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Rock Lobster Fishery from East Coast of India

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Abstract: The lobster fishery of east coast of India, particularly Andhra Pradesh contributes more than one fourth of total landings of east and west coast of India. The present study was aimed to establish a base line data on the lobster fishery resources of the east coast of India. Periodic field surveys were carried out at 10 different landing centers in east coast (Andhra Pradesh) and the data were collected by direct observation. Common non-mechanized and mechanized crafts were engaged in lobster fishing during the study period (2010-2012). Lobsters are manually caught by gill nets. Six commercially important species of rock lobsters *Panulirus longipes*, *P. homarus, P. penicillatus, P. polyphagus, P. versicolor* and *P. ornatus* are available along the east coast among them *P. homarus* dominated the landings throughout the study period, with maximum catch in October through November and December followed by *P. ornatus.* The total rock lobster landings from east coast during the study period were estimated at 26.66 tons

Keywords: Lobster resources, Monsoon period, Post monsoon period.

Introduction

The lobster fishery of India is based on eight species of spiny lobsters (six shallow water and two deep sea) and two species of slipper lobsters of these *P. polyphagus*, *P. homarus, P. ornatus,* and the deep sea lobster *Puerulus sewelli* form the main fishery, other species that are exploited at low or moderate levels are *P. versicolor*, *P. penicillatus, P. longipes*, *Scyllarus sosrdidus* and *Linuparus sominosus* (Radhakrishnan and Vijayakumaran, 1990; Suseelan 1996).

Lobsters are distributed along the whole east and west coasts of India, with major landings coming from the north western, south western and south eastern coasts. The estimated resource potential for Indian lobsters is 52,360 t, consisting of 2,500 t of shallow water spiny lobsters, 1,476 t of deep sea lobsters and 12,600 t of slipper lobsters. Even though new fishing grounds were found, there is very limited scope for improvement in the lobster catch because of their habit and habitat preference, a point of observation also made from the studies of (Vijaya Kumaran and Radhakrishnan, 1997). Radhakrishnan (1995) on lobster fisheries of India, Devaraj *et al.,* (1996) on the coastal fisheries and aquaculture management. Kagwade (1986; 1993; 1994) and Kagwade *et al.,* (1991) have provided estimates and stocks of the spiny lobster *P. polyphagus* and other lobsters from the north-west coast of India

The lobster fishery of east coast of India, particularly Visakhapatnam coast of Andhra Pradesh contributes more than one fourth of total landings, comprises of six species *Panulirus longipes*, *P. homarus, P. penicillatus, P. polyphagus, P. versicolor* and *P. ornatus,* among these *P. penicillatus* and *P. longipes* landings were poorly recorded because of their limited distribution.

There are quite good number of studies pertaining to the lobster fishery from different coasts, (Radhakrishnan 1995; Phillips and Pearce 1997; Brown and Phillips 1994; Picher *et al.,* 1994; 1997; Palh de Sousa 1997; Wuhle Richard 1998; Radhakrishnan and Manisseri 2003; Radhakrishnan *et al.,* 2005).

Since studies on lobster resources from east coast of India is very scanty particularly at Andhra Pradesh coast, and keeping in view of these reasons a study was undertaken to evaluate fishery resources form Andhra Pradesh coast. The main objective of the present study is to locate the rock lobster resources and fishery off east coast of India.

Materials and Methods

A survey was conducted for lobster resources in Andhra Pradesh coast during the year 2010-2012. Sampling was practiced at ten regular/ seasonal lobster fishing stations were identified, they are Kakinada, 82.2^0 longitude and 17^0 latitude, Uppada, 82.25^0 longitude and 17.05^0 latitude, Pentakota, 82.6^0 longitude and 17.3^0 latitude, Revupolavaram, 82.85^0 longitude and 17.35^0 latitude, Visakhapatnam harbour, 83.3^0 longitude and 17.7^0 latitude, Chepalakancheru, 83.5^0 longitude and 17.95^0 latitude, Mukkam, 83.55^0 longitude and 17.99^0 latitude, Chintapalli, 83.6^0 longitude and 18^0 latitude, Koyyam, 83.75^0 longitude and 18.15^0 latitude and Kalingapatnam 84.4 longitude and 18.3^0 latitude in the state of Andhra Pradesh on the east coast of India shown in Figure 1. At every landing center boats were randomly selected for every five consecutive days to collect data of landings by fishing gear, species, size, and sex from which mean daily landing was calculated. The total quantity of lobsters caught in each month was then computed by multiplying with mean

