



## Bankable model of *Mesodopsis orientalis* (Mysids)

Sushilkumar Chaudhari & Dilip V. Nakhwa

Department of Zoology, The Institute of Science, Mumbai

E-mail: [drsbchaudhari01@gmail.com](mailto:drsbchaudhari01@gmail.com)

### Manuscript details:

Received: 01.07.2023  
Accepted: 06.08.2023  
Published: 30.09.2023

### Cite this article as:

Sushilkumar Chaudhari & Dilip V. Nakhwa (2023) Bankable model of *Mesodopsis orientalis* (Mysids), *Int. J. of Life Sciences*, 11 (3): 229-235.

Available online on <http://www.ijlsci.in>

ISSN: 2320-964X (Online)

ISSN: 2320-7817 (Print)

<https://doi.org/10.5281/zenodo.8395529>



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other thirdparty material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

### ABSTRACT

Mysid play an important role in use as food for human beings, and as food of fishes, mysids play a very important part in the economy of the sea also. Mysid fisheries in the study area is considered an extremely traditionally self-operating fishing method with sari net without employing any crafts and gears. It does not require any equipment like craft and engine as it is utmost required for Acetes fisheries. Mysids are collected using hand trawl made of sari net during low tide period at surface water from coastal, estuarine and saltpans regions during spring as also nip tides in waning and waxing period irrespective of moon phase and tidal conditions of every month manually during May 2016 to December 2017. The internal rate of return (IRR) of mysid fisheries more than 50 % i. e. 287 % with Benefit Cost of Ratio (BCR) at 15% 1: 2.52 and Net Present Worth (NPW) at 15% is 85990 in mysid fisheries. As such, the traditional mysid fishing method is found technically feasible and economically viable. Even if any fisherman can avail the bank loan assistance, since, the traditionally self-operated mysid fisheries is economically viable and bankable as well. The repayment schedule indicates that the principal amount of bank loan with interest can be repaid in three years with a first year as a grace period when only interest could be paid. This has certainly enlightened that Mysid fisheries is more than just as a livelihood.

**Keywords:** Mysids, Acetes, Economical importance, IRR, value added products

### INTRODUCTION

Several species of mixed groups of mysids are fished in local region of China, Korea and south eastern Asian countries but no descriptions of these fisheries are available. Pelagic crustaceans such as mysids and *Acetes* are important organisms in coastal and estuarine food webs and for humans as food, in particular in Asian countries (Omori, 1975, 1978; Mauchline, 1980). For example, the following species of mysids

are harvested as food for humans or live food for cultured aquatic organisms in these areas such as Japan: *Neomysis awatschensis*, *N. japonica*, *Acanthomysis mitsukurii* (Murano, 1963; Mauchline, 1980; Toda *et al.*, 1982; Hanamura, 2001) and India: *Mesopodopsis orientalis*, *M. zeylanica*, *Gangemysis assimilis* (Jadhav and Josekutty, 2003; Mauchline, 1980; Paul and Josekutty, 2005). In Mumbai, India, the fishery of *Mesopodopsis orientalis* is lucrative and regularly conducted by local fishermen, and the overall catch reached 1250 kg/month in 2004 (Paul and Josekutty, 2005).

Mysids or 'Opposum shrimps' as they are popularly called "Kolim" have not been reported to have any fishery value in Maharashtra State as a whole. But at Satpati, an important fishing village of Maharashtra a fishery for a species (*Mesopodopsis orientalis*) was noticed to be in existence. It is locally known as 'Kolim' and the net used for its capture as 'Kolim bokshi' In Maharashtra, mysids are exploited commercially on a small scale by the fishermen of Satpati and Alewadi villages in Thane district of the North Konkan coast (Patil and Sankolli, 1991). 'Kolim' fishing is done mainly in Thane district of Maharashtra in India. The women catch 'kolim', a tiny shrimp, from the nearby creeks, spending about three to four hours between 5 am and 9 am in the morning, everyday. The tiny mysid shrimp-'*Mesopodopsis orientalis*'-reaches a maximum size of around one cm. (Paul and Josekutty, 2005).

