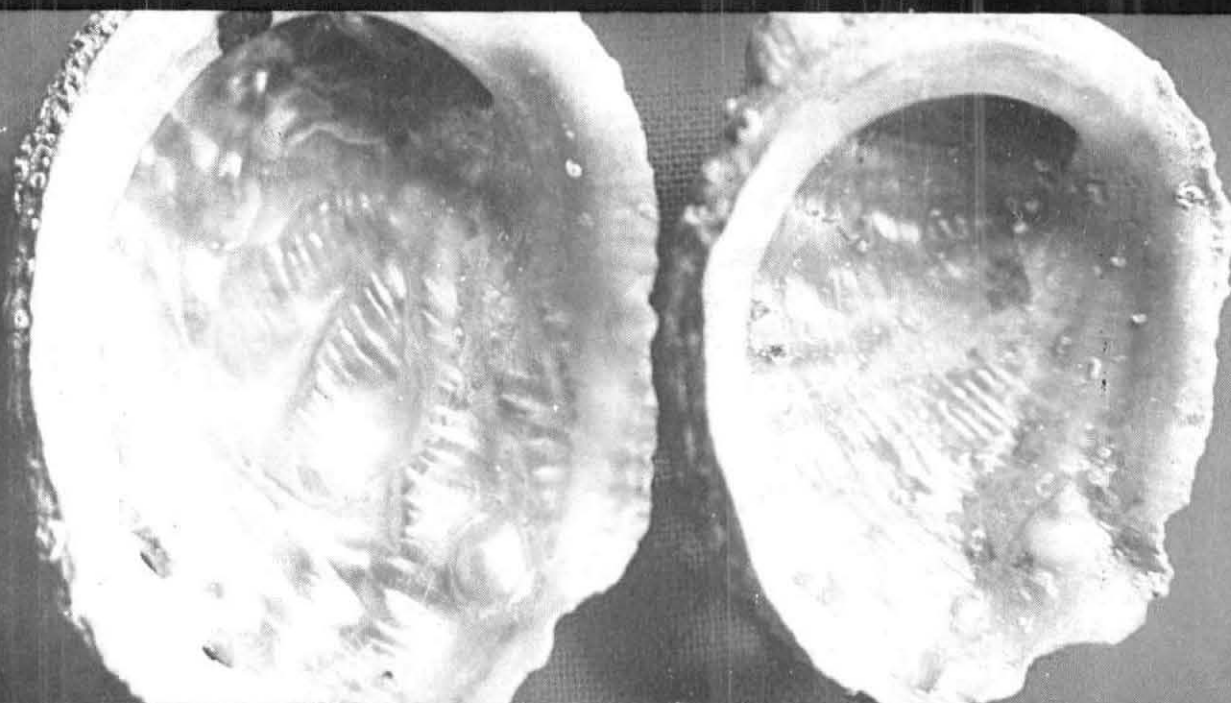




# MARINE FISHERIES INFORMATION SERVICE

No. 170

October, November, December 2001



TECHNICAL AND EXTENSION SERIES

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN, INDIA

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)

The enterprising small and medium shrimp trawler operators of Kerala ventured into deep sea fishing for the first time in November 1999 defying the longheld concept that deep sea prawn resources could be harvested only by means of large trawlers. This endeavour proved successful with the realisation of 25,647 t of deep sea prawns in the first fishing season lasting between November '99 and May 2000. The catch/hr of trawling was estimated as 53 kg against 6 kg of coastal species obtained for the inshore prawn fishery during the same period. A detailed account of the fishery and

biology of deep sea prawns of the period November '99 - March 2000 was given by Rajan *et al.* [(*Mar. Fish. Infor. Serv. T & E Ser.*, 168, 2001).

The deep sea prawn fishery in the second season of exploitation (2000-'01) was closely monitored to study the impact of trawling on this resource and the present communication gives the result of this study. Future prospects of this important commercial fishery along Kerala coast with possible management measures are discussed.

Though trawling operations were mainly concentrated in the 'Quilon Bank', some of the trawlers based at Munambam and Kochi fisheries harbour carried out targeted fishing for the prime prawn species *Aristeus alcocki* (Red Ring) in deeper waters beyond 400 meters off Kanyakumari in the south and Beypore in the north. Some medium sized trawlers based at Mangalore shifted the base of operations to Kochi and concentrated on fishing for high priced 'Red ring'. In the last fishing season, one fishing trip generally lasted for 2 to 3 days whereas, in the following season (2000-2001) the fishing vessels stayed over 5 to 6 days per trip, mainly due to poor returns.