number of boats operating daily and the total number of days of fishing in a month. The total number of fishing days was found out by direct enquiry and based on these observations the total number of fishing days were

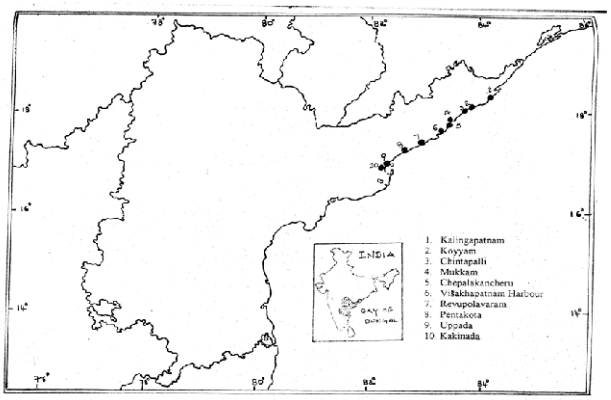


Figure 1: Study area of the Rock lobster fishery

The common fishing gear and fishing craft were used for rock lobster fishery were observed different mesh sized gill nylon nets, stretched surrounding the rocks over a large extent of area in such a way that the net extends underneath the rocks. Fishermen usually keep some bait to attract the lobsters. The fishermen usually go for fishing in afternoon hours for laying the nets and keep overnight. The common fishing craft used for this purpose are wooden boats, locally known as 'Padava' and 'Teppa'. In the early hours of succeeding day, fishermen remove the nets and the trapped lobsters are carefully separated and marketed. Before marketing, lobsters are graded basing on body size and body weight. Sometimes, the fishermen temporarily preserve the lobsters in sand pits dug in the intertidal zones, this makes the lobsters active and keeps them in a live condition. Fishery landings were noted from both the landing stations as well as the main marketing center at Visakhapatnam harbor and compared.

Results

At Visakhapatnam harbour, 10-15 boats, each boat carrying four to six fishermen carry out lobster fishing operations during the peak seasons from August through September up to February. But from March onwards the lobster fishery landings were reduced and accordingly only limited number of fishing craft were operated, only three to four boats were used during this period. In other fishing stations, 4-6 boats at Chepalakancheru, 6-8 boats each at Chintapalli and Koyyam and 10-12 boats at Kalingapatnam were of regular use in lobster fishing. The by catch in lobster fishery is mud crabs, which earn considerable returns to the fishing folk.

The important points of consideration are, the lobster resources in the coastal districts of Andhra Pradesh, the monthly lobster landings in all the fishing stations, seasonal influence, species wise distribution at different fishing stations and % composition of different species of lobsters at different fishing stations over a period of time (2010-2012).

S. No.	Months	Years Quantity in Kg		
		2010	**2011**	**2012**
1	January	672	707	1356
2	February	704	576	1090
3	March	447	479	666
4	April	246	339	566
5	May	162	227	342
6	June	307	224	248
7	July	463	432	327
8	August	574	916	1050
9	September	570	924	1264
10	October	690	860	1575
11	November	674	1126	1439
12	December	1037	1575	1819
	Total	6546	8388	11544