Mysids or opossum shrimps are component of zooplankton composition which is used for human consumption. *Mesopodopsis orientalis* is a common mysid of the shallow coastal waters of India. It is a small, shrimp like arthropod belonging to the Order *Mysidacea* of the class *Crustacea*. This is locally called as "Lepa" or "Banda Kolim" which is smaller than "Acetes" i.e. "Jawla". Due to their high nutritive quality, this species is suitable for aquaculture as a live feed (Biju *et al.*, 2009). Bhattacharya and Kewalramani (1972) observed that *M. orientalis* could survive even in fresh water for considerable time after gradual acclimatization. *Mesopodopsis orientalis* breed throughout the year but there is a seasonal variation in the intensity of breeding. It occurs in large shoals during September to November in coastal waters of Mumbai. The animal also occurs in January but less abundantly.

Lepa/Banda kolim/Kolim are alike Acetes i.e. Jawla. The purpose of this study is to get detailed information about fisheries. as also post-harvest technology of the mysid *Mesopodopsis orientalis*. This paper deals with the current fisheries status of these organisms such as target species at each locality viz., *Mesopodopsis orientalis* from coastal, estuarine and saltpan waters. kinds of gears employed by fishermen, the amount of catches. on the basis of our field samplings and interview assessments. This will enable to highlight the economical viability of mysids which will certainly enlighten that Mysid fisheries is more than just as livelihood. Keeping this view an attempts have been to prepare a bankable model for the Mysid fisheries this will also enable to find out the economical importance of mysids.

## MATERIAL AND METHODS

Mysids are collected using hand trawl of saree netting during low tide period at surface water and from coastal, estuarine and saltpan regions during spring as also nip tides of every month manually during May 2016 to December 2017. The study was carried out monthly basis from: 1.0 one site from Coastal area (Girgaon Chaoupati). 2.0 three sites from mangrove estuarine areas (Juchandra, Thane and "Kandalvan" at Mauze - Mulund/Bhandup) the Eastern suburb of Mumbai, lying along the Western bank of Thane creek. and 3.0 three sites from Saltpan (Airoli, Vasai and Naigaon) from different parts viz., reservoirs, condensers and crystallizers. Total mysids found in Coastal waters were 35.59% followed by 35.67% in Estuarine waters and 28.72% in Saltpan waters. In Coastal waters mysids were present year-round and exhibited marked monthly variations in abundance, with modal peaks during summer period.

### Value added food products of mysids

As regards, post-harvest technology viz, value added products of mysids, the pickle and chatni has been prepared on the basis of our field samplings and interview assessments.

In the present study prepared 1.0 mysids pickle and 2.0 mysids chutney. Mysids sundried for a period of one month for mysids chutney.

Procedures	
Preparation of Mysid pickle	Preparation of Mysid chatni
Requirements :	Requirements :
Fresh Mysids : 1000 gm	Dry Mysids : 1000 gm
Mustard seeds : 4 gm	Mustard seeds: 4 gm
Green chillies : 30 gm	
Garlic : 100 gm	Garlic : 250 gm
Ginger : 25 gm	Ginger : 25 gm
Red chilli powder:25 gm	chilli powder : 250 gm
Jeera : 30 gm	Jeera : 30 gm
Turmeric powder: 5 gm	Turmeric powder: 30 gm
Sugar : 5 gm	
Salt : 80 gm	Salt : 50 gm
Oil : 250 gm	
Vinegar : 300 gm	
<b>Procedure : Part – 1</b>	<b>Part – 1</b>
1. Wash mysids in clean water and remove unwanted organisms;	1. Sun dry mysids for one month where mysids are sandwich between two layers of 50 gm Salt viz., mysids spread on one layer of salt and one layer of salt spread on above mysids.
2. Add about 40 g salt and keep aside for 1 hour.	
3. Fry in oil and keep them aside.	
<b>Part – II</b>	<b>Part – II</b>
1. Heat oil in vessel.	1. Roast mysids for a while 2. Then paste of green chilli, garlic and ginger, jeera, turmeric powder & Red chilli powder and added and stirred it together  <b>Result:</b> Mysid chatni is ready which can be preserved for period of 1 year.
2. When hot, add mustard seeds and methi seeds.	
3. Then paste of green chilli, garlic and ginger added and stirred it together.	
4. Add jeera, sugar, turmeric powder and fry for a while. Mix the fried mysids in fried pan and stir for some time.	
5. Remove from fire pan and cool it to room temperature and add vinegar slowly in small proportion.	
6. Pour the mixture in plate, decorate as desired and serve it hot.	
<b>Result:</b> Mysid pickle is ready which can be preserved for period of one year.	

### Fisheries

Primary information has been collected from fishermen, fisherman groups, traders, through personal interviews, based on a structured questionnaire. Information collected included mainly capital cost, kinds of gears employed by fishermen, the amount of catches, operational costs, income, credit availability, and marketing channels.