Trawling operations commenced early in September, 2000 at Kochi, Munambam and Sakthikulangara-Neendakara. Because of the presence of juvenile prawns in large numbers in the fishery and consequent fall in prices, the industry voluntarily declared a ban on fishing in September and October. Regular operations commenced in November and continued upto March 2001 only. Deep sea prawn landings at Munambam, Kochi and Sakthikulangara-Neendakara together accounted for almost the entire fishery in Kerala. The landings at these centres accounted for 10,042 t, the catch/hr being 31 kg/hr of trawling (Table 1). 64.4% of the fishery was contributed by Sakthikulangara-Neendakara followed by 25.8% by Munambam and 9.8% by Kochi. *M. andamanensis* (33.60%) was the dominant constituent of the fishery followed by *H. woodmasoni* (25.46%), *A. alcocki* (15.33%), *H. gibbosus* (14.46%) and *P. spinipes* (9.15%). Other species such as *P. martia*, *P. jerryi*, *P. investigatoris* and *P. hextia* were caught in small quantities.

Data on size composition, sex ratio and breeding population of the dominant constituents were collected from all centres and the pooled data are presented here.

Monthwise, species-wise and sex-wise data on size range, dominant size, sex ratio and breeding stock are presented in Table 2. Major departures in the biological characteristics from the previous season (1999-2000) are as follows.

*H. woodmasoni* : 51 to 130 mm size classes supported the fishery, whereas in the previous season sizes below 71 mm were totally absent. Size classes below 91 mm contributed to 19% of the overall fishery in this season, whereas in the previous season this group supported only 2%. Percentage contribution of berried females in the total landings declined from 79.3 in 1999-2000 to 56.5 in this season.

*H. gibbosus* : The fishery was supported by 51-150 mm size classes in 2000-'01 season against 91-140 in the previous season. Juveniles below 100 mm in total length supported 9% of the fishery against 5% in the previous season. However, berried prawns were observed more in number in 2000-'01 season.

*P. spinipes* : Size range of this species in the fishery during 2000-'01 season was 71-125 mm and sizes were almost similar in both seasons except a slight domination of juvenile population (3%) in 2000-'01. Percentage contribution of berried prawns in the fishery declined from 73 in 1999-2000 to 57 in the present season.

*M. andamanensis* : 66-135 mm sizes were represented in the fishery in 2000-'01 against 71-100mm sizes in the previous season. Prawns below 91 mm contributed to 48% of the fishery in 2000-'01, whereas in 1999-2000 season this size group formed only 26%.

*A. alcocki* : The fishery was generally dominated by higher size groups between 131-175 mm in females against 126-150 mm in the previous year. Males above 100 mm were common in the catch in 2000-'01.

Spawners formed 71% in 2000-'01 against 58.3% in the previous season.

Deep sea prawn fishery in Kerala during 2000-'01 widely differed from the previous season (1999-2000) in catch, effort, catch rate, species composition and biological characteristics of component species. The overall catch in 2000-'01 heavily declined by 15,605 t, over the previous season, the shortfall being 61%. The catch declined in all the fishing centres and the centrewise decline was 26% at Munambam, 77% at Kochi and 64% at Sakthikulangara-Neendakara. The overall catch/hr of trawling decreased drastically to 31 kg in 2000-'01 against 53 kg in the previous season, the percentage decline being 42. The catch rate also went down by 57% at Munambam, 61% at Kochi and 28% at Sakthikulangara. As the fishing days per trip was more during 2000-'01, the catch per boat trip showed a slight improvement of 13% over the previous season which is in the expected lines.

The overall fishing effort in terms of trawling hours in 2000-'01 declined by 33%. The centre wise decline was 41% at Kochi, 49% at Sakthikulangara-Neendakara. However, at Munambam the effort improved by 73%. Fishing operations in 1999-2000 extended upto May whereas, in the following season the activities ceased by March because of fall in prawn catch.

The catch of all deep sea prawn species declined in 2000-'01 season, with the shortfall more pronounced in pandalid prawns. *H. woodmasoni* landings declined by 73%, *P. spinipes* by 86% and *H.gibbosus* by 66%. In penaeid prawns the decline was only marginal and catch of *M. andamanensis* and *M. alcocki* declined by 3 and 10% respectively. Targetted fishing for the prime species of *A. alcocki* in deeper waters off Kanyakumari has yielded good returns for trawlers based at Munambam.