Table 1: Total landings of Lobsters from Andhra Pradesh coast

The landings of rock lobsters are shown in Table 1, Figures 2, 3 and 4. It is evident from the table and figures that there is a gradual but marginal increase in the lobster landings during the years 2010-2012. This increase in lobster landings is especially due to increased fishing efforts and improved marketing facilities at Visakhapatnam and improved facilities for transportation of live lobsters from the fishing stations to the market yards at Visakhapatnam. When the lobster landings are taken into consideration from different field stations, a gradual increase in the total landings were observed from southern field stations to northern areas. Maximum landings were observed at Kalingapatnam, Koyyam, Chintapalli and Visakhapatnam harbour, represented in Figures 2, 3 and 4. Greater lobster landings were associated with the beginning of monsoon through the post-monsoon periods. Minimum landings (7.10%) were observed during the summer months shown in Table 1 and Figures. 2, 3 and 4. This is true in all the fishing stations studied. Because of poor landings during the summer months, lobster fishing was totally stopped in certain fishing stations such as Pentakota, Uppada and Kakinada. Occasionally, lobsters were observed as by catch in these fishing stations.

Analysis of regression lines depicted in Figures 2, 3, 4 revealed that during the year 2010 (Figure 2, b) the significant fishery was noticed in *Panulirus longipes* (R^2=0.5254) among six different species at all the fishing stations, where as in 2011 (Figure 3, b) and 2012 (Figure 4, b) the regression values were represented for the species *P. longipes* recorded as R^2=0.994; R^2=0.2269 respectively.

When the species composition is taken into consideration, all the six species of lobsters, *Panulirus homarus*, *Panulirus ornatus*, *Panulirus polyphagus*, *Panulirus versicolor* were seen in fishing stations, Chepalakancheru, Mukkam and Chintapalli. An important point of consideration in the distribution of rock lobsters is that *P. penicillatus* was seen only in three fishing stations, Chepalakancheru, Mukkam and Koyyam where as *P. longipes* was observed in Visakhapatnam harbour, Chepalakancheru, Mukkam and Chintapalli. Unusual dominance in *P. penicillatus* landings were observed in the months of January and February 2012 and such fishery of *P. penicillatus* was never seen earlier. *P. longipes* was least

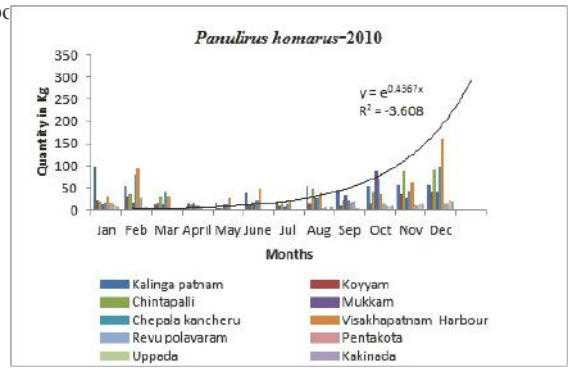
represented in all the fishing stations observed, the most dominant species were *P. homarus, P. ornatus,* and *P. polyphagus* were mentioned in Figure 2, 3 and 4.

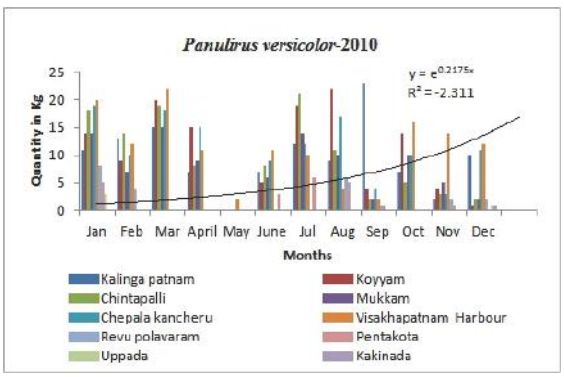
When the total lobster landings are taken into consideration and compared, *P. homarus* dominated other lobsters in their landings in all the three years of study represented in Table 1 and Figures 2, 3, and 4. *P. ornatus* occupied the second position followed by *P. polyphagus* in the % landings in all the three years of study. *P. longipes* was least represented when compared to other species were shown in Figures 2, 3, and 4.

