CPUE of Different Fishing Gears Operated in Seasonal and Perennial Farms at Vypeen Island, Kerala

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Harvesting of shrimps in traditional filtration farms is being done periodically through sluice gate and other fishing methods like those with usage of gill net, cast net, drag net and hand picking. Six seasonal and six perennial farms were selected for studying the catch per unit effort of different harvesting systems employed in filtration shrimp farms in Vypeen island, Kerala State. The gear wise production from seasonal and perennial farms are discussed.

Trapping and holding shrimp and fish seeds in the seasonal (*pokkali)* and perennial fields through tidal influx is a traditional culture method practised in Kerala. In addition to auto stocking, additional stocking of the seeds is also carried out. The stock is harvested periodically through sluice gate filtration and other fishing methods such as those related to the operation of gill net, cast net, drag net and hand picking. Many studies to assess the yield from paddy fields and the rate of growth of the different shrimp species has been carried out by many workers (Panikkar, 1937; Menon, 1954, Gopinath, 1956; Panikkar and Menon, 1956; Raman and Menon, 1963; George *et al.*, 1968; George *et al.*, 1974, George and Brandt, 1975; Gopalan *et al.*, 1982; Verghese *et al.*, 1982, Jose *et al.*, 1987; Mathew and George, 1987; Kurup *et al.*, 1992; Mathew, 1993; Pillai and Krishnan, 1998; Chandramohan *et al.*, 1999; Purushan, 1995, 1996 a, b, and c, 1989; Unnithan, 1985, 2000; and Srinath *et al.*, 2000). However, the catch and catch per unit effort of different gears operated have not been worked out.

Harvesting is done mostly over a period of seven or eight nights, distributed on either side of the full moon and new moon days. In the case of perennial farms, in addition to the above, total harvest is carried out once in three months using different fishing gears.

Prawn filtration farms

Six seasonal fields and six perennial fields in Vypeen island (Ernakulam district, Kerala) were selected for the study. Fortnightly sampling of catch was done from the sluice nets during each lunar phase for a period of 18 months from December 1999 to April 2001. The catch and weight of different species of shrimp caught in different fishing gears viz, Sluice net, gillnet, cast net, and also by handpicking , were recorded separately for each fishing method. The shrimp production from each farm by different gears was estimated based on 10 % random sample in the case of cast net and gill net and for handpicking and sluice net. Total catches of the gear were also collected separately for each of the study units. Details were also collected from the register maintained separately for this purpose by the lessee of the respective farms. In the case of gill net the total catch is presented as catch (kg) obtained per 1,000 m^2 of netting per hour (kg. 1,000 $m^2.h^{-1}$ and in $kg.ha^{-1}$), cast net (kg. cast h^{-1} and $kg.ha^{-1}$), bag net ($kg.h^{-1}$ and $kg.ha^{-1}$) and in the case of hand picking it is given as catch in $kg.h^{-1}$ $person^{-1}$, species-wise total catch and average yield from each farm and contribution of each gear in the total catch were also calculated.

Gear-wise catch per unit effort

Gear-wise operation and total production from different harvesting methods from seasonal farms and perennial farms are given in Table 1 & Table 2. respectively.

Seasonal farms

Sluice net : Sluice nets were operated throughout the season from December to April every year. The average catch of shrimps from sluice net in the seasonal farm, varied from 25.9 $kg.operation^{-1}$ to 103.9 $kg.operation^{-1}$ during 1999-2000 whereas it varied from 22.9$kg.operation^{-1}$ to 85.7 kg.operation-^{1} during 2000-01.

Gill net: Gill nets were operated only during the end of the season, during February and March. The average production of shrimps from gill net varied from 1.85 kg.1000 $m^{-2}.h^{-1}$ to 2.83 $kg.1000\ m^{-2}.h^{-1}$. The catch rate of shrimps from gill net was 10.14 $kg.ha^{-1}$ in 1999-2000 and it increased to 11.38 $kg.ha^{-1}$ in 2000-01.