Species composition of deep sea prawn fishery in 2000-'01 showed wide fluctuations in comparison with the previous season (Fig.1). Pandalid prawns contributed to 78% of the deep sea prawn fishery in 1999-2000, major contributors being *H.woodmasoni* (37%), *P. spinipes* (26%) and *H. gibbosus* (15%). The contribution of pandalid prawns in 2000-'01 declined to 49%. Both *H.woodmasoni* (25%) and *P. spinipes* (9%) registered heavy decline in the percentage contribution whereas, the share of *H. gibbosus* remained almost the same in both seasons (14%). Penaeid prawn *M.andamanensis* contributed to 34% of the fishery in 2000-'01 against 14% in the previous season. The share of *A.alcocki* improved by 9% in the present season mainly due to operation of some of the boats in deeper grounds beyond 400m off Kanyakumari and Beypore targeting for larger varieties of deep sea prawns.

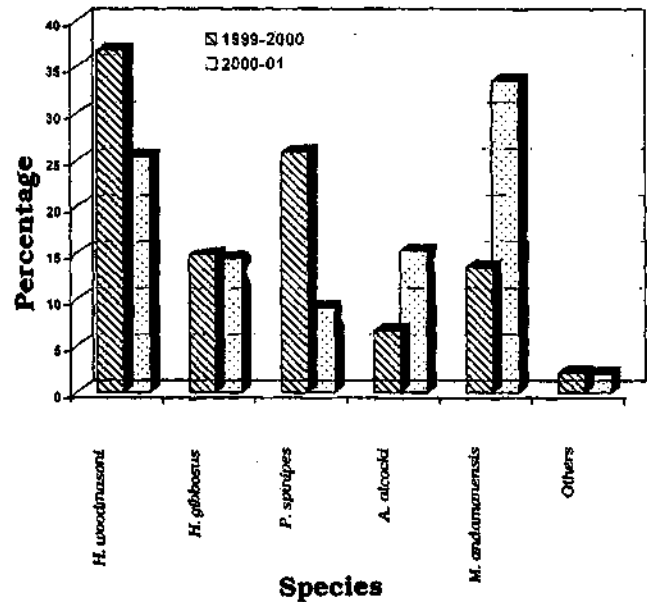


Fig.1 Specieswise percentage contribution of deep sea prawns fishery of Kerala during 1999-2000

Pandalid prawn fishery in 1999-2000 was mostly supported by adult prawns. But in

the following fishing season of 2000-'01, juveniles were present in good numbers and they formed 19% of the fishery in *H. woodmasoni*, 9% in *H. gibbosus* and 24% in *P. spinipes*. Percentage contribution of berried prawns declined by 22.8% in *H. woodmasoni* and 15.6% in *P. spinipes*. In the case of penaeid prawn *M. andamanensis* juveniles formed 48% of the fishery.

While discussing the future prospects of deep sea prawn fishery along Kerala coast it is predicted that the catch rate are likely to decline in the ensuing season due to the virgin nature of the fishing ground and the biological limitations, such as slow growth rate, low fecundity and long life span of deep sea prawns.

Drastic reduction in the overall catch and catch rate in the deep sea prawn fishery of 2000-01 season, heavy decline in the contribution of pandalid prawns, abundance of juveniles in pandalid as well as penaeid prawn catch and decline in the

percentage composition of berried prawns, concretely point out that the deep sea prawn stock is facing over exploitation in the second year of the fishery itself. The fishing pressure is to be drastically reduced by minimising the number of trawlers operated for deep sea prawn fishery. Attempts should be made to explore new trawling grounds beyond the intensively exploited 'Quilon Bank'. Availability of the prime species, *A. alcocki* in fairly large quantities for a few vessels in deeper waters off Kanyakumari and Beypore is an encouraging trend in this direction.

Deep sea prawns are easily susceptible to spoilage. Except hard shelled *Heterocarpus* species, all other prawns were landed in partially spoiled condition after long fishing trips. Post harvest technology should be upgraded for on board preservation of the deep sea prawns to maximize the profit to this industry which is facing a crisis due to depletion of the stock.