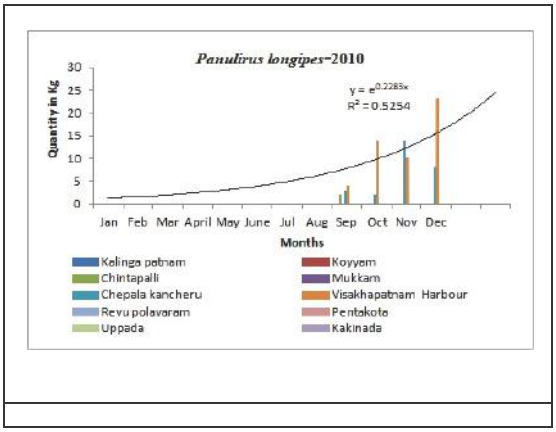
Discussion

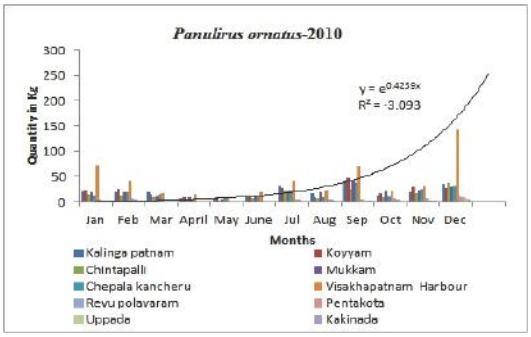
Commercial exploitation of the spiny lobsters in India began in the early 1950's but reliable data on landings were available only from 1968 (Radhakrishnan *et al.,* 2005). Lobster fishery has gained momentum from the beginning of 1990 when a separate market is established in the Visakhapatnam fishing harbor and when the demand for frozen lobster tails, boiled lobsters and for live lobsters increased in other countries. Lobsters are exported to other countries basing on the demand. Live lobsters are collected from different fishing stations, pooled and exported. Live lobsters are packed in cartoons after immobilizing the abdomen by means rubber band and air lifted to Chennai which is about 900 km from Visakhapatam. Chennai is the main export centre where lobsters from different places are pooled, packed and exported to other countries. Considerable information given by Vijayakumaran and Radhakrishnan (1997) on live transport and marketing of spiny lobsters in India

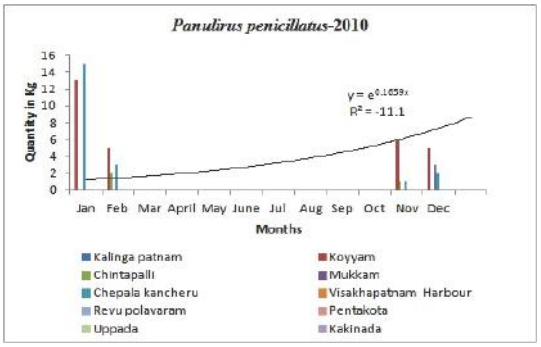
The present study revealed four common species, *Panulirus homarus, Panulirus polyphagus, Panulirus ornatus, Panulirus versicolor* and two relatively rare species of lobsters *Panulirus longipes and Panulirus penicillatus* contribute to the fishery landings. Lobster fishery became a traditional activity on the east coast of India from 1985 onwards. In general maximum fishing activity was seen during the monsoon and pc











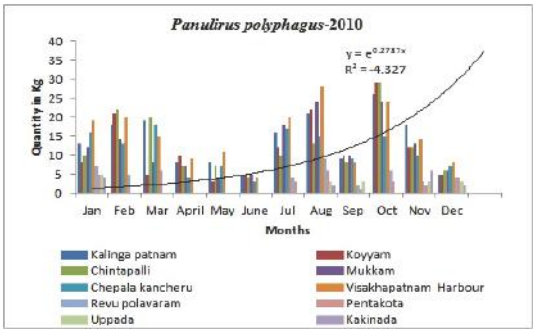


Figure 2. Landings of Six species of Rock lobsters from different fishing stations during the year 2010

monsoon periods corresponding to September through October, November and January. Large size lobsters were mostly seen during the post- monsoon period, while juveniles were mostly noticed during monsoon season this might be due to the availability of sufficient nutritious food to the organism during the post monsoon period, promoting moulting and growth.

