhra Pradesh) Cauvery (Tamil Nadu) and natural lakes Kolleru, Chilka, Pulicat and Yercaud in the region (Natarajan, 1982).

The Godavari estuary system is the second largest estuary in India that takes routes through the Eastern Ghats in Andhra Pradesh unlike Mahanadi and Cauvery which are situated away from the Eastern Ghats. They are important habitats for aquatic fauna. This article gives a brief account of the distribution of aquatic fauna, diversity and their status with specific reference to mangrove wetland habitats of Eastern Ghats region.

Aquatic Fauna Diversity and Distribution :

The aquatic faunal classes found in the estuarine regions of Eastern Ghats are mainly planktons, nektons, benthos and meio-benthos. Majority of these aquatic fauna are prolific in the mangrove wetland habitats adjoining the estuaries in the brackish waters of Andhra Pradesh, Orissa and Tamil Nadu. Around 2,075 aquatic species belonging to various classes occur in the mangrove habitats along the east coast. They include prawns, crabs, insects, mollusks, fish, parasites, finfish, amphibians, reptiles, birds, mammals and other invertebrates (Kathiresan 2004). The east coast wetland habitats represent a high diversity of aquatic fauna owing to the nutrient rich alluvial soils formed along the deltaic coasts. Of the total 3,111 species of aquatic fauna in Indian mangrove wetlands, 66 percent of these are distributed in the mangrove wetlands along east coast alone. The Mahanadi delta has a record of 141 species of fishes, and 13 species of shellfish (Natarajan 1982). Bhitarkanika mangrove wetland

is known for its presence of salt water crocodile, *Crocodylus porosus* and other smaller reptilian species such as water lizard, *Varanus salvador* (Krishna Raju and Dev 1982). The Godavari estuary harbors 224 species of fishes, among which 92 species are found to be common to Godavari and Krishna. This mangrove habitat also provides shelter to 120 species of water birds that live in harmony with microfauna on the mud banks and other biota (Raja Sekhar et al. 2002). This estuary is dominant with crabs, skates, rays, pomfrets and fresh water prawns (Natarajan 1982). Amphibian species of the Godavari mangrove wetlands include *Rana hexadactyla* (skipper frog), *R. cyanophlyctis* (common frog), *Bufo melanostictus* (toad), *Microhyla ornata* (tree frog) (Raja Sekhar et al. 2002). The prominent fishes that flourish in the Nagarjunasagar region include *Labeo fimbriatus*, *L. carbasu*, *Tor khudree*, *Pangasius pangasius*, *Mystus aor*, *M. seenghala*, *Wallago attu*, *Silonia childrenii*. Demoiselle cranes occur in the catchment areas of the reservoir (Natarajan 1982).

As many as 45 fish species alone inhabit the water bodies of Nallamalai hills with several species of the genus *Puntius* (Sharma and Yesu Nayak 2002).

Cauvery river system in Eastern Ghats harbours 23 families of fishes with indigenous fish species such as *Puntius dubius*, *P. carnaticus*, *Labeo kontius*, *Cirrhinus cirrhosa* and *Acrossocheilus hexagonolepis*. The catfish species include *Wallago attu*, *Mystus aor*, *Silonia silonida* and *Pangasius pangasius*. Migration of fish species such as *Anguilla bicolor bicolor*, *Therapon jarbua*, *Gerres filamentosus*, *Scatophagus argus* and *Elotris fusca* to the lower reaches of stream from coastal waters is prominent in water bodies that join the Bay of Bengal sea along the east coast. The largest number of fish species that inhabit the Eastern Ghats aquatic zone is from family Cyprinidae (Sharma and Yesu Nayak 2002). Common fish species of Eastern Ghats region have been provided in Table 1.