TABLE 1. Details of deep sea prawn fishery along Kerala coast during 1999-2000, 2000-2001

| Particulars                      | Munambain             |                        | Kochi fisheries harbour |                        | Sakthikulangara        |                        | Total         |               |
|----------------------------------|-----------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|---------------|---------------|
|                                  | Nov. '99-<br>Mar. '00 | Sep. 2000-<br>Mar. '01 | Nov. 1999-<br>Mar. '00  | Sep. 2000-<br>Mar. '01 | Nov. 1999-<br>Mar. '00 | Sep. 2000-<br>Mar. '01 |               |               |
|                                  |                       |                        |                         |                        |                        |                        | 1999-2000     | 2000-'01      |
| No. of boat trips                | 2949                  | 2337                   | 3051                    | 1064                   | 28434                  | 9112                   | 35034         | 12513         |
| Trawling hrs.                    | 60096                 | 104187                 | 69995                   | 41311                  | 357102                 | 181091                 | 487193        | 320589        |
| Deep sea prawn catch (t)         | 3483                  | 2591                   | 4348                    | 982                    | 17816                  | 6469                   | 25647         | 10042         |
| Catch/boat trip (kg)             | 1181                  | 1109                   | 1191                    | 923                    | 627                    | 710                    | 732           | 803           |
| Catch/hr (kg)                    | 58                    | 25                     | 62                      | 24                     | 50                     | 36                     | 53            | 31            |
| <b>Specieswise catch (t)</b>     |                       |                        |                         |                        |                        |                        |               |               |
| <i>Heterocarpus woodmasoni</i>   | 1193 (34.3%)          | 438 (16.9%)            | 1582 (36.4%)            | 171 (17.4%)            | 6666 (37.41%)          | 1948 (30.11%)          | 9441 (36.81%) | 2557 (25.46%) |
| <i>H. gibbosus</i>               | 505 (14.5%)           | 289 (11.2%)            | 779 (17.9%)             | 258 (26.3%)            | 2547 (14.30%)          | 905 (13.99%)           | 3831 (14.94%) | 1452 (14.40%) |
| <i>Plesionika spinipes</i>       | 1131 (32.5%)          | 550 (21.2%)            | 974 (22.4%)             | 98 (10.0%)             | 4539 (25.48%)          | 271 (4.19%)            | 6644 (25.91%) | 919 (9.15%)   |
| <i>P. murina</i>                 | 14 (0.4%)             | 8 (0.3%)               | 1 (-)                   | 4 (0.4%)               | 62 (0.35%)             | -                      | 77 (0.30%)    | 12 (0.12%)    |
| <i>Aristeus alcocki</i>          | 164 (4.7%)            | 369 (14.2%)            | 637 (14.7%)             | 234 (23.8%)            | 910 (5.11%)            | 936 (14.4%)            | 1711 (6.67%)  | 1539 (15.33%) |
| <i>Metapenaeus andamanensis</i>  | 450 (12.9)            | 769 (29.7%)            | 289 (6.6%)              | 198 (20.29%)           | 2739 (15.37%)          | 2407 (37.21%)          | 3478 (13.56%) | 3374 (33.60%) |
| <i>Penaeopsis jerryi</i>         | 23 (0.6%)             | 160 (6.2%)             | 14 (0.3%)               | 19 (1.9%)              | 251 (1.41%)            | -                      | 288 (1.12%)   | 179 (1.78%)   |
| <i>Pumpenetus truesdallianus</i> | -                     | 8 (0.3%)               | -                       | -                      | -                      | -                      | -             | 8 (0.08%)     |
| <i>Solenocera hextil</i>         | 3 (0.1%)              | -                      | 72 (1.7%)               | -                      | 102 (0.57%)            | 2 (0.03%)              | 177 (0.69%)   | 2 (0.02%)     |