Financial viability has been assessed by the discounted cash flow technique using financial parameters like NPW, BC Ratio, IRR and Return on Investment (%). Moreover, capital cost, variable cost, fixed cost, total expenditure, revenue generated and net profit were

the major components considered for economic analysis. This also enables to find out the economical importance of mysid fisheries by local/traditional method.

### Mysid fisheries

The present account deals with a regular fishery, occurring in the coastal waters, estuarine waters of Juchandra, Thane and Mulund as also from salt pan areas adjacent to mangroves close to Airoli, Vasai and Naigaon. In Coastal waters mysids were present year-round and exhibited marked monthly variations in abundance, with modal peaks during summer period. In estuarine waters as also in salt pans waters

maximum quantity was found during summer period. Apart from my own collection from coastal waters from Girgaon choupati, Estuarine waters as also from Saltpan waters, it was found that the women from Vasai, Naigaon, even from Dahanu and Palghar come up to the saltpan waters and estuarine region of Airoli, Mulund area. These women do not necessarily belong to fishing communities-a lot of them come from the community of traditional salt pan workers. It was also found that the days when the catch is bad, the women go back to catch the mysids again in the evening.

In the study area, only sari jal is being found to be used without employing any boat. The net is being operated by a single individual woman or sometimes 2 mostly husband and wife. This hand held gear is a piece of tapering fine cloth stretched between small wooden poles. The fisherwomen operate the nets at 0.5 to 0.8 m depth at early morning and late evening. The net is dragged along the surface water column vertically and then mysids present found on the upper layer are collected and put it into separate vessel containing water. As gathered by the local fishermen that the wind direction and the lunar cycles affect the availability of this tiny shrimp. The fishing is therefore conducted during waning and waxing periods irrespective of moon phase and tidal conditions during

the same period each year. Total mysids found in Coastal waters were 35.59% followed by 35.67% in Estuarine waters and 28.72% in Saltpan waters. Females found predominated over the males and brooding females in every haul. However, surprisingly females found much more in coastal waters than estuarine as also salt pan waters.

**Financial analysis**

**Capital cost:** Only cost of equipments like Sari jal (hand net) and Bamboo poles are considered as Capital cost.

**Operational cost:** Traveling cost, Labor cost and crushed ice cost are the operational cost.

**Profit distribution system:** As mysid fisheries is an extremely traditional self-operating fishing method this does not apply; no need found for profit distribution system.

**Total project cost:** Total project cost is Rs.36400/-.

**Total fixed cost:** No any depreciation cost is considered as it is an extremely traditional self-operating fishing. It does not require any equipment like craft and engine.

Unit cost of Mysid fisheries					
Sl	Item	Quantity	Unit	Cost/unit	Cost
1	<b>Capital cost(Rs)</b>				
	Cost of equipments				
	Sari jal (hand net)	1	No.	200	200
	4'high Bamboo poles	2	No.	100	200
	<b>Total Capital Cost</b>				<b>400</b>
	<b>Operational cost for eight months</b>				
	Fishing of mysids per 4 hrs for 240 days				
	Travelling cost to & fro/day for 8 months	2	No.	50	24000
	Labour cost (self)	2	No.	0	0
	Ice(crush) @ Rs 45 /day for 240 days	1	kg	50	<b>12000</b>
	<b>Total operational cost(Rs)</b>				<b>36000</b>
	<b>Total cost(Capital+Operational)</b>				<b>36400</b>
	<b>Farmer's contribution @10% of Total cost</b>	10%	<b>36400</b>		<b>3640</b>
	<b>Loan amount</b>				<b>32760</b>
	<b>Catch for 240 days</b>				
	Catch per effort per day at 1 kg per day	240	kg		240
	Selling price @ 500 per kg	240	kg	500	120000
	<b>Income</b>				<b>120000</b>
	<b>Gross surplus (Income-Total cost)</b>				<b>83600</b>

