

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI
Original Application No.152 of 2023 (SZ)

In the matter of:

Thiru. Kumaresan Sooluran

... Applicant(s)

Versus

The Tamil Nadu Coastal Zone Management Authority,
Rep. by its Member Secretary,
Chennai and ors.

...Respondent(s)

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Through

Dr. D. Shanmuganathan
Standing Counsel of Tamil Nadu
National Green Tribunal
Southern Zone, Chennai

5/11/2025

Report on the spread of invasive mussel (*Mytella strigata*) in Ennore creek and Kosasthalaiyar wet lands

Pursuant to the complaint received from Ennore fishermen during December 2022, regarding the panic spread of an invasive species of mussel (*Mytella strigata*) locally known as Kakka Aazhi from South American coasts into Ennore and Pulicat estuaries posing threat to the niches of indigenous species of Prawns and oysters of the local waterbodies, a preliminary meeting was conducted by the Joint Director of Fisheries and Fishermen Welfare (Regional) Chennai on **30.12.2022** with the Dean and Experts of Fisheries College and Research Institute, Ponneri, & CMFRI Scientists. Subsequent to the meeting, Dr.MGR Fisheries College and Research Institute, Ponneri had decided to carry out study on the invasive mussel and steps to control its spread and carry studies on the following (i) plankton analysis, (ii) proximate composition, (iii) gut content analysis, (iv) fecundity studies and (v) utilization of shell. The Fisheries College and Research Institute, Thoothukudi decided to conduct (i) Analysis of Micro and Macro elements found in the animals and shell and (ii) Analysis of Water and sediment and Central Marine Fisheries Research Institute (CMFRI) had decided to conduct a survey on the biology of the Kaaka azhi and its environmental impacts. Further, it was also decided to inspect the site and to have discussion with the concerned fishermen on **03.01.23**.

Accordingly, a joint inspection was conducted on 03.01.2023 by the aforesaid Committee and in accordance to the survey and analysis made by the team , the following inferences were reported:

1. The Invasive mussel *Mytella strigata* has wide range of environmental tolerance and attains maturity at 1.25 cm and that it is able to colonize in variety of hard and soft substrates within short time span and hence their fast spreading in brackish water area.
2. Gut content analysis indicated that charru mussel mainly feeds on phytoplankton, *Pleurosigma* sp.
3. Charru mussel invasion was found to be relatively low in sites where phytoplankton density was high, which has shown that mussel invasion limits phytoplankton productivity, which in turn affects the availability of other fauna (including prawns).
4. The study has revealed that the invasive mussel has now grown and covered the bottom like a carpet and it is likely to impact the survival of bottom feeders like prawns.
5. Presence of heavy metals (Hg, Cd, Ni, Pb) in Charru mussel meat was below the maximum permissible limits.
6. Charru mussel meat incorporated as an alternative for fish meal in fish feed preparation revealed that it can be used as a feed for GIFT and other carnivorous fish.

Thus the Expert Committee provided the following recommendations to impede the growth of the invasive mussel :

1. Manual or Mechanical removal of mussels and drying in open space away from coastal area to avoid chances of its re-entry into the ecosystem.
2. Utilization of charru mussel meat as an ingredient in fish feed preparation
3. Dried shells may be used in lime industry and also for any other industrial purpose.

A discussion was held under the chairmanship of Commissioner of Fisheries & Fishermen Welfare on **15.9.2023** with CMFRI scientists , Water Resource Organization & Fisheries officials pertaining to curtailment of Chaaru mussel proliferation. Based on the suggestions implied by the stakeholders for manual removal of the invasive mussel from the Ennore creeks, it was proposed to conduct a joint inspection on **4.10.2023** in the Ennore creek and associated Kosasthalaiyar river area with the officials / Scientists of concerned Research Institutes and Departments to elucidate mechanism and extent of removal of the invasive mussel.

Accordingly, scientists from CMFRI were entrusted with the task to initiate hydro-biological and Pathological studies and Fisheries College experts to conduct Phytoplankton, Nutrition, heavy metal accumulation, biological studies. Futhermore, Engineering division from Water Resource Organization were assigned with the work to interpret the extent to which dredging work would be conducted for which Engineering wing of Fishing Harbour Project Division shall formulate cost estimation for the proposed dredging.