No trawling in October 2000

TABLE 2. Biological characteristics of deep sea prawns

|                                    | Male            |                    | Female          |                    | Sex ratio (%) |        | Berried females (%) |
|------------------------------------|-----------------|--------------------|-----------------|--------------------|---------------|--------|---------------------|
|                                    | Size range (mm) | Dominant size (mm) | Size range (mm) | Dominant size (mm) | Male          | Female |                     |
| <i>Heterocarpus woodmasoni</i>     |                 |                    |                 |                    |               |        |                     |
| Sep. 2000                          | 66-125          | 106-120            | 66-120          | 106-120            | 53.9          | 46.1   | 73.4                |
| Nov. 2000                          | 76-120          | 96-115             | 66-120          | 96-115             | 50.4          | 49.6   | 42.4                |
| Dec. 2000                          | 51-125          | 96-120             | 56-125          | 66-80 & 101-105    | 48.1          | 51.9   | 33.7                |
| Jan. 2001                          | 66-120          | 91-110             | 76-125          | 106-120            | 27.5          | 72.5   | 51.7                |
| Feb. 2001                          | 81-125          | 101-120            | 76-125          | 101-115            | 57.8          | 42.2   | 79.6                |
| Mar. 2001                          | 66-130          | 101-120            | 66-130          | 106-125            | 49.5          | 50.5   | 61.9                |
| Total                              | 51-130          | 96-120             | 56-130          | 96-120             | 50.2          | 49.8   | 56.5                |
| <i>Heterocarpus glibbosus</i>      |                 |                    |                 |                    |               |        |                     |
| Sep. 2000                          | 91-125          | 106-120            | 101-135         | 116-130            | 62.5          | 37.8   | 17.6                |
| Nov. 2000                          | 76-125          | 96-115             | 81-140          | 101-125            | 44.6          | 55.4   | 19.4                |
| Dec. 2000                          | 91-130          | 106-120            | 91-140          | 106-125            | 54.4          | 45.6   | 25.0                |
| Jan. 2001                          | 81-150          | 101-125            | 76-140          | 106-135            | 47.0          | 53.0   | 43.7                |
| Feb. 2001                          | 91-130          | 106-125            | 91-145          | 111-130            | 47.1          | 52.9   | 76.9                |
| Mar. 2001                          | 51-130          | 101-125            | 56-130          | 106-130            | 38.3          | 61.7   | 77.3                |
| Total                              | 51-150          | 96-125             | 56-145          | 101-135            | 46.6          | 53.4   | 58.0                |
| <i>Plesionika sputipes</i>         |                 |                    |                 |                    |               |        |                     |
| Sep. 2000                          | 76-110          | 91-105             | 81-115          | 96-110             | 48.2          | 51.8   | 56.8                |
| Nov. 2000                          | 81-110          | 101-110            | 91-115          | 96-105             | 46.7          | 53.3   | 31.3                |
| Dec. 2000                          | 71-110          | 81-105             | 81-120          | 96-110             | 45.8          | 54.2   | 57.1                |
| Jan. 2001                          | 71-115          | 91-105             | 81-115          | 91-105             | 42.9          | 57.1   | 77.6                |
| Feb. 2001                          | 71-115          | 86-105             | 81-120          | 91-110             | 35.8          | 64.2   | 73.6                |
| Mar. 2001                          | 71-115          | 81-105             | 71-125          | 86-115             | 43.2          | 56.8   | 28.5                |
| Total                              | 71-115          | 81-110             | 71-125          | 86-115             | 42.6          | 57.4   | 47.7                |
| <i>Metapenaeopsis andamanensis</i> |                 |                    |                 |                    |               |        |                     |
| Sep. 2000                          | 66-105          | 81-90              | 71-115          | 81-95              | 40.6          | 59.4   | -                   |
| Nov. 2000                          | 76-115          | 91-110             | 81-135          | 86-105             | 36.8          | 63.2   | -                   |
| Dec. 2000                          | 71-130          | 76-95              | 71-130          | 76-100             | 45.6          | 54.4   | 1.3                 |
| Jan. 2001                          | 76-130          | 86-105             | 76-130          | 91-120             | 39.7          | 60.3   | 3.3                 |
| Feb. 2001                          | 66-125          | 81-100             | 66-130          | 81-105             | 44.0          | 56.0   | 4.9                 |
| Mar. 2001                          | 76-125          | 81-100             | 76-130          | 81-100             | 41.7          | 58.3   | 1.0                 |
| Total                              | 66-130          | 76-105             | 66-135          | 76-120             | 43.1          | 56.9   | 2.5                 |
| <i>Aristeus alcocki</i>            |                 |                    |                 |                    |               |        |                     |
| Dec. 2000                          | 81-115          | 86-110             | 106-190         | 131-160            | 13.3          | 86.6   | 72.4                |
| Jan. 2001                          | 81-105          | 91-100             | 116-180         | 151-170            | 11.5          | 88.5   | 87.0                |
| Feb. 2001                          | 81-100          | 91-95              | 126-185         | 146-170            | 16.3          | 83.7   | 66.7                |
| Mar. 2001                          | 76-115          | 86-110             | 116-190         | 141-175            | 10.8          | 89.2   | 65.7                |
| Total                              | 76-115          | 86-110             | 106-190         | 131-175            | 12.5          | 87.5   | 71.1                |