

A study on the Ootha fishing in Karuvannoor River, Thrissur, Kerala, India

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ABSTRACT

The migration of brood fishes with the onset of monsoon to pair and deposit the ova is known as oothayilakkam in local parlance. The intensive indiscriminate fishing during this short-range migration is known as Oothapidutham. A sizable portion of the breeders is being removed from the population, which has a deleterious effect on the fish stock of the Karuvannoor River. The fish species, the quantity of fish captured during the season, and the gear employed are also provided.

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1. Introduction

The breeding cycle of most freshwater fishes of the Indian subcontinent coincides with the two monsoon seasons viz., southwest monsoon (June to September) and northeast monsoon (November to February). For example, members of the family Cyprinidae (carps and minnows), in particular, migrate over short ranges to pair and deposit their ova at suitable places, preferably in the floodplains of the main river channel or in the adjacent fields around the irrigation canals. This short-range migration of freshwater fishes is referred to as 'Oothayilakkom' in the southern Indian state of Kerala. (Shaji and Laladhas, 2013). It is a common phenomenon that the brood fishes move to the paddy fields *en masse* from the nearest rivers during the onset of monsoon. The ova of these fishes would have been ripe enough to deposit in the paddy fields or floodplains during the initial days of monsoon (Shaji and Laladhas, 2013). The fisher folks capture these brood fishes employing different means, which is called Oothapidutham in local discourse, which is now referable to as Monsoon Floodplain Fishery (MFF, See Shaji and Laladhas, 2013).

Fishing techniques vary from simple handpicking to more lethal methods like electrocution (Shaji, 2012). Fish that ascend to the floodplains *en masse* are caught by the local fishers using mono-filament gill nets, erecting 'adichil' like traps, or fitting fish baskets. In addition, 'Ottal', traditional fishing gear, is also used by skilled fishers to capture large-sized species such as snakeheads (*Channa* sp.) and the freshwater shark, *Wallago attu*.

The current state of knowledge on the breeding behaviour of native fishes, their movements, preparation for migration, developments of the gonads in concurrence with the advent of monsoons, etc., is abysmal. However, this had been a subject curiously observed by the pioneering ichthyologists of the Indian subcontinent, dating back to Hamilton (1822) and Day (1873). The inventive notice of the occurrence of *Hilsa ilisha* both in the sea and estuaries and its ascension to the Gangetic system during the rainy season for spawning was made by Hamilton (1822) and subsequently studied by Hora (1938), Hora and Nair (1940) and Prashad *et al.* (1950).

Day (1873), in his excellent treatise, 'The Freshwater Fish and Fisheries of India and Burma,' provided an exhaustive account of India's migratory and non-migratory freshwater fishes along with observations on their breeding season. Day (1873) also recorded the destruction of the brood fish and fries in southern India and, particularly, the Malabar Presidency. In Mysore and Coorg, the fish, irrespective of time or condition, were captured in every conceivable manner (Day, 1873). It was observed that fishes moving to seek suitable habitats to deposit their ova have naturally lost their timidity (Day, 1873), resulting in fishers quickly capturing them, even by handpicking or injuring them.

Our current research on freshwater fishes is focused mainly on taxonomy and listing the fish species from various regions. Information on threats to freshwater fish species, such as the indiscriminate exploitation of brood fishes and fry, is a real hazard to the long-term survival of fish wealth seems to be least addressed diversity but has been poorly documented. This paper aims to present information on the fish species caught from the Karuvannoor river basin during their breeding migration, including the diversity of fish caught and the quantity of fish concerning different fishing methods.

2. Materials and Methods

2.1 Study Area

The Karuvannur River Basin (KRB) is a sixth-order basin with six sub-watersheds (Bhadran *et al.*, 2018). The drainage area of Karuvannur river is 1071 km² and geographically bounded between the longitude 76°04'55" to 76°33'45"E and latitude 10°19'15" to 10°36'55"N (Fig. 1). Physiographically, this river basin can be divided into four well-defined units viz., high land, midland, Kole lands and coastal plains. The basin enjoys a tropical monsoonal climate, with a mean annual rainfall of ~2925 mm (Bhadran *et al.*, 2016).

