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Research Article

LOBSTER FISHERIES IN INDIA

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ABSTRACT

Lobsters are commercially fished decapods found in all oceans with hard protective exoskeleton. Lobster meat was one of the high valued seafood with well-established export markets around the world. Commercial exploitation of lobsters from the Indian seas began in the 1950s. The peak annual lobster landings were 16663 t in 1974 followed by 12508 t in 1973 and 9612 in 1971. The recent landings were 1410 t in 2013 followed by 1568 t in 2014. Due to overfishing or improper management, the lobster fishery was declining in recent years. The lobster fishery could be managed properly by Lobster aggregating devices (LAD's); forming artificial habitats; strict implementation of conservatory measures on mesh size with community and co-management principles. Suggestions and recommendations have been made for the enhancement of lobster fisheries in India enclosing all the fishers, stakeholders and scientific communities.

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INTRODUCTION

Lobsters are one of the most valuable and highly priced marine crustaceans in India, as well as an important export commodity (Nandakumar, G & Marry K. Manisseri, 2006) either in live condition or in frozen form (Kleisner *et al*, 2013). The export of lobsters varies from previous year to next year (Sathianandan *et al*, 2011).

The Taxonomic status of lobster belongs to Phylum Arthropoda; Class Malacostraca and order Decapoda. The suborder Macrura Reptantia has four infraorders: Astacidea, Glypheidea, Achelata and Polychelida (Chan, T.Y. 2010). There are 12 Major lobster fishing centres along the Indian coast are follows Veraval (Gujarat); Mumbai (Maharashtra); Quilon (Kerala) followed by Colachel; Muttom; Kanyakumari; Thoothukudi; Tharvaikulam; Nagapattinam; Kovalam and Chennai (Tamil Nadu) dignifies the lobster landings in India. The taxonomy of known species of lobsters from Indian coast is described. Chan (2008) provided a checklist of the currently recognized six families, 55 genera and 248 species (with four subspecies) of living marine lobsters. The current list includes 5 families, 3 subfamilies, 24 genera and 45 species. The commercially important species belongs to 2 families Palinurridae and Scyllaridae.

MATERIALS AND METHODS

Literature on various aspects of lobsters have been gathered and synthesized for the present study. Lobster production data or Annual Lobster Landings (t) had been collected from Central Marine Fisheries Research Institute (CMFRI) annual reports from 1961 to 2014. The species diversity and check list has been given for the lobster species confined to Indian waters including the New species record or the First recorded species in Indian waters. The total annual production of lobster landings were calculated and interpreted by using simple column chart using Microsoft Excel.

RESULTS AND DISCUSSIONS

The lobster landings in tonnes had been collected from Central Marine Fisheries Institute annual reports from 1961 to 2014. For the year 1961 – 1970, the highest annual landings recorded were 5670t followed by 4564t and 4330t during 1969, 1964 and 1967 respectively. For the year 1961 – 1970, the lowest annual landings recorded were 1031t during 1962.

During 1971 – 1980, the highest annual landings recorded were 16663t followed by the lowest annual landings recorded were 679t. During 1981 – 1990, the highest annual landings recorded were 4082t followed by the lowest annual landings recorded

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Scientific Classification or Taxonomic Status:

Phylum :	Arthropoda
Subphylum:	Crustacea
Class :	Malacostraca
Subclass :	Eumalacostraca
Superorder :	Eucarida
Order :	Decapoda
Suborder :	Macrura Reptantia