Repayment Schedule								
Bank loan		32760	3931	36691	14676	2.50		
Repayment schedule		Three years with first year as grace peropd						
Income expenditure statement and repayment								
Particulars						Years		
						I	II	III
1. Gross Income						20900	83600	83600
2. Gross expenditure						36400	36000	36000
3. Gross Surplus : (1 -2)						-15500	47600	47600
3Add recurring cost capitalised for term loan							36000	36000
5. Amount available for repayment (3+4)						-15500	83600	83600
6. Less AEI (12%)C.R.F :0.329234						11984	11984	11984
7. Net surplus (5 - 6)						-27484	71616	71616
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1	Cost							
2	Capital cost	400	0	0	0	0	0	0
3	Operatinal cost	36000	36000	36000	36000	36000	36000	36000
4	Total cost	36400	36000	36000	36000	36400	36400	36400
5	Benefit	20900	83600	83600	83600	83600	83600	83600
6	Net benefit	-15500	47600	47600	47600	47200	47200	47200
7	PWC	56654						
8	PWB	142644						
9	NPW@15	85990						
10	BCR at 15 %	2.52						
11	IRR	> 50%	<b>287%</b>					

## RESULTS

### Techno-Economic feasibility vis-a-vis Financial Analysis

Mysid fisheries in the study area is considered an extremely traditionally self-operating fishing method with sari jal. It does not require any equipment like craft and engine as it is utmost required for Acetes fisheries.

Total outlay of the mysid fisheries at Rs. 36,400/- taking into consideration the operating cost for fishing per 4 hours per day for 8 months (240 days) works out to Rs. 36000/-. Hence, operational cost for 240 fishing trips of 4 hours per day in mysid as also income has taken into consideration for estimation of economics.

The gross income in mysid fisheries from sale of 240kg mysid @ 1 kg per day fishing trip @Rs.500 per kg works out to Rs.1,20,000/- on a conservative scale.

On assuming 25% catch per effort during first year the net surplus works out to Rs. 47,600/ from second year onwards on a conservative scale in mysid fisheries.

The internal rate of return of is more than 50 % i. e. 287 % with (BCR) Benefit Cost of Ratio at 15% 1 : 2.52 and N P W (Net Present Worth) at 15% is 85990 in mysid fisheries

As such, the traditional mysid fishing method is found more technically feasible and economically viable

### As food for man

In Calcutta markets, *Mesopodopsis orientalis* mixed with the decapods Acetes are sold as "Kada chingri" (Mauchline, 1980). In the Chilka lake region the mysids are mixed with turmeric and boiled and eaten with rice. In Maharashtra, mysids locally called "Kolim" are exploited commercially on a small scale by the

fishermen of Satpati and Alewadi villages in Thane district of the North Konkan coast (Patil and Sankoli, 1991).

## DISCUSSION

Apart from mysid play important role in use as food for human beings, as food of fishes, mysids play a very important part in the economy of the sea. Mysids are an important link in the food web of coastal ecosystem (Yamada et al., 2007) and prey for various fishes (Takahashi et al., 1999; Baldo & Drake. 2002; Jamura, 2007) as well as for invertebrates, birds and seals (Mauchline, 1980) thereby linking primary and secondary production to higher tropic level. In India reproduction, oogenesis and development of *M. orientalis* has been studied by Nair (1939). Salinity and temperature tolerance of *M. orientalis* from West coast has been studied by Bhattacharya and Kewalramani (1972). A laboratory investigation on salinity and temperature tolerance of the juveniles of *M. orientalis* has been carried out by Bhattacharya (1981). Breeding and fecundity in a subterranean Mysid, *Lepidomysis longiceps* has been studied by Nath and Pillai (1973). It is expected that like, several other species of mysids, *M. orientalis* must be playing a very significant role as an important species in the food chains in the coastal waters as well in the food chains in the coastal waters as well as in the estuaries and backwaters (Larkin 1948, Naoyoshi 1964, Langford 1973, Morgan 1979).

The importance of *M.orientalis* becomes more significant in the estuaries and backwaters, since these areas are the breeding grounds of several species of marine fishes and nursery grounds of various species of prawns. Bhattacharya and Kewalramani (1972) observed that *M. orientalis* could survive even in fresh water for considerable time after gradual acclimation. Due to their high nutritive quality, this species is suitable for aquaculture as a live feed (Biju et., 2009). As a food for man will ultimately uplift the economy of the poor people. Mysids or opossum shrimps are component of zooplankton composition which is used for human consumption.

As food for fish which would reduce the feeding cost of the candidature culture species of marine, brackish water, fresh water as also of ornamental fish. Presently the feed cost viz., *Artemia nauplii* is more or less 75% in the different fish culture practices.

## CONCLUSION

As per the above illustration highlighted, the economical viability shows that Mysid fisheries is certainly more than just as a livelihood. Moreover, this view has been firmly endorsed as 1.0 mysids apart from human regular conventional consumption as food, 2.0 post harvests technologically prepared as different value added products and 3.0 it is also suitable for aquaculture as a live feed. Hence, the importance of *M.orientalis* becomes more significant.