Cast net: Cast nets were also operated only during the end of the season. The average production of shrimps from cast net varied from 1.54 $kg.unit^{-1}$ to 1.62 $kg.unit^{-1}$ during

Table 1. Gear-wise average catch per unit effort from seasonal farms

Harvesting method	Sluice Net			Gill Net			Cast Net			Hand Picking		
Period	No. of Operations	kg. operation^{-1}	Total ($kg.ha^{-1}$)	No. of Units	(kg. 1000 m^2)	Total ($kg.ha^{-1}$)	No. of Units	($kg.unit^{-1}$)	Total ($kg.ha^{-1}$)	No. of Persons	($kg.person^{-1}$)	Total ($kg.ha^{-1}$)
Two seasons Dec : 1999 to Apr 2000 and Dec 2000 to Apr 2001	621	62	371	359	2	11	71	2	2	588	4	12

Table 2. Gear-wise average catch per unit effort from perennial farms

Harvesting method	Sluice Net			Gill Net			Cast Net			Hand Picking		
Period	No. of Operations	kg. operation^{-1}	Total ($kg.ha^{-1}$)	No. of Units	(kg. 1000 m^2)	Total ($kg.ha^{-1}$)	No. of Units	($kg.unit^{-1}$)	Total ($kg.ha^{-1}$)	No. of Persons	($kg.person^{-1}$)	Total ($kg.ha^{-1}$)
Nov 1999 – Apr 2001	816	43	137	1930	4	29	1388	4	20	1042	2	13

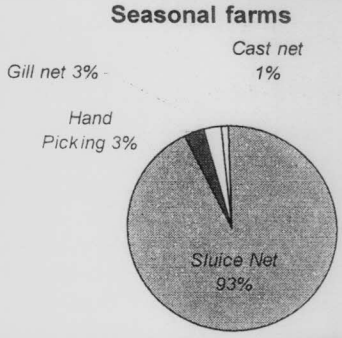

Fig. 1: Catch composition from different fishing gears in seasonal farms

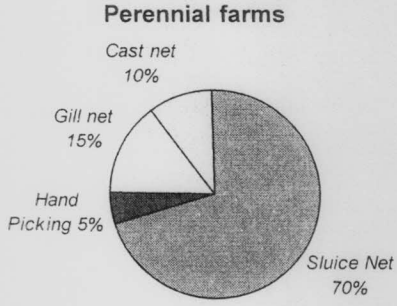

Fig. 2: Catch composition from different fishing gears in perennial farms

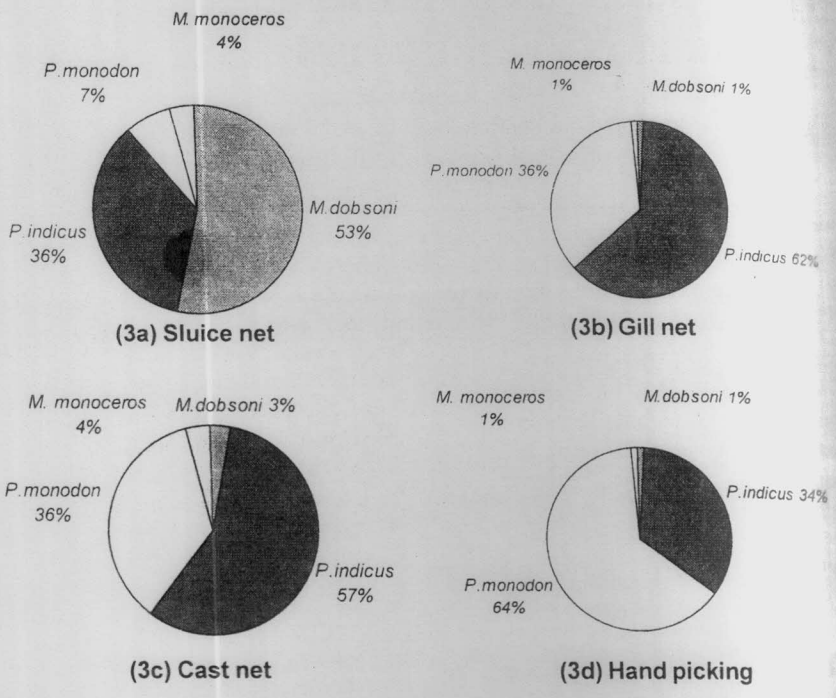

Fig. 3 (a to d): Species composition of shrimps from different gears in seasonal farms

1999-2000 and 2000-01 respectively. The catch rate of shrimps from cast net varied from 1.96 kg.ha^{-1} to 3.03 kg.ha^{-1}, in the two seasons.