Table 1 Diversity of Lobsters in Indian Ocean and Associated fishing areas

Family / subfamily	Genus	Species	Common name	Environmental habitat	Fisheries status	Recorded maximum length	Distribution	IUCN Status	CITES Status
Palinuridae	<i>Jasus</i>	<i>Jasus paulensis</i>	St. Paul rock lobster	B	C	37.0 cm	Western Indian Ocean: St. Paul and Amsterdam Islands.	DD	NE
	<i>Justitia</i>	<i>Justitia longimana</i>	West Indian furrow lobster	B	PI	15.0 cm	Western Atlantic and Indo-Pacific.	DD	NE
		<i>Justitia mauritiana</i>	Gibbon furrow lobster	B	NI	16.0 cm	Indo-West Pacific.	NE	NE
	<i>Linuparus</i>	<i>Linuparus somniosus</i>	African spear lobster	D	C	35.0 cm	Western Indian Ocean.	LC	NE
	<i>Nupalirus</i>	<i>Nupalirus japonicus</i>	Japanese furrow lobster	B	NI	24.0 cm	Indo-West Pacific.	LC	NE
	<i>Palibythus</i>	<i>Palibythus sp.</i>	-	-	-	-	-	-	-
	<i>Palinurus</i>	<i>Palinurus delagoae</i>	Natal spiny lobster	D	C	35.0 cm	Western Indian Ocean.	LC	NE
		<i>Palinurus gilchristi</i>	Southern spiny lobster	B	C	16.0 cm	Western Indian Ocean and Southeast Atlantic: South Africa and Madagascar.	LC	NE
	<i>Panulirus</i>	<i>Panulirus waguensis</i>	Japanese blunthorn lobster	D	PI	10.0 cm	Indo-West Pacific.	LC	NE
		<i>Panulirus dasyopus</i>	-	-	-	-	-	-	-
		<i>Panulirus burgeri</i>	-	-	-	-	-	-	-
		<i>Panulirus fasciatus</i>	-	-	-	-	-	-	-
	<i>Panulirus</i>	<i>Panulirus homarus</i>	Scalloped spiny lobster	B	C	31.0 cm	Indo-Pacific: East Africa to Japan, probably the Marquesas Archipelago	LC	NE
		<i>Panulirus penicilatus</i>	Pronghorn spiny lobster	B	C	40.0 cm	Indo-Pacific	LC	NE
	<i>Panulirus</i>	<i>Panulirus longipes</i>	Longlegged spiny lobster	B	C	30.0 cm	Indo-Pacific: South Africa to Japan and Polynesia.	LC	NE
		<i>Panulirus polyphagus</i>	Mud spiny lobster	B	C	40.0 cm	Indo-West Pacific: from the coasts of Pakistan and India to Vietnam, the Philippines, Indonesia, Northwest Australia and the Gulf of Papua	LC	NE
	<i>Panulirus</i>	<i>Panulirus versicolor</i>	Painted spiny lobster	B	C	40.0 cm	Indo-Pacific: Melanesia and Polynesia.	LC	NE
		<i>Panulirus orientalis</i>	-	-	-	-	-	-	-
	<i>Panulirus</i>	<i>Panulirus ornatus</i>	Ornate spiny lobster	B	C	50.0 cm	Indo-West Pacific.	LC	NE
		<i>Projastus</i>	-	-	-	-	-	-	-
<i>Puerulus</i>	<i>Puerulus sewelli</i>	Arabian whip lobster	D	C	20.0 cm	Western Indian Ocean.	LC	NE	
<i>sagmariusus</i>	-	-	-	-	-	-	-	-	
Scyllaridae / Arctidinae	<i>Scyllarides</i>	<i>Scyllarides elisabethae</i>	Cape slipper lobster	D	MC	20.0 cm	Indo-West Pacific and Southeast Atlantic: Mozambique and South Africa	LC	NE
		<i>Scyllarides tridacnophaga</i>	Clamkiller slipper lobster	D	NI	30.0 cm	Indo-West Pacific	LC	NE
	<i>Parribacus</i>	<i>Parribacus antarcticus</i>	Sculptured mitten lobster	B	C	20.0 cm	Worldwide.	LC	NE
Scyllaridae / Scyllarinae	<i>Biarctus</i>	<i>Biarctus sordidus</i>	-	B	-	-	Indo-West Pacific.	LC	NE
		<i>Biarctus tutiensis</i>	-	-	-	-	-	-	-
	<i>Bathyarctus</i>	<i>Bathyarctus rubens</i>	-	B	-	-	Indo-West Pacific.	LC	NE
	<i>Scyllarus</i>	<i>Scyllarus rubens</i>	-	B	-	-	Indo-West Pacific.	LC	NE
<i>Petrarctus</i>	<i>Petrarctus rugosus</i>	Hunchback locust lobster	B	NI	6.0 cm	Indo-West Pacific: from Red Sea, East Africa and Madagascar to Japan, Taiwan, the Philippines, Indonesia and N.E. Australia.	LC	NE	

