

ICHTHYO AND HERPETOFAUNAL DIVERSITY OF KALAKKAD WILDLIFE SANCTUARY

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Abstract

Relative to the area encompassing, Kalakkad Wildlife Sanctuary harbours a rich lower vertebrate fauna. This is more true in respect of fishes and amphibians about which more information is available. Based on recent studies, 84 species belonging to the lower vertebrate groups are found here which comprise four endemic to the Sanctuary, 32 to the Western Ghats mostly its southern ranges and 41 to India. The species composition and some of the factors contributing to the species richness of the Sanctuary are discussed.

Introduction

Consolidated information on the faunal diversity of most of our wildlife sanctuaries, national parks and biosphere reserves is rather non-existent. As part of an ongoing programme of the Zoological Survey of India (ZSI), attempts have been underway in recent years to survey and generate information on the faunal diversity of a few of the species-rich but little known ecosystems of our protected areas. Intensive faunistic surveys of various faunal groups were carried out by the scientists of Southern Regional Station, ZSI, Chennai from 1983 to 87 and in later years covering most of the areas of the Kalakkad Sanctuary. The study revealed a rich amphibian fauna, in this area followed by fishes and reptiles in that order.

Located on the eastern slopes of the southern Western Ghats, i.e. the area south of Palghat gap, in Tirunelveli District of Tamil Nadu, Kalakkad Wildlife Sanctuary covers an area of 223.76 km².

The Sanctuary lies between 8°25' and 8°35' N and 77°25' and 77°35' E. The hills are covered with dry deciduous forests on the lower slopes and evergreen sholas on the upper reaches, all traversed by rivulets, rivers and streams. Rivers of the area include Kodumudiar, Nambiar, Netterikal and Pachayar flowing eastwards and Kilmanimuthar traversing the western part.

Ichthyofaunal diversity

Earlier studies on the fishes of Kalakkad include the report of nine species by Silas (1953) with the description of a new genus

Horallabiosa and species *H. joshuai* and a subspecies *Puntius arulius tambraparniei*. Subsequent reports on the ichthyofauna of Kalakkad Wildlife Sanctuary are by Rema Devi (1992 a,b) who described a new hill stream fish *Garra kalakadensis* and later dealt with 19 species from the area (Table 1). Recently Rema Devi *et al.* (1997) listed 70 primary freshwater fishes from the Tambraparni River. The Tambraparni River system harbours three endemic species, of which *H. joshuai* and *G. kalakadensis* are confined to the hill streams in its higher reaches while the third species *P. a. tambraparniei* is found mostly in the lower reaches and in the plains. Of the 19 species collected from the hill streams 14 are found in peninsular India of which 12 have their range also in Sri Lanka and five in Pakistan, Nepal, Bangladesh and Myanmar. The ichthyofauna of Kalakkad is significant since two cyprinid species inhabiting torrential streams have evolved and thrive here at a general elevation of 1200 m. A few specimens of *G. kalakadensis* were also encountered at an altitude of 190 m. (Biometric studies of these two species viz. *G. kalakadensis* and *H. joshuai* revealed some morphometric variations in the populations from different drainages and altitudes). From the zoogeographical point of view a closer affinity is observed between the species of the southern Western Ghats and Sri Lanka since 63 per cent of the fish fauna found in this small Sanctuary alone have representatives in Sri Lanka. The nomenclature followed is after Menon (1993).

Amphibian diversity

Collection and study of over 1590 specimens from the area through three years from 1984 (Ravichandran, 1996, 1997) revealed that the sanctuary is home for a rich and diverse amphibian fauna. A comparison of the amphibian diversity (Ravichandran, 1996, 1997) and Zacherias and Bharadwaj (1996) represented by 35 species occurring in the Sanctuary far outnumber that hitherto recorded from any one of the three other better known conservation areas in the southern Western Ghats besides Silent Valley lying north of the Palghat gap. The nomenclature followed is after Inger and Dutta (1986).