Latin name	Common name	Latin name	Common name
<i>Anguilla bicolor bicolor</i>	Short fin eel	<i>Therapon jarbua</i>	Tiger fish
<i>Gerres filamentosus</i>	Whipfin silverbiddy	<i>Scatophagus argus</i>	Spotted scat
<i>Elotris fusca</i>	Dusky sleeper	<i>Hilsa ilisha</i>	Indian shad
<i>Sardinella spp.</i>	Indian oil sardine	<i>Thrissocles sps</i>	Orange mouth anchovy
<i>Labeo fimbriatus</i>	Fringed lipped peninsula carp	<i>Labeo calbasu</i>	Black rohu
<i>Tor khudree</i>	Yellow mahseer	<i>Pangasius pangsius</i>	Pungas
<i>Mystus aor</i>	Long whiskered cat fish	<i>Mystus seenghala</i>	Cat fish
<i>Wallago attu</i>	Freshwater shark	<i>Silonia childrenii</i>	White catfish
<i>Macrobrachium malcolmsonii</i>	Monsoon river prawn	<i>Macrobrachium rosenbergii</i>	Giant river prawn
<i>Acrossocheilus hexagonolepis</i>	Copper mahseer	<i>Puntius dubius</i>	Gold barb
<i>Labeo kontius</i>	Pig mouth carp	<i>Cirrhinus cirrhosa</i>	Cauvery white carp
<i>Silonia silondia</i>	Silond cat fish	<i>Mugil cephalus</i>	Striped mullet
<i>Mugil parsia</i>	Gold spot mullet	<i>Liza macrolepis</i>	Large scale mullet
<i>Polynemus indicus</i>	Thread fin	<i>Polynemus tetradactylus</i>	Four finger thread fin

Threats to the Aquatic Fauna :

Environmental variability in streams, especially habitat features, has been recognized as a determining factor of distribution and abundance patterns for fishes. The construction of dams and water breaks across the river streams has deterred the population of *Hilsa ilisha* effecting its migration for spawning. Construction of barrages and anicuts on Mahanadi, Godavari and Krishna has effected the migration of fish species *Acrossocheilus hexagonolepis* and *Tor khudree*. In addition, the industrial discharges and sprawling urbanization surrounding the wetland habitats have affected the quality of natural waters. Over the years, there has been a phenomenal decrease in the fish catches from these wetlands due to year round fishing activity by the fishermen communities living in the vicinity of these

wetland ecosystems. The wetland habitats are continually under threat in the Eastern Ghats region from both natural and anthropogenic pressures. Commercial exploitation of lower order micro-fauna affects the food resources of some fishes and wetland birds. High freshwater inflows into the brackish water during floods alter the density patterns of many vulnerable aquatic fauna leading to the wash off young hatchlings to distant zones. Pumping brackish waters for commercial aqua culture ponds in addition is leading to the death of small juvenile crabs, prawns, mollusks that get clogged to the motor pump resulting in the loss of valuable fauna. The maximum utilization of Cauvery water without letting it into the Bengal Sea is has been considered to be the prime factor to minimize the migration rate of marine fish into inland waters, causing discontinuous distribution. Catching the juvenile prawns in

large numbers before attaining reproductive maturity in lower Godavari anicut has drastically reduced the prawn diversity and its dependant avifauna that survive on feeding the prawn hatchlings.

Conclusion

The sustainability and diversity of aquatic fauna in the Eastern Ghats depend upon the wise management of the habitats. They include (1) framing stringent action on communities involved in overexploitation of fish resources in wetland habitats, (2) banning the reclamation of estuarine areas with strict adherence to coastal zone regulations, (3) maintenance of optimum levels of river flows for the sustenance of estuaries in order retain the estuarine character throughout the year, (4) mandatory limitations on further establishments of aquaculture ponds and restrictions on expansion of existing ponds, (5) control on continuous fishing activity by fishermen communities, (6) implementing regulation and other conservation measures such as establishing seed development ponds of vulnerable and threatened species and subsequent reintroduction into their natural habitats to enhance and protect the vulnerable aquatic fauna from external anthropogenic pressures, (7) discouraging illegal fishing in the creeks of these wetlands, (8) creating awareness among fishing communities to avoid over-fishing of juveniles in estuaries while collecting prawn seed, and (9) artificial incubation of eggs of certain vulnerable wetland birds and releasing the young hatchlings. These are some innovative attempts to maintain the species balance of the aquatic fauna in wetland habitats of Eastern Ghats.

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Contact : ENVIS Coordinator, baquer@eptri.com

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ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

91/4, Gachibowli, Hyderabad - 500 032, A.P., India

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