	<i>Eduarctus</i>	<i>Eduarctus martensii</i>	Striated locust lobster	B	NI	4.0 cm	Indo-West Pacific	LC	NE
	<i>Scammarctus</i>	<i>Scammarctus batei batei</i>	-	B	-	-	Indo-West Pacific	LC	NE
Scyllaridae / Theninae	<i>Thenus</i>	<i>Thenus Indicus</i>	-	B	-	-	Western Central Pacific: Australia.	DD	NE
		<i>Thenus orientalis</i>	Flathead lobster	B	C	25.0 cm	Indo-West Pacific	LC	NE
		<i>Thenus unimaculatus</i>	-	B	-	-	Indian Ocean.	DD	NE
Polychelidae	<i>Stereomastis</i>	<i>Stereomastis andamanensis</i>	-	-	-	-	-	-	-
		<i>Stereomastis grimaldii</i>	-	-	-	-	-	-	-
		<i>Stereomastis nana</i>	-	-	-	-	-	-	-
		<i>Stereomastis phosphorus</i>	-	-	-	-	-	-	-
	<i>Polycheles</i>	<i>Polycheles phosphorus</i>	-	-	-	-	-	-	-
Enoplometopidae	<i>Enoplometopus</i>	<i>Enoplometopus macrodontus</i>	-	D	-	-	Western Central Pacific: Philippines.	DD	NE
		<i>Enoplometopus occidenatlis</i>	Red reef lobster	B	-	-	Indo-Pacific	LC	NE
Nephropidae	<i>Acanthacaris</i>	<i>Acanthacaris tenuimana</i>	Prickly deep-sea lobster	B	NI	40.0 cm	Indo-West Pacific	LC	NE
	<i>Nephropsis</i>	<i>Nephropsis carpenter</i>	Ridge-back lobsterette	D	NI	12.0 cm	Indo-West Pacific: Japan and India	LC	NE
		<i>Nephropsis ensirostris</i>	Gladiator lobsterette	D	NI	6.0 cm	Indo-West Pacific	LC	NE
		<i>Nephropsis stewarti</i>	Indian ocean lobsterette	D	PI	15.0 cm	Indo-West Pacific and East Africa	LC	NE
		<i>Nephropsis suhmi</i>	Red and white lobsterette	B	NI	11.0 cm	Indo-West Pacific	LC	NE
		<i>Nephropsis sulcata</i>	Grooved lobsterette	B	NI	-	Southeast Atlantic and Indo-West Pacific.	LC	NE

were 1297t. During 1991 – 2000, the highest annual landings recorded were 2917t followed by the lowest annual landings recorded were 1671t. During 2001 – 2010, the highest annual landings recorded were 1974t followed by the lowest annual landings recorded were 1201t. During 2011 – 2014, the highest annual landings recorded were 1852t followed by the lowest annual landings recorded were 1410t

The species diversity of Indian Ocean and its associated waters had been discussed with sea life base. This paper would add the contribution to the diversity and resource potential of lobsters in India thereby enables the need and benefits of conservation and management measures with pertaining to lobster catch and overfishing. The checklist could furnish the following information 5 families with 45 species were supplied along with common name, environmental habitat, fisheries status, recorded maximum length, distribution, IUCN status (International Union for Conservation of Nature and Natural Resources) and CITES status (Convention on International Trade in Endangered Species of Wild Fauna and Flora).

Under Palinuridae Family, there were 10 Genus with *Panulirus* sp. as dominating genus with 18 species for which 10 species of commercial; 2 species of Potential interest and 2 species of No interest as fisheries status followed by 11 species of Least concern; 2 species of Data deficit and 1 species of Not evaluated by IUCN status. Under Scyllaridae Family, there were 9 Genus and 13 species for which 2 species of Commercial; 1 species of Minor Commercial; and 3 species of No interest as fisheries status followed by 10 species of Least concern; 2 species of Data deficit by IUCN status.

Under Polychelidae Family, there were 2 Genus and 5 species were listed with undersupplied information. Under Enoplometopidae Family, 1 Genus and 2 species were recorded for which 1 species of least concern and 1 species of Data deficit by IUCN status. Under Nephropidae Family, there were 2 Genus and 6 species for which 1 species of Potential interest and 5 species of No interest as fisheries status followed by 6 species of Least concern by IUCN status and all species of Not evaluated by CITES status.

Suggestions

1. Small meshed size should be effectively managed and enforcing size regulation.
2. Excess fishing pressure should be reduced.
3. Large scale sea ranching is to be done to rejuvenate the stock.
4. Fixing the Minimum size of the first capture and size of export (Adoption of EIA notification).
5. Installing FAD's; LAD's and Artificial reef management.
6. Release of berried female and small one to avoid recruitment over fishing as well as juvenile over fishing.
7. Eco-friendly fishing methods should be encouraged instead of destructive fishing.
8. The culture of the commercially important lobsters should be under taken on large scale to fill up gap between demand and supply.
9. Passive methods should be encouraged instead of active gears.

10. Accumulated knowledge gained from continuous interaction with the sea.
11. Genetic management of endangered populations.
12. Strict implementation and evaluation of Marine Fishing Policy should under taken.