Amphibians recorded from Kalakkad also comprise three Caecilian species collected in 1985 (Pillai & Ravichandran, in press).

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Table 1. Ichthyofauna of Kalakkad Wildlife Sanctuary

| | Endemicity | |
|--|---------------|-------|
| | Western Ghats | India |
| Order : Cypriniformes | | |
| Family : Cyprinidae | | |
| 1. <i>Danio aequipinnatus</i> (McClelland) | | |
| 2. <i>Esomus thermoicos</i> (Valenciennes) | | |
| 3. <i>Rasbora daniconius</i> (Hamilton) | | |
| 4. <i>Rasbora caverii</i> (Jerdon) | | |
| 5. <i>Puntius bimaculatus</i> (Bleeker) | | |
| 6. <i>Puntius chola</i> (Hamilton) | | |
| 7. <i>Puntius dorsalis</i> (Jerdon) | | |
| 8. <i>Puntius sarana subnasutus</i> (Valenciennes) | | |
| 9. <i>Puntius punctatus</i> (Day) | + | + |
| 10. <i>Horallabiosa joshuaisilas*</i> | + | + |
| 11. <i>Garra kalakadensis</i> Rema Devi* | + | + |
| 12. <i>Garra mullya</i> (Sykes) | | + |
| Family : Homalopteridae | | |
| Subfamily : Homalopterinae | | |
| 13. <i>Bhavana australis</i> (Jerdon) | + | + |
| Subfamily : Noemacheilinae | | |
| 14. <i>Noemacheilus triangularis</i> Day | + | + |
| Family : Cobitidae | | |
| 15. <i>Lepidocephalus thermalis</i> (Valenciennes) | | |
| Order : Siluriformes | | |
| Family : Bagridae | | |
| 16. <i>Mystus montanus</i> (Jerdon) | | + |
| 17. <i>Mystus vittatus</i> (Bloch) | | + |
| Order : Atheriniformes | | |
| Family : Cyprinodontidae | | |
| 18. <i>Aplocheilus lineatus</i> (Valenciennes) | | + |
| Order : Channiformes | | |
| Family : Channidae | | |
| 19. <i>Channa orientalis</i> (Schneider) | | |

(*Endemic to Kalakkad)

Table 2. Relative abundance of amphibians recorded from five conservation areas in the Western Ghats.

| | Study area | No.of genera | No.of species |
|----|-----------------------------|--------------|---------------|
| 1. | Silent Valley | 11 | 19 |
| 2. | Ponmudi | 11 | 25 |
| 3. | Sabarigiri | 7 | 14 |
| 4. | Periyar Wildlife Sanctuary | 6 | 16 |
| 5. | Kalakkad Wildlife Sanctuary | 14 | 35 |

The 35 species from Kalakkad dealt with here include 33 collected and studied by the authors since 1983 and one, *Rhacophorus calcadensis* Ahl recorded by Boulenger from the Sanctuary in 1882 (Inger and Dutta, 1986) under the preoccupied name *R.beddomii* but not sighted since. Hence its present status is uncertain. In addition, *Melanobatrachus indicus* Beddome was reported from the area by Karthikeyan (1997).

The amphibian fauna with 14 genera and 35 species occurring at Kalakkad is rich for a sanctuary of its size (223.76 km²) in India. The fauna represents a large component of endemic elements, since 21 species representing 60 per cent of the fauna found here are Indian endemics. Of these 19 species are exclusive to Western Ghats, of which 13 are confined only to the southern ranges of the Ghats. Besides, two species *Rhacophorus calcadensis* Ahl and *Nyctibatrachus vasanthi* Ravichandran found here are endemic to Kalakkad.

Reptile diversity

Reptiles are the least known of the lower vertebrate groups of the Sanctuary. Murthy (1990) reported 26 species from here. His studies were supplemented by the works of Krishnan (1985) who observed three more species viz. King Cobra, Indian Python and Flying Lizard in the Sanctuary. During the present studies, apart from confirming the occurrence of these three species, one more species, Indian Cobra was also found distributed here. The nomenclature followed is after Murthy (1990).