The study sites selected to generate data on ootha fisheries were fixed after undertaking a preliminary survey to identify the active fishing localities on the banks of the Karuvannoor river. The identified study sites were

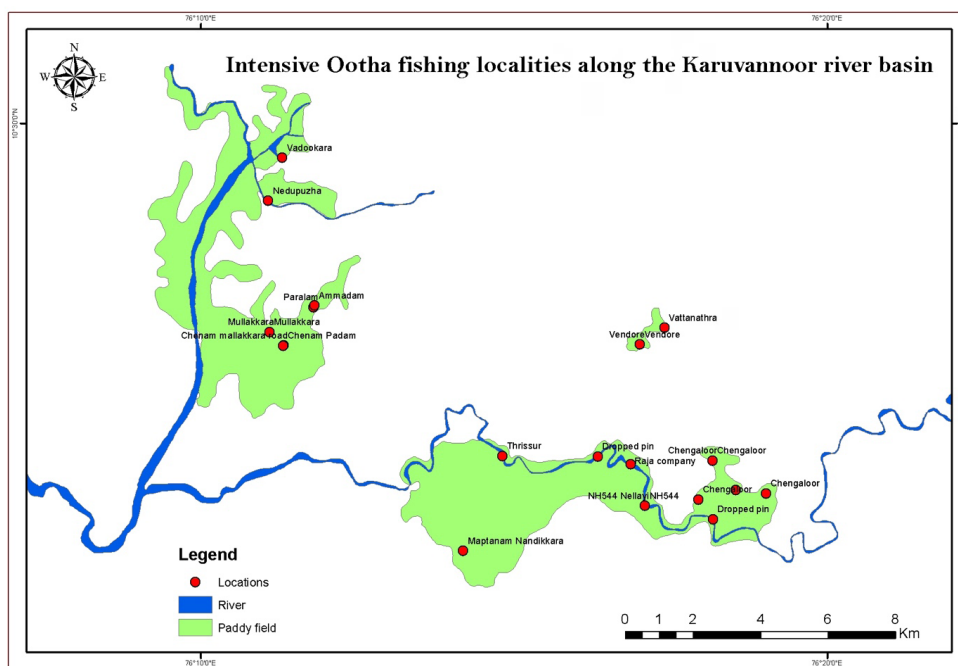


Fig. 1. Map of Karuvannoor River basin, Kerala, showing intensive ootha fishing localities

located at Karuvannoor, Konthipulam, on the banks of Kurumalippuzha, Kundukadav, near Chengalur, and Mangattupadam, near Chengalur, Thrissur district, Kerala, India (Fig. 1).

2.2 Methods

Data on the fish species captured, locales of fishing and quantity of fish caught were gathered from the fishers by direct observation and through questionnaire/interview. The open-ended questionnaire was designed in such a manner to generate data on the number of fishers engaged in ootha fishing, fishing locality, fish species caught and methods employed for catching.

Fish species were identified with the help of taxonomic manuals and other relevant ichthyological literature (Day, 1865, 1875-78; Talwar and Jhingran, 1991; Menon, 1999; Jayaram, 1999; Raghavan et al., 2020).

3. Results

Along the Karuvannoor river, there were 14 sites where ootha fishing was prevalent, with intense activity observed at Konthipulam on the banks of Kurumalippuzha, Kundukadav near Chengalur, Irrigation Kadavu, Mangattupadam near Chengalur and Marvanchri, Kurumalipuzha. The quantity of fish collected by the fishers from these locations on May 17 and 18 is given in Table 1.