Thus, a joint inspection was conducted by the Joint Director of Fisheries (Regional)Chennai, Assistant Director of Fisheries & Fishermen Welfare,Chennai along with CMFRI & TNJFU representatives. However, as the Engineering Division of Fishing Harbour Project Division were not present during the said inspection, a separate inspection was conducted by them on **02.11.2024** and report submitted. A summary of report furnished by them is as detailed below:

The Central Marine Fisheries Research institute (CMFRI) collected samples from seven stations of the estuary and on analysis elucidated that *Mytella strigata* were predominant species, followed by *Crassostrea*

madrasensis and *Villorita cyprinoides*. The distance from the shore to the last station no. 7 was about 9 kms and that the estimated mussel biomass from the survey area of 18,000 sq.m. area is 14.64 tonnes. Moreover, it was also inferred that *Mugil cephalus* followed by *Gerres filamentosus*, *Tilapia* sp and *P.indicus* were predominant and that settlement of the invasive mussel *Mytella strigata* had thickly spread throughout the bottom with heavy settlement on hard substratum like pillars of bridges, hard underwater mud banks formed by the fly ash and clay.

Scientists on deriving water quality parameters in the specified areas recommended that the only option to control the population is manual or mechanical removal of this species from the affected area at frequent intervals and that mussels thus removed can be dried in an open space away from coastal area to avoid the chances of its re-entry into the ecosystem. The dried shells may also be used in the lime industry that is already in operation or for any other industrial purposes.

The studies of Dr.MGR Fisheries College & Research Institute, Ponneri revealed that the extent of present mussel spread is around 7 to 10 km from Ennore creek waters to Kattupalli and density ranges from 150 to 200 nos /25 Sq cm which was found reduced in par with the previous data (243nos/25 Sq cm) analysed during the month of January 2023. Thus it was evident from these observations that mass mortality were witnessed in various sampling sites. Live mussels observed during previous sampling were found to have perished in the present sampling for which it was interpreted that reduction in salinity influenced by fresh water influx in the creek would have been a prime factor for mass mortality of mussels. Furthermore, size of mussels was found to have

reduced than observed in the previous sampling which would have been due to seasonal changes and that mussel population was found predominant towards seaside than near river mouth of creek. In addition, the gut contents revealed presence of fully digested Plankton and other mud contents.

Fishing Harbour Project Division, in its report stated that the Chaaru mussel spread had extended at 5km from Ennore barmouth upto 12km into the Kosasthaliyar river and that disruption of radiation of sun into the waters had obstructed growth of aquatic species inhabiting the river due to depletion of dissolved oxygen. Moreover, the Executive Engineer had stated that the dredging work would be initiated by Water Resource Department as the Kosathalyiar river area falls under their jurisdiction.

Pursuant to the Proceedings of the Principal Secretary /Commissioner of Fisheries & Fishermen Welfare ,a Sub-Committee was constituted with the officials of line departments with the objective to elucidate measures to eradicate and subsequently preclude proliferation of the alien species in the Ennore creek which posed hindrance to the livelihood of Fishers of these area. Accordingly, the following officials envisaged in the Sub-Committee conducted a field visit on **05.08.2024** in the mussel affected Ennore creek:

S.No	Name & Designation (Thiru/Tmt)	Department
1	K. Divakar, Chief Technical Officer	Central Marine Fisheries Research Institute.
2	N. Rudhramoorthy, Assistant Chief Technical Officer	
3	Dr.C.Sudhan, Assistant Professor.	Dr.MGR Fisheries college and Research Institute, Ponneri.

4	O. Ramya, Farm Manager.	
5	I. Dhilipkumar, Assistant Engineer	Department of Water Resources
6	N.Navinkumar Assistant Engineer	
7	Dr.S.Mohan, Hydrologist	Tamilnadu Wetland Mission, Chennai.
8	Dr.E.Manikandan, Geologist	
9	J. Vijayalakshmi, Assistant Director	Department of Fisheries and Fishermen Welfare.
10	Raja	Representatives from Kattukuppam Fishing Village
11	Thangaraj	
12	Lokesh	
13	Kuppusamy	
14	Ranjith	
15	Prakash	
16	Raman	
17	Murugesan	
18	Munusamy	
19	Ela.Mathiyazhagan	
20	Muthukrishnan	Representatives from Mugathuvarakuppam Fishing Village
21	Udhayakumar	
22	Selvamani	
23	Suryakumar	
24	Honestraj	
25	Isaack	

The sub-committee initiated field inspection in 3 fishing boats from Kattukuppam fish landing point upto Vilaamaram.