The nature of the terrain and various other contributing factors as also the relative abundance of other vertebrate groups in the area all point to the possibility of a large component of reptiles here. Hence the 30 species so far recorded from the sanctuary may at best constitute only a fraction of the total species diversity of reptiles found here.

Though none of the reptiles so far known is endemic to the sanctuary, 40 per cent of the species found here are endemic to India which include eight species confined to the Western Ghats. Besides, 15 species comprising 50 per cent of the fauna found here are common to Sri Lanka, showing closer affinity of the fauna of the two areas.

The proximity of the Sanctuary to the equator where the largest number of species are found according to the principle of latitudinal diversity gradient (Wilson, 1992) is partly because of the steady shrinking of the ranges of individual species. The closer one comes to the equator, the impacts of abundant solar energy and stable climate the terrain experiences, the telescoping of a wide range of altitudinal variations from a few metres above sea level to 1775m. into a small area of over 200 km², the occurrence of rain shadow areas on the eastern slopes and heavily rain fed ones on the western higher ranges, all leading to the development of an admixture of deciduous and

Table 3. Amphibian fauna of Kalakkad Wildlife Sanctuary

| Name of species | Southern W. Ghats | Endemic to W.Ghats | India |
|---|----------------------|-----------------------|-------|
| Order : Anura | | | |
| Family: Bufonidae | | | |
| 1. <i>Bufo melanostictus</i> Schneider | | | |
| 2. <i>B. microtypanum</i> Boulenger | | | |
| 3. <i>Melanobatrachus indicus</i> Beddome | + | + | + |
| 4. <i>Microhyla ornata</i> (Duméril & Bibron) | | | |
| 5. <i>M. rubra</i> (Jerdon) | | | |
| 6. <i>Ramanella montana</i> (Jerdon) | | + | + |
| Family: Ranidae | | | |
| 7. <i>Euphlyctis cyanophlyctis</i> Schnieder | | | |
| 8. <i>Hoplobatrachus tigerinus</i> Daudin | | | |
| 9. <i>Micrixalus fuscus</i> (Boulenger) | | + | + |
| 10. <i>M. opisthorhodus</i> (Günther) | + | + | + |
| 11. <i>M. silvaticus</i> (Boulenger) | + | + | + |
| 12. <i>Nanobatrachus beddomii</i> (Boulenger) | + | + | + |
| 13. <i>Nyctibatrachus aliciae</i> Inger, Shaffer, Koshy & Bakde | + | + | + |
| 14. <i>N. deccanensis</i> Dubois | + | + | + |
| 15. <i>N. major</i> Boulenger | + | + | |
| 16. <i>N. vasanthi</i> Ravichandran * | + | + | + |
| 17. <i>Rana aurantiaca</i> Boulenger | | | |
| 18. <i>R. beddomii</i> (Günther) | | + | + |
| 19. <i>R. brachytarsus</i> (Günther) | | + | + |
| 20. <i>R. curtipes</i> Jerdon | | + | + |
| 21. <i>R. keralensis</i> Dubois | | | + |
| 22. <i>R. limnocharis</i> Boie | | | |
| 23. <i>R. malabarica</i> Tschudi | | | + |
| 24. <i>R. temporalis</i> Günther | | | |
| 25. <i>Tomopterna breviceps</i> Schneider | | | |
| Family : Rhacophoridae | | | |
| 26. <i>Philautus beddomii</i> (Günther) | | + | + |
| 27. <i>P. femoralis</i> (Günther) | | | |
| 28. <i>P. nasutus</i> (Günther) | | | |
| 29. <i>P. pulcherrimus</i> (Ahl) | | + | + |
| 30. <i>P. variabilis</i> (Günther) | | | |
| 31. <i>Polypedates maculatus</i> (Gray) | | | |
| 32. <i>Rhacophorus calcadensis</i> Ahl* | + | + | + |
| Order : Gymnophiona | | | |
| Family : Ichthyophidae Taylor | | | |
| 33. <i>Ichthyophis longicephalus</i> Pillai | | + | + |
| 34. <i>Uraeolyphus melabaricus</i> (Beddome) | | + | + |
| 35. <i>U. oxyurus</i> (Duméril & Bibron) | | + | + |