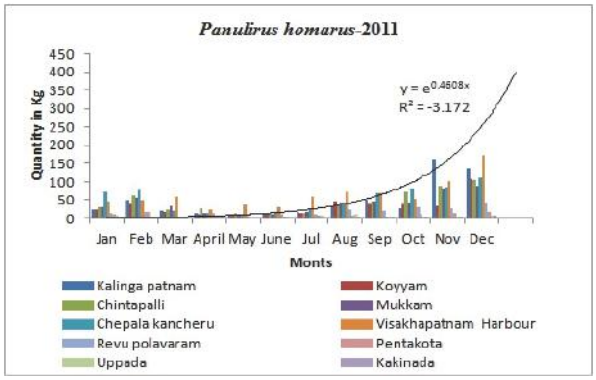


Fig. a *P. Homarus*

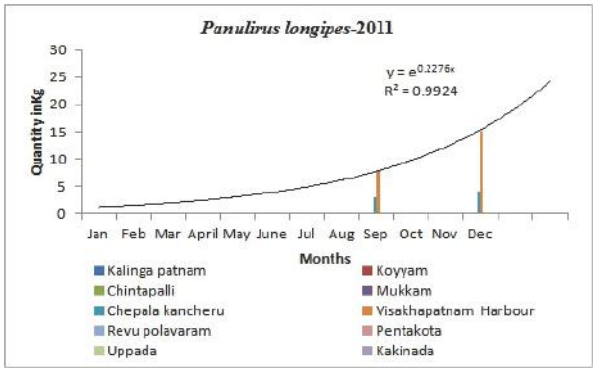


Fig. b *P. longipess*

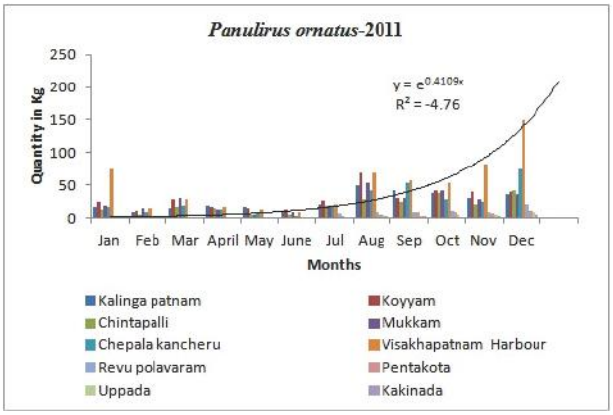


Fig. c.*P. ornatus*

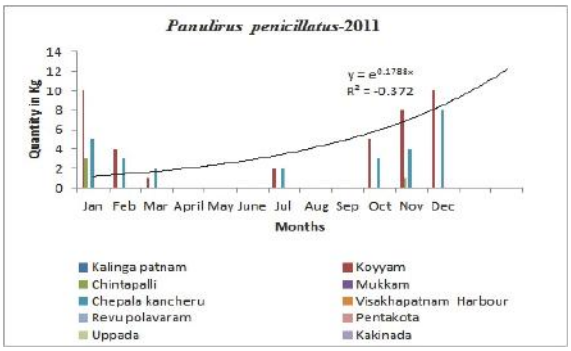


Fig. d.*P. penicillatus*

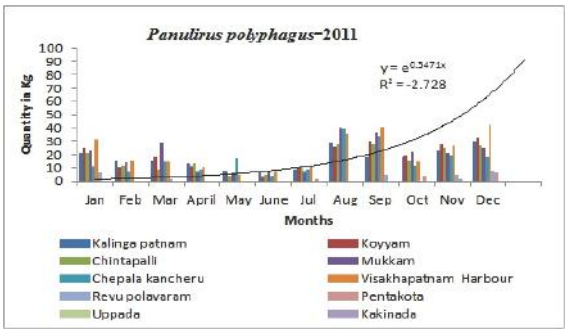


Fig. e.*P. polyphagus*

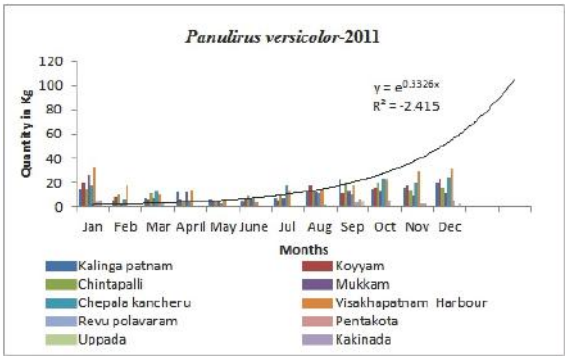


Fig. f. *P. versicolor*

Figure 3. Landings of Six species of Rock lobsters from different fishing stations during the year 2011

In the present observations, it has been found that *P. versicolor* and *P. homarus* are distributed both in the shallow as well as deep waters. *P. longipes* and *P. penicillatus* are not seen in near shore waters which are influenced by fresh water influxes. These two species are seen in deep rocky areas. It is also evident from the present observation that *P. penicillatus* is a migratory species and usually prefer to migrate during the post monsoon period. Considerable quantities of these are trapped as by catches in the trawl nets used for deep water fishes. It is also evident

that *P. penicillatus* is not regularly encountered, their landings dominated only in the months of January and February 2012.