## Acknowledgement

The, Director, The Institute of Science, Mumbai extended us all support to carry out the above work.

**Conflict of interest:** The authors declare that they have no conflict of interest.

## REFERENCES

- Biju A and Anampunnayil SU (2009) "Mysids (Crustacea) from the shallow waters off Maharashtra and south Gujarat, India, with description of a new species" National Institute of Oceanography, Regional Centre, Kochi, Kerala, India 682018, Author version: Mar. Biol. Res.: 5(4); 345-362.
- Baldo and Drake (2002) Jamura, 2007: A multivariate approach to the feeding habits of small fishes in the Guadalquivir Estuary. J Fish. Biol. 61: 21-32
- Bhattacharya (1981), Salinity and temperature tolerance of the juveniles of *M.orientalis* : laboratory studies. Journal Indian Fish Ass, 21-2...Journal of Experimental Marine Biology & Ecology 54(2): 137-148, 1981, Springer : Ecology of Mysidacea Chapter 3 pp23-30, part of the Developments in Hydrobiology, book series (DIHY,volume10)
- Bhattacharya and Kewalramani (1972) "Salinity and temperature tolerance of juvenile *Mesopodopsis orientalis*": Laboratory studies Hydrobiologia. Vol.93: 23-30.
- Hanamura et al. (2009) "Mysids (Crustacea) from the salt pans of Mumbai, India", Article in Marine Biology Research, 6(6).
- Hanamura (2001) Ecological significance of mysids in coastal waters. Kaiyo., 27: 161-140.
- Jadhav DG and Josekutty CJ (2003) A note on the fishery of mysid, *Mesopodopsis zeylamica* Nouvel, 1954 at Mahim, Mumbai. Marine Fisheries Information Service, Technical and Extension Series 176:14
- Langford (1973) "Feeding and assimilation of *Mysis relicta*" Article in Limnology and Oceanography 18(2): 280-285 .
- Larkin 1948, "Effect of Temperature on Feeding and Survival of *Mysis relicta*" www.academia.edu

- Mauchline J (1980) The Biology of Mysids and Euphausiids. Advances in Marine Biology.50: 169-175.
- Miriam Paul and Josekutty CJ (2005) Mumbai Research Centre of CMFRI, Mumbai, Marine Information Service ISSN 0254-380 X No. 183
- Morgan, Mark D. and Alfred M. Beeton 1979 Life history abundant of Mysids of *Mysis relicta* in Lake Michigan. J. Fish. Board, Can: 35 1165-1170
- Murano M, 1963: Fisheries Biology of a mysid *Neomysis intermedia* CZERNIAWSKY. I. Role of the mysid in the production of lakes Aquaculture 11: 149-158
- Nair B. (1939) The reproduction, oogenesis and development of *M. orientalis* Tatt. Proceedings of Indian Academy of Sciences; 9: 175-223
- Naoyoshi (1964) Fauna Japonica, Mysidae. Biogeographical society of Japan
- Nath CN and Pillai NK (1973) Breeding and fecundity in a subterranean Mysid, *Lepidomysis longiceps*(Piallai and Mariamma) Int.J.Speleol. 5: 319-323
- Omori, M. 1978. Zooplankton fisheries of the world: a review, Marine Biology, 48: 199-205
- Patil S.W. and Sankolli K.N. (1991) Kolim (Mysid) Fishery of North Konken Coast. Fishery Technology (special issue) Low Energy Fishing- *Proceedings of the National Workshop on Low Energy Fishing*, held at Cochin.
- Paul M and Josekutty CJ, (2005) Note on a regular fishery of mysid, *Mesopodopsis orientalis* in Mumbai waters. Marine Fisheries Information Service, Technical and Extension Series; 183: 15-16.
- Takahashi K, Hirose T, Kawaguchi K (1999); The importance of intertidal sand-burrowing peracarid crustaceans are prey for fish in the surf-zone of a sandy beach in Otsuchi beach in Otsuchi Bay, Northern Japan. Fisheries Sci, 65: 856-864.
- Toda, H., Takahashi, M. and Ischimura, S. 1982. Advance and life history of *Neomysis intermedia* Czerniawsky in the Lake Kasumigaura, Hydrobiologia 93: 31-39.
- Yamada K, Takahashi K, Vallet C, Taguchi S, Toda T (2007): Distribution, life history, and production of three species of *Neomysis* in Akkeshi-ko estuary, northern Japan. Mar Bio 150: 905-917.