Hand picking: Similarly, hand picking was carried out during the fag end of the season. The catch per unit of shrimps by hand picking varied from 5.72 kg.person^{-1} h^{-1} to 3.26 kg. person^{-1} h^{-1} and the catch rate of shrimps by handpicking was 17.0 kg.ha^{-1} to 7.2 kg.ha^{-1} for 1999-2000 to 2000-01 respectively.

Perennial farms

Sluice net : The average catch of shrimps from sluice net in the perennial field, varied from 10.4 kg. operation^{-1} to 78.9 kg. operation^{-1} during the period.

Gill net: Gill nets were operated during most of the months with higher intensity during February, April and May coinciding with the final harvesting periods. The average catch per unit effort from gill net varied from 0.47 kg. 1000 m^{-2} h^{-1} to 3.93 kg. 1000 m^{-2} h^{-1}. The average production of shrimps in gill net from perennial farms was 39.1 kg.ha^{-1}.

Cast *net:* Cast nets were also operated for the final harvest along with gill nets. The average catch per unit effort of shrimps from cast net varied from 1.23 kg.unit^{-1} to 4.73 kg.unit^{-1} . An average production of 26.7 kg.ha^{-1} was obtained in cast nets during the period of study.

Hand picking: Hand picking was carried out only during the end of the season. The catch per unit of shrimps caught by hand picking varied between 1.33 kg.person^{-1}h^{-1} and 1.69 kg.person^{-1} h^{-1}. and the average of production of shrimps varied from 1.5 kg.ha^{-1} to 11.6 kg.ha^{-1}.

Catch and species composition from different fishing gears

The catch composition from different harvesting techniques in seasonal and perennial farms is shown in Fig. 1 and Fig. 2 respectively. The species composition of shrimps from different fishing gears in seasonal and perennial farms is shown in Fig. 3 and Fig 4 respectively. The shrimp species were *Metapenaeus dobsoni, Penaeus indicus, M. monoceros* and P. *monodon* (Locally called as *Thelly, Choodan, Naran* and *Kara Chemeen*, respectively). Fishes like *Mugil* spp., *Chanos* sp., *Etroplus* sp, tilapias, catfishes and a few other species of miscellaneous groups *(Ambasis* sp., *Barbus* sp. *Cyprinoides* sp., *Anchoviella sp, Therapon* sp., etc.) and crab *(Scylla serrata)*, were also obtained mainly in the perennial farms.

In seasonal farms, the catch of shrimps dominated in the sluice net (93 %) followed by gillnet and handpicking (3 %) and cast net (1%). In perennial farms the shrimp catch was dominant in the sluice net (70 %). The contribution of shrimps in gill net (15%) and cast net (10 %) and hand picking (5%) was higher when compared to seasonal farms. This was mainly due to comparatively larger size of the perennial farms and shrimp harvesting by filtration alone is not possible and therefore fishing with other gear is more than that of the seasonal farms. The percentage composition of shrimps caught in the sluice gate in the case of perennial farms was much less compared to the seasonal farms. This was mainly due to comparatively larger size of the perennial farms and shrimp harvesting by filtration alone is not possible and therefore intensity of operation with other gear is more than that of the seasonal farms.