From Table 1, it is apparent that the maximum quantity of fish was caught at Konthipulam, followed by Madamathopu and Nedupuzha. In Konthipulam, the fishers devised the gillnets, which were fixed on the migratory channel connecting the rivers and floodplains and could easily entrap large numbers of *H.brachysoma* and *Wallago attu*. Exploitation at Konthipulam was followed by Kudukadavu, which produced 52Kg of fish like *W.attu*, *H.brachysoma*,

S.sarana and small barbs (*D.filamentosa* and *P.mahecola*). The total quantity of fish caught during the 17th and 18th of May 2021 is provided in Table 2. Unlike the previous years, in 2021, the ootha fishing was not triggered with the onset of monsoon, instead coincided with the heavy rain brought by the unusual tropical cyclone, ‘Toukte ’that hit the coastal states of India. Fish started migrating to the inundated paddy fields and floodplains on the 17th and 18th of May, 2021. The local fishers fished from both the inundated paddy fields and adjoining rivers employing different methods. A total of 20 species weighing 518.10Kg were caught from the study area on May 17th and 18th, 2021. Of these, *Systemus sarana* (Mundothi, Kuruva in Malayalam) formed 20.75% (107.5Kg) of the total catch. This species was followed by *Horabagrus brachysoma* (Manjakkoori), which contributed 85Kg comprising 16.41% (85Kg) and *Wallago attu* (16.6%: 86Kg). *Amblypharyngodon melettina* was the smallest contributor to the catches (0.19% (1.00kg) of the total catch. *Hypsleobarbus* was represented by single species weighing 300gm.

Table 1. Quantity of fish caught from different locations

No	Location of fish collection	Quantity of fish caught (Kg)
1	Kodannur	14
2	Konthipulam	258.5
3	Kudukadavnear Chengalur	52
4	Kurumali puzha	8.5
5	Madamathopu, Nedupuzha	25.3
6	Madamathopu, Nedupuzha	25
7	Alencherypadam, Chengalur	20
8	Irrigation Kadavu, Nelayi, Kurumali R	29
9	Nanthipulam, Mupliyam	11
10	PuthrakkalPadam	13
11	Marvanchri, Kurumalipuzha	10.8
12	Manjamkuzhi, Palazhi	22
13	Vattanathra, Mannapetta	15
14	Vendoor, Alagappanagar	14
	Total	518.1

The number of individuals of a species removed from the system as a part of the fishery is an important question that needs to be addressed in conservation and management decision-making. Almost all individuals caught during 17th and 18th of May 2021 were ripe, ready to shed gonads. About 710-720 individuals of *Horabagrus brachysoma*, 820-840 individuals of *Systemus sarana*, 720-730 individuals of *Dwakinsia filamentosa*, *Puntius parrah*, and 20-25 individuals of *Wallago attu* were removed within a span of 48 hours (Table 2).

The catastrophic flood in August 2018 resulted in a large-scale invasion of our freshwater ecosystems by exotic and alien fish species (Raj *et al.*, 2020 & 2021). Most non-native fishes established in our freshwater systems were escapees from pet traders or aquaculture facilities. Exotic species such as *Tilapia*, which were once confined to the lakes, reservoirs and rivers, have now become a part of the fishery in the lowland regions of major rivers. *Clarias gariepinus* (Mal: *African mushi*), *Oreochromis mossambicus* (Silopi), *Ctenopharyngodon idella* (grass carp), *Pangassius hypophthalmus* (Assam vaala) were the exotic species reported from the catch of ootha fishers. A single individual of *Lutjanus argentimaculatus* (Local name Eri) (weighing 3.5Kg), which prefers the estuarine habitats, was also recorded in the catch.

Major gears employed by the fishers were mostly mono-filament gillnets (Mal: *Kandadivala*), *Kuthuvala*, fish baskets (Mal; *Kuruthi*, *Koodu*) and spears.

A total of 27 people belonging to the age group 26-75 were engaged in fishing, including licensed and unlicensed fishers. The demand for brood fishes in the local market is very high, attracting people to ootha fishing. Species such as *W. attu*, *C.striata*, *H.brachysoma* and *S.sarana* fetch an exorbitant price in the local markets. During the ootha season, the price of these species rises up to 800/Kg. On average, Rs. 450/Kg is earned by the fishers. Thus, fish worth Rs.131, 120/ were caught within a couple of days.