(* Endemic to Kalakkad)

semievergreen forests, sholas and rolling tall grass clearings have contributed to the richness and diversity of the fauna of the Sanctuary.

The richness and diversity of the fauna, the degree of endemism

observed among the faunal components, the presence of 'refugial pockets' in the area which serve as home for many of the species which are rare or face various levels of threat to their existence in even other parts of the Western Ghats, qualifies the Kalakkad Sanctuary to be considered one of the "hottest of the hot spots"

Table 4. Reptilian fauna of Kalakkad Wildlife Sanctuary

| | Endemism | |
|--|---------------|-------|
| | Western Ghats | India |
| Class : Reptilia | | |
| Order : Testudines | | |
| Family : Emydidae | | |
| 1. <i>Melanochelys trijuga trijuga</i> (Schweigger) | | + |
| Family : Testudinidae | | |
| 2. <i>Geochelone elegans</i> (Schoepff) | | |
| Order : Squamata | | |
| Suborder : Sauria | | |
| Family : Gekkonidae | | |
| 3. <i>Cnemaspis ornata</i> (Beddome) | + | + |
| 4. <i>Dravidogecko anamallensis</i> (Günther) | + | + |
| 5. <i>Hemidactylus leschenaulti</i> Duméril & Bibron | | |
| Family : Agamidae | | |
| 6. <i>Calotes calotes</i> (Linn) | | |
| 7. <i>Calotes ellioti</i> Günther | + | + |
| 8. <i>Calotes grandisquamis</i> Günther | + | + |
| 9. <i>Calotes versicolor</i> (Daudin) | | |
| 10. <i>Draco dussumieri</i> Duméril & Bibron | + | + |
| 11. <i>Psammophilus dorsalis</i> (Gray) | | + |
| 12. <i>Sitana ponticeriana</i> Cuvier | | |
| Family : Chamaeleonidae | | |
| 13. <i>Chameleo zeylanicus</i> Laurenti | | |
| Family : Scincidae | | |
| 14. <i>Mabuya beddomii</i> (Jerdon) | | |
| 15. <i>Mabuya macularia</i> (Blyth) | | |
| Suborder : Serpentes | | |
| Family : Boidae | | |
| 16. <i>Python molurus</i> Linn. | | |
| Family : Colubridae | | |
| 17. <i>Ahaetulla dispar</i> (Günther) | + | + |
| 18. <i>Ahaetulla nasuta</i> (Lacepede) | | |
| 19. <i>Ahaetulla pulverulenta</i> (Duméril & Bibron) | | |
| 20. <i>Amphiesma beddomei</i> (Günther) | + | + |
| 21. <i>Elaphe helena</i> (Daudin) | | |
| 22. <i>Liopeltis calamaria</i> (Günther) | | |
| 23. <i>Oligodon travancoricus</i> Beddome | + | + |
| 24. <i>Xenochrophis piscator</i> (Schneider) | | |
| Family : Elapidae | | |
| 25. <i>Calliophis melanurus</i> (Shaw) | | |
| 26. <i>Naja naja</i> Linn. | | |
| 27. <i>Ophiophagus hannah</i> Canton | | |
| 28. <i>Hypnale hypnale</i> (Merrem) | | |
| 29. <i>Trimeresurus macrolepis</i> Beddome | | + |
| 30. <i>Trimeresurus malabaricus</i> (Jerdon) | | + |

of the world today.

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