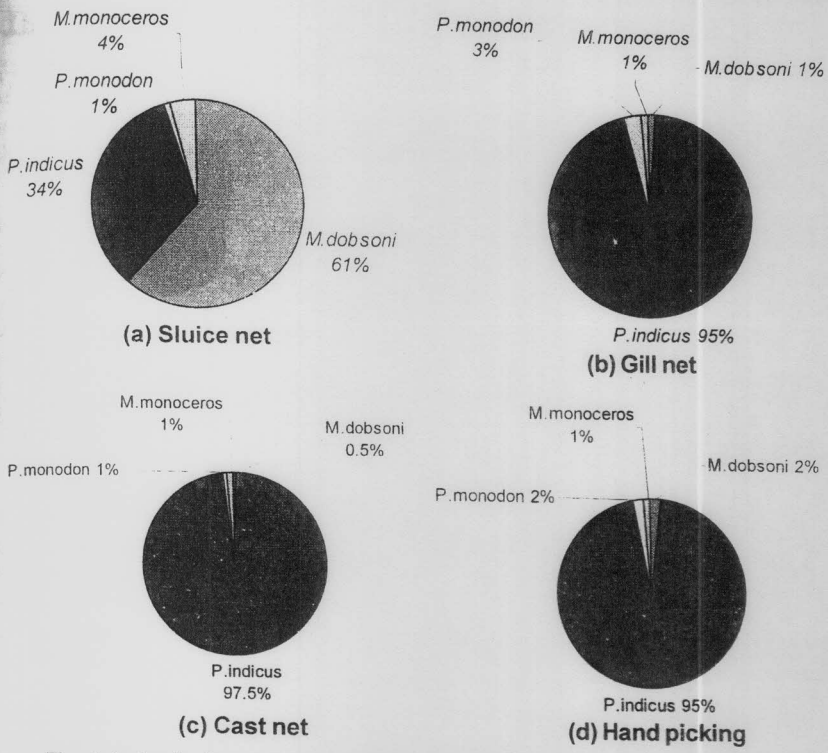

Fig. 4 (a to d): Species composition of shrimps from different gears in Perennial farms

Conclusion

Harvesting techniques employing electric trigger mechanism, in order to bring out shrimps buried in mud, holds potential for development, as traditional methods such as sluice net, gill net, cast net and hand picking techniques, are not 100% efficient in retrieval of shrimps from shrimp farms. Problems in harvesting farmed shrimp are often encountered in the ponds which are not fully drainable as the complete retrieval of the stock cannot be carried out. Different methods of harvesting such as sluice net operation, cast netting, gill netting, complete draining of farm and hand picking are employed at different stages. Harvesting is a labour intensive operation in any aquaculture system. The success of shrimp farming to a great extent depends upon the efficiency of harvesting. As natural stocking of shrimp seed is very less, the farmers stock the ponds with quality seeds of P *monodon* and *P indicus* to increase production so as to make profit. The total catch per unit effort $kg.h^{-1}$ of different gears from the perennial farms was relatively less than that of the seasonal farms. As the perennial farms are of much larger size and deeper as compared to the seasonal farms, the shrimps in the seasonal farms can be easily caught by finally draining the pond, but the perennial farms cannot be drained out fully due to their larger size, and the shrimps are not easily caught by filtration alone and therefore other fishing techniques like those using gill net, cast net, drag net and hand picking will have to be carried out periodically to harvest maximum quantity of shrimps from the ponds. Harvesting techniques employing electric trigger mechanism, in order to bring out shrimps buried in mud, holds potential for development, as traditional methods such as sluice net, gill net, cast net and hand picking techniques are not 100% efficient in retrieval of farmed shrimps from the shrimp farm.

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Organic Aquaculture Programme on the Anvil in India

The Marine products Export Development authority (MPEDA) aims to implement organic aquaculture in India through technical collaboration with the Swiss Import Promotion Programme (SIPPO). A Memorandum of Understanding (MoU) was signed between MPEDA and SIPPO in this regard.

The brackishwater area available in India for shrimp farming includes the existing traditional shrimp filtration fields located in West Bengal (46,100 ha) and Kerala (10,700 ha). These vast areas are actually paddy fields, belonging to entrepreneurs who carry out salt-resistant paddy cultivation by themselves and later auction the area, after paddy cultivation, for seasonal traditional shrimp cultivation by filtration when the water becomes saline due to inundation. The traditional type of filtration system is highly environment-friendly as no antibiotics or chemicals are used; hence the system is well suited for promotion of organic aquaculture.

Organic aquaculture ensures that the farming activity is in harmony with nature, with due care for the good health and welfare of the cultured organisms. Organic products have become very popular recently due to a rise in health and environmental awarness and concerns on food safety and there is a growing demand for organic products in developed countries, especially USA, EU, etc. Organic products also command an attractive premium in the international markets.

The proposal submitted by MPEDA to the Ministry of Commerce and Industry envisages the implementation of an organic aquaculture project for brackishwater shrimp (*Penaeus monodon*) and the freshwater giant prawn (*Macrobrachium rosenbergii*) in the States of Kerala, West Bengal and Andhra Pradesh, initially. SIPPO will extend technical assistance which would include a few training programmes followed by demonstration of organic tiger shrimp and freshwater prawn culture in Kerala and Andhra Pradesh.