Two decades back, there were about 25 active fishers and 10-15 wooden canoes in the Karuvannoor River. Due to the decline of fish, the fishing turned unprofitable and was subsequently abandoned as a profession. At present, only three wooden canoes exist in this locality and fishing is limited to ootha fishing.

4. Discussion

The destruction of spawning individuals and fries is not uncommon in India. Day (1873) commented “In British Burma, this trapping of fish in the breeding season was locally sanctioned, and in general use, without being taxed, it, as well as still more murderous forms, if possible, existed in 1869, and probably do so now”. He further added that in the inundated paddy fields, which are the known haunts of the fry of fish, the Burmese were being permitted to use an easy and very destructive apparatus. It had been an age-old practice of the people to place the traps in every run wherein breeding fishes may pass to find suitable places to deposit the ova. At Ballarpur, breeding and young fish are wantonly and indiscriminately destroyed in all rivers, pools, streams and tanks throughout the district and rice fields.

In Kerala, the information on inland fish production is somewhat scanty, and whatever information available is pinned on the aquaculture species such as transplanted Indian major carps, *Tilapia*, grass carp, etc. The lack of data on inland fish production is ahinderseloping suitable management practices and predict the long-term sustainability of fish resources. Shaji and Laladhas (2013) prepared a list of freshwater fish species migrating to the paddy fields and floodplains of Thrissur, Wayanad, Pathanamthitta and Kottayam districts of Kerala. The data generated during their studies yielded no exotic species, and the ootha fishery was focused on native species like *Wallago attu*, *Channa striata*, *Barbodes sarana* (= *Systemus sarana*), *Mystus oculatus*, *Macrognathus guentheri*,

Table 2. Quantity of fish collected from the floodplains and paddy fields adjacent to the Karuvannoor river

No	Fish Species	Qty of fish caught	% in the catch	Approx. no. individuals
1	<i>Wallago attu</i>	86	16.6	20-25
2	<i>Horabagrus brachysoma</i>	85	16.41	710-720
3	<i>Systemus sarana</i>	107.5	20.75	820-840
4	<i>Dwakinsia filamentosa</i> and <i>Puntius parrah</i>	79	15.25	720-730
5	<i>Lutjanus argentimaculatus</i>	10	1.93	3
6	<i>Channa striata</i>	56	10.81	65-70
7	<i>Mastacembelus armatus</i>	3.3	0.64	25-30
8	<i>Labeo dussumieri</i>	20	3.86	28-30
9	<i>Clarias gariepinus</i>	4	0.77	03-Apr
10	<i>Pseudotrophus maculatus</i>	3	0.58	250-300
11	<i>Heteropneustes fossilis</i>	21	4.05	280-300
12	<i>Nandus nandus</i>	4	0.77	160-170
13	<i>Ompok bimaculatus</i>	6	1.16	60-70
14	<i>Amblypharyngodon melettina</i>	1	0.19	100-120
15	<i>Hypselobarbus</i> sp.	0.3	0.06	1
16	<i>Oreochromis mossambica</i>	6	1.16	NA
17	<i>Ctenopharyngodon idella</i>	5	0.97	NA
18	<i>Pangassius hypophthalmus</i>	11	2.12	NA
19	<i>Etroplus suratensis</i>	5	0.97	NA
20	<i>Clarias dussumieri</i>	5	0.97	20-25
	Total	518.1	100	

Heteropneustes fossilis, etc. The flood of 2018 has also paved the way for the spread of exotic species (Biju Kumar et al., 2019).

The present study identified some exotic species in the natural breeding ground of the native freshwater fishes. Grass carp (*Ctenopharyngodon idella*), African catfish (*Clarias gariepinus*) and *Pangassius hypophthalmus* are the exotic species obtained in the collection. *Labeo dussumieri*, known as an endemic species of the *panchanadhikal* (five rivers: Pamba, Achenkovil, Periyar, Meenachil and Manimala) of Kerala, was caught from the floodplains of Karuvannoor River in large numbers totalling around 30-40 individual weighing 6.10 Kg.