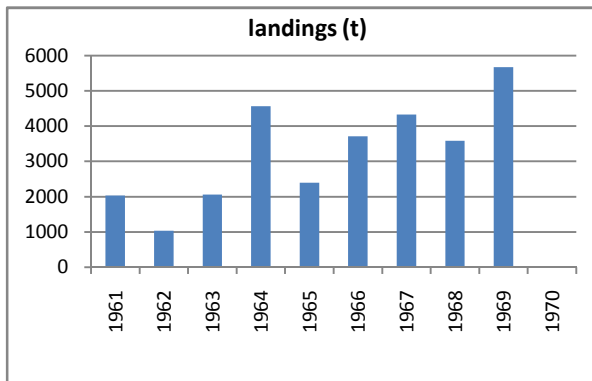


Figure 1 Total Annual Lobster Landings in India During 1961-1970

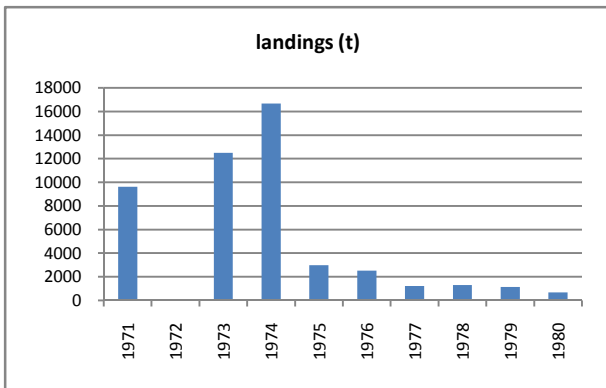


Figure 2 Total Annual Lobster Landings in India During 1971 – 1980

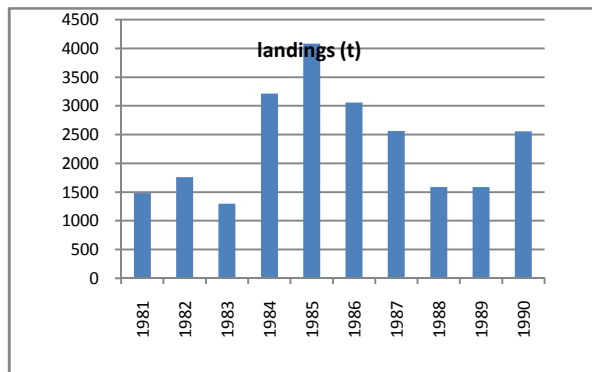


Figure 3 Total Annual Lobster Landings in India During 1981 – 1990

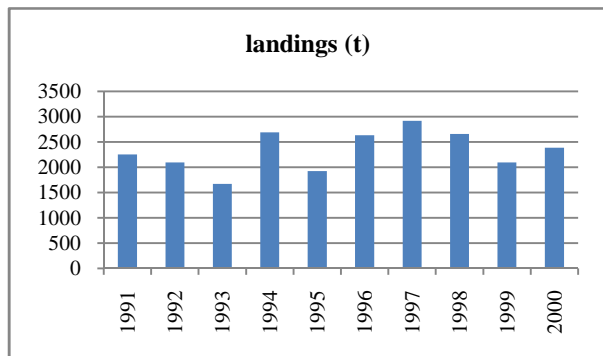


Figure 4 Total Annual Lobster Landings in India 1991 – 2000

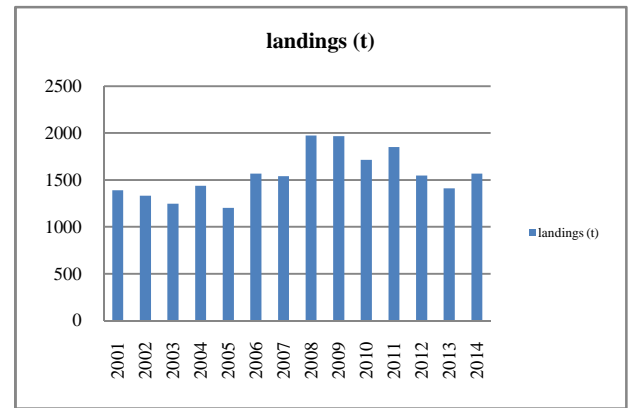


Figure 5 Total Annual Lobster Landings in India During 2001 – 2014

CONCLUSION

The gear-wise contributions used for harvesting lobsters were relatively decreased for trawlers 50% to 40%; gill net contributes 43% to 51%; other nets 7% to 5% to record in 2008 and 2014 respectively. The lobster fishery could be managed properly by Lobster aggregating devices (LAD's); forming artificial habitats; strict implementation of conservatory measures on mesh size with community and co-management principles. Suggestions and recommendations have been made for the enhancement of lobster fisheries in India (Biswas, 2011; Suseelan & Pillai, 1993; James Hornell, 2010; Deshsmukh, 2001) enclosing all the fishers, stakeholders and scientific communities thereby enhancing the value and conserving for future resources of lobsters and its uses to the common people and scientific communities.

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