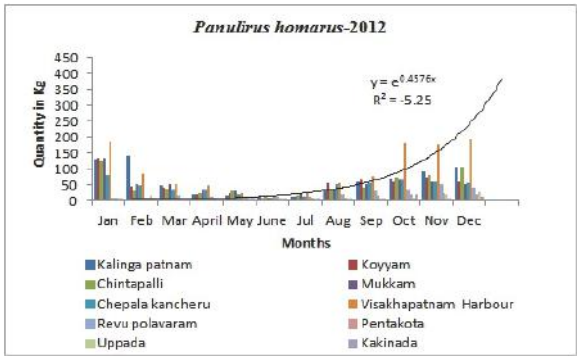


Fig. a *P. Homarus*

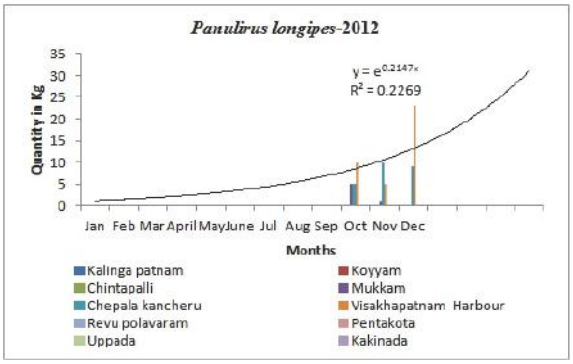


Fig. b *P. longipess*

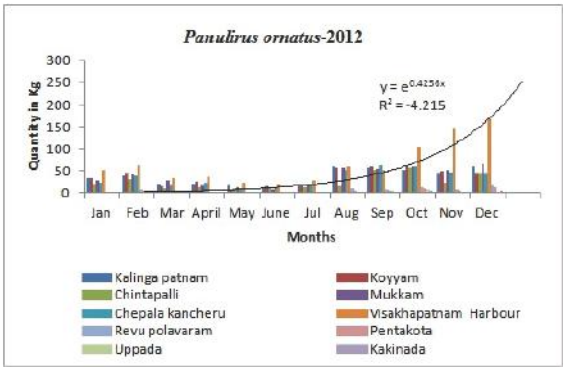


Fig. c.*P. ornatus*

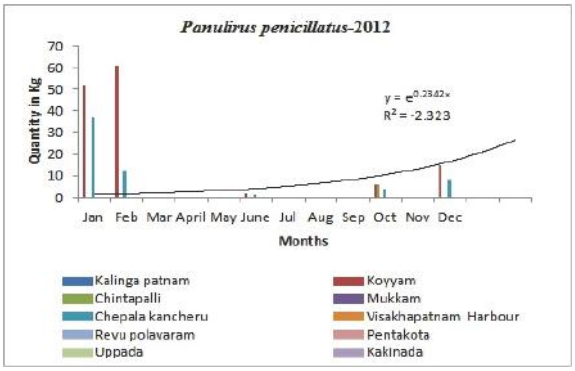


Fig. d.*P. penicillatus*

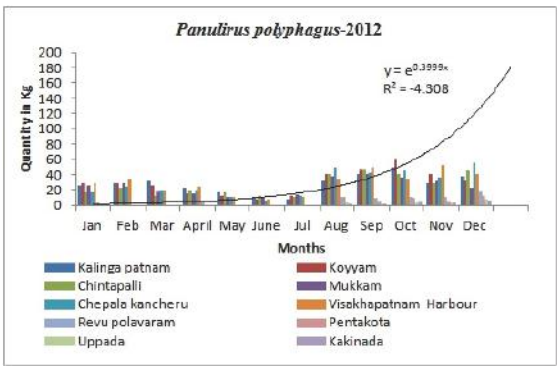


Fig. e.*P. polyphagus*

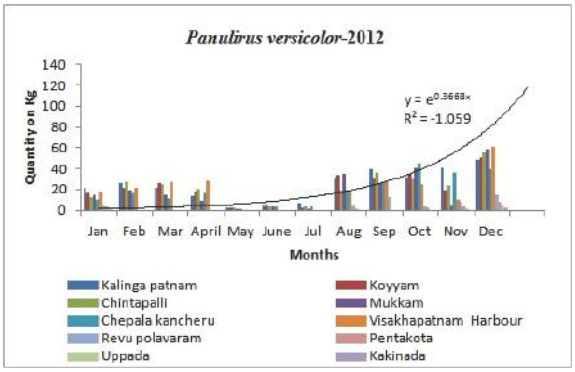


Fig. f. *P. versicolor*

Figure 4. Landings of Six species of Rock lobsters from different fishing stations during the year 2012.

The dominant rock lobsters that habituate crevices of the rocky boulders in sandy zones are *P. polyphagus*, *P. ornatus* and *P. homarus*. *P. versicolor* occurs in areas with more algal vegetation. *P. longipes* was seen mostly in association with rocky and sandy areas without freshwater influx. Fishing stations, situated south of Visakhapatnam have brackish water influence and these areas are relatively muddy, the lobsters distribution is relatively less in such areas. Lobster fishing is totally abandoned during the monsoon months when the salinity of the coastal waters drops quiet significantly. In spite of the fact that the southern areas are more productive in other fisheries, salinity plays a dominant role in the distribution of the rock lobsters; hence the lobster fishing was negligible in eastern areas. Season has a great influence on the lobster landings, good

quantity of these were noticed during the later part of monsoon and the post-monsoon periods of perennial rivers like Godavari.

The observations of present study was correlated with similar studies were made at Andaman island for lobster fishery by (Kumar *et al.,* 2010 , Kumar and Tembhre, 2010).

Conclusions

Six species of rock lobsters, *Panulirus homarus*, *Panulirus polyphagus*, *Panulirus versicolor*, *Panulirus ornatus*, *Panulirus penicillatus, Panulirus longipes*, were encountered in the present studies. The first four species are common and occur throughout the year but *Panulirus longipes* and *Panulirus penicillatus* are not very common distributed only towards the north coastal areas of Andhra Pradesh. Rock lobster fishing is a regular habit in fishing stations north of Visakhapatnam but seasonal fishing activity was observed south of Visakhapatnam.

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