The present study reveals that around 2000 individuals of fish, of which 75% were spawning individuals, were removed from the system. The injury from fishing on the spawners in a fishery stock has been debated since Day (1873). Though the inland Fisheries and Aquaculture Act 2010 strictly bans the fishing of brood fishes, it is poorly enacted and implemented in Kerala. The present data highlights the urgent intervention of the authorities to implement a complete ban on fishing in any form during the breeding season. Further, the research should be focused on understanding the process of this short-range migration of the fish.

5. References

- Bhadran, A., Vijesh, V. K., Gopinath, G., Girishbai, D., Jesiya, N. P. and Thriyakramji, K.P. 2018. Morpho-hypsometric evolution of the Karuvannur River Basin, a tropical river in central Kerala, southwestern peninsular India. *Arabian Journal of Geosciences* 11:430
- Bhardan, A., Girish, G. and Rini, S. 2016. Quantitative Morphometric Analysis and Prioritization of Karuvannur River Basin (KRB), Kerala, S. India using-GIS and SRTM-(DEM), *IJPRET*, 4 (12): 21-39.
- Biju Kumar, A., Raj, S., Arjun, C.P., Katwate, U and Raghavan, R. 2019. Jurassic invaders: flood-associated occurrence of arapaima and alligator gar in the rivers of Kerala. *Current Science*. 116 (10): 1628-1630.
- Hamilton, F., 1822. *An Account of the Fishes found in the River Ganges and its Branches*, Archibald Constable and Company, Edinburgh pp. 243-246.
- Hora, S. I.J. and Nair, K. K., 1940.-Further Observations on the Bionomics and Fishery of the Indian Shad, *Hilsa ilisha* (Ham.) in Bengal Waters. *Rec. Ind. Mus.* XI.III, pp. 35-50.
- Hora, S. L., 1938.-A Preliminary Note on the Spawning Grounds and Bionomics of the so-called Indian Shad, *Hilsa ilisha* (Ham.), River Ganges. *Rec. Ind. Mus.* XL, pp. 147-158.
- Jayaram, K.C., 1999. The freshwater fishes of the Indian region. Narendra Publishing House, Delhi-110006, India. 551 p.
- Menon, A.G.K. (1999). Checklist of Fresh Water Fishes of India. Records of the Zoological Survey of India, No.175, 366pp.
- Raghavan, R., A. Ali, S. Philip, V.K. Anoop and A. Bijukumar (2020). Checklist of the freshwater fishes of Kerala (1.0), 01 January 2020. <https://threatenedtaxa.org/index.php/JoTT/checklists/fish/kerala>.
- Raj, S., Kumar, A.B., Tharian, J. et al. Illegal and unmanaged aquaculture, unregulated fisheries and extreme climatic events combine to trigger invasions in a global biodiversity hotspot. *Biol Invasions* 23, 2373–2380 (2021). <https://doi.org/10.1007/s10530-021-02525-4>
- Raj S, Kumar AB, Raghavan R, Dahanukar, N. (2020) Amazonian invaders in an Asian biodiversity hotspot: understanding demographics for the management of the armoured sailfin catfish, *Pterygoplichthys pardalis* in Kerala, India. *J Fish Biol* 96:549–553. <https://doi.org/10.1111/jfb.14243>
- Shaji C.P. 2012. Oothayilakkom- oru padana report. Kerala State Biodiversity Board, Thiruvananthapuram.
- Shaji, C.P. & Laladhas, K.P. (2013). Monsoon flood plain fishery and traditional fishing methods in Thrissur district, Kerala. *Indian journal of traditional knowledge*. 12. 102-108.
- Talwar, P.K. & A.G. Jhingran, (1991). *Inland fishes of India and adjacent countries*. Vol. I and II. Oxford and IBH Publ., New Delhi, 1158pp.