From the field visit conducted by the sub-committee to perceive suitable mechanism to exterminate the invasive mussel, it was witnessed that the mussel spread was vehemently severe and that the debris of dead mussels has created mounds in the river beds which needs to be cleared for the livelihood of the fishermen relying on this river.

The following suggestions were recommended by the experts and

officials in the sub- committee to eradicate and restrain the growth of invasive mussel in the Ennore Creek:

1. As entire River bed has been vehemently mounded with live mussel bed and debris, physical deportation i.e dredging shall be the only possible mechanism to eradicate the alien mussel. Charu mussel beds along with silt deposition underneath bridges and between concrete pillars constructed across Ennore creek to be removed while dredging.

2. Dredging shall be initiated at a stretch of 23 kms from Ennore creek to Pulicat river mouth at a time in the first phase and that disposal of mussel bed would be transferred to far off place from the area of dredging.

3. Studies conducted by Dr.M.G.R Fisheries College and Research Institute, Ponneri reveals that reduction in salinity influenced by freshwater influx would lead to mass mortality of Charu Mussel. Mussels less than 5 gms body weight are found to be immature and mussels with 6-7 gms body weight are found to be with mature gonads. As, during monsoon period Kosasthaliyar / Ennore backwater is usually flooded with freshwater, dredging may be carried out immediately after monsoon season i.e in the month of January to restrict further growth of Mussel.

4. Department of Water Resources in coordination with Dr.M.G.R Fisheries College and Research Institute, Ponneri and Central Marine Fisheries Research Institute (CMFRI) shall be entrusted with the task of post dredging and regular monitoring of growth of mussel.

- Dr.M.G.R Fisheries college and Research Institute, Ponneri to identify measures to restrict proliferation of the alien mussel

through continuous studies on feeding and reproductive cycle of the mussel based on water quality parameters.

- Study on revival of aquatic organisms after dredging shall be entrusted to Central Marine Fisheries Research Institute (CMFRI)

5. As a part of biological control measures, Mud crabs can be ranched in the creek as studies conducted by Dr.M.G.R Fisheries College and Research Institute, Ponneri reveals that Mud crabs feed on Charru Mussel. To restore the native ecosystem in the Ennore creek after dredging, indigenous species like Shrimp (*Penaeus indicus*), Mulletts (*Mugil cephalus*), Milk Fish (*Chanos chanos*), Green Mussel (*Perna viridis*), Edible Oyster (*Crassostrea madrasensis*), etc., may be ranched.

For dredging, Post monitoring studies and further periodical dredging, funds may be obtained from neighboring Port Authorities of Ennore area.

Based on the NGT(SZ) order dated **08.08.2024**, a meeting was conducted on under the Chairmanship of the Chief Secretary to Government with the Head of Departments/ Research institutes concerned wherein it was intended to elucidate scientific approaches to control spread and facilitate removal of Charu mussel from the Ennore creek.

It is submitted that the officials /representatives of Dr.M.G.R Fisheries College & Research Institute, Ponneri and Tamilnadu Wetland Authority entrusted with the task for eradication of the invasive mussel were enquired regarding the present position and learnt that the following proposals have been submitted by the respective departments for conducting baseline Pilot studies towards executing biological control of *Mytella strigata* in the identified locations :

1. Mapping of the areas infested with *Mytella strigata* in the Ennore creek and Pulicat area.
2. Biological control/eradication of the invasive mussel
3. Value addition of the invasive mussel

It is ascertained from **Wetland Authority** officials that as **a measure to ensure possibility for genuine scientific evaluation towards eradication of the invasive mussel, National Centre for Sustainable Coastal Management (NCSCM) have been entrusted with mapping of Charru mussel heaped areas and that the Fisheries College & Research Centre with intention to implement biological eradication and scientific approaches to exterminate the invasive mussels have proposed to initiate Pen cultures with Charru mussel and green mussel in the identified areas and witness the duration of spat settlement and recurrence of *Mytella strigata*** .For **evaluation** towards utilization of these mussels **for value addition** , samples have been collected for **observation of Protein, carbohydrate, moisture and other nutrients** for utilization as fertilizers and plotting of maps and analysis is in progress.

Sd/-R.Gajalakshmi
Commissioner
Fisheries and Fishermen Welfare

R. Gajalakshmi
4/10/25

For Commissioner
Fisheries and Fishermen Welfare

R. Gajalakshmi
04/10/25