# ON THE MEAT CONTENT OF *PORTUNUS PELAGICUS* WITH SOME OBSERVATIONS ON LUNAR PERIODICITY IN RELATION TO ABUNDANCE, WEIGHT AND MOULTING

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ABSTRACT

Study shows that the male crabs of *Portunus pelagicus* contain more meat than feamles. Crab catches were relatively good during the new moon phase than during the full moon phase. The variation in the weight of *P. pelagicus* during the two moon phases is much less. The recently-moulted crabs in the commercial catches were relatively more during the new moon phase than in full moon period.

## INTRODUCTION

The yield of meat from physically-partioned whole, raw crab, *Portunus pelagicus* Linnaeus was studied by Badawi (1971) in Alexandria, Egypt. Apart from this, the meat content in this species has not been studied in detail. The present account gives the percentage meat content in different size groups of both males and females of *P. pelagicus* caught by the gill and trawl nets.

Our knowledge about the influence of lunar periodicity on the crab abundance, weight and mounlting is very poor. However, the fluctuations in prawn landings in relation to the lunar, diurnal and tidal periodicity have been studied by several authors. Racek (1959) found a distinct lunar and diurnal abundance in the prawn catches while studying the prawn fisheries of the estuaries and off-shore waters in the eastern part of Australia. Menon and Raman (1961) have explained the fluctuations by correlating the prawn catches with the rainfall and tidal currents in Cochin backwaters. They, however, find that the variation in the catches during the two moon phases is much less. The fluctuations in the prawn landings in relation to the lunar phases in the Godavari estuarine systems and Chilka lake have been described by Subrahmanyam (1964, 1965, 1966, and 1967). He observed that the prawn landings during the new moon phase were heavier than the landings during the full moon phase in the Godavari estuarine systems.

It is generally believed that the weight of the crab is more during the new moon period than during the full moon period. It is also believed that the crabs prefer darkness for their moulting. To verify these facts, an attempt was

also made to study the influence of lunar phases on the weight and moulting of crabs. The details gathered on the meat content of *Portunus pelagicus* and the influence of lunar phases on the crab abundance, weight and moulting are presented here.

## Material and methods

The blue swimming crab, *Portunus pelagicus* Linnaeus is the only species of crab caught in large quantities throughout the year in Mandapam area. Observations were made on crabs got in landings by gill and trawl nets operated near Mandapam in the Palk Bay and Gulf of Mannar during the period from January 1973 to December 1973.

Fresh crabs of *P. pelagicus* were used to study the meat content. After noting the width and weight, the specimens were dissected out and the gonads stomachs, gills and chitinous muscle covering layers were removed. The specimens were rendered free of moisture by rolling them in towels. The edible meat from the body and chelipeds was carefully scraped out by scalpel and the weight of the meat was determined. The mean weights of crab and meat in each size group for males as well as for females have been taken for the determination of the percentage meat content. Only matured specimens of males and females were used in this study.

Catches of *P. pelagicus* were recorded in each month during the new-moon and full-moon phases and the data were used to correlate the crab abundance with the lunar phases.

Samples were collected during the two moon phases and the individual weights were determined in fresh condition. The mean weight of the crab in each size group of the new moon period was compared with the mean weight of the individuals of the same size group of the full moon period to study the lunar periodicity in relation to the weight of the crabs. The accurrence of recently-moulted crabs in the commercial landings was noted during the two moon phases and the data was compared to correlate between the crab moulting and lunar phases.

## Results and Discussion

*Meat content in* Portunus pelagicus:

A total of 163 crabs, out of which 81 were males and 82 females in the size range of 110-184 mm across the carapace were used in this study. The percentage meat content in different size groups ranged from 24.59 to 32.46 for males and 22.30 to 25.27 for females (Table 1). The average meat content in different size groups was 28.01 and 23.99g for male and females respectively. This shows that male crabs contain more meat than females and also supports the fact that the mean weight of the male crab in each group is higher than that of the female of the same group (Table 1).

TABLE 1. *Percentage meat content in male and female carbs of* Portunus pelagicus

| Size group (Carapace width) 'mm' | Crab weight (Mean) 'g' | | Meat content (Mean) 'g' | | % Meat content | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 110-114 | 92.0 | 82.3 | 24.5 | 20.8 | 26.63 | 25.27 |
| 115-119 | 103.3 | 90.5 | 28.5 | 21.5 | 27.60 | 23.75 |
| 120-124 | —— | 104.0 | —— | 23.2 | —— | 22.30 |
| 125-129 | 115.0 | 112.0 | 37.0 | 28.0 | 32.17 | 25.00 |
| 130-134 | 142.4 | 131.3 | 39.0 | 31.6 | 27.39 | 24.05 |
| 135-139 | 172.2 | 146.5 | 44.6 | 33.8 | 25.92 | 23.05 |
| 140-144 | 189.1 | 158.8 | 48.6 | 37.5 | 25.68 | 23.59 |
| 145-149 | 200.7 | 171.3 | 53.1 | 42.9 | 26.44 | 25.04 |
| 150-154 | 236.0 | 195.2 | 60.8 | 48.1 | 25.77 | 24.64 |
| 155-159 | 262.9 | 207.0 | 69.8 | 50.5 | 26.54 | 24.39 |
| 160-164 | 296.4 | 249.0 | 72.9 | 59.0 | 24.59 | 23.69 |
| 165-169 | 314.8 | 260.0 | 92.2 | 62.0 | 29.28 | 23.84 |
| 170-174 | 343.8 | —— | 105.6 | —— | 30.73 | —— |
| 175-179 | 387.5 | 309.5 | 120.0 | 72.0 | 30.97 | 23.26 |
| 180-184 | 456.0 | —— | 148.0 | —— | 32.46 | —— |

## LUNAR PERIODICITY IN RELATION TO ABUNDANCE, WEIGHT AND MOULTING

*Abundance*:

The catches during the new moon and full moon periods in each month are presented in Table 2. It was noticed that the crab catch was relatively good during the newmoon period in all the months except in April and October. This is closely agreed to the prawn abundance during the new moon phase in the Godavari estuarine systems (Subrahmanyam 1965, 1967).

*Weight*:

The weight of the crab in relation to lunar phases is considered here, based on 216 individuals in the size range of 110-184mm carapace width. The mean weights of male and female in each size group during the two moon phases are given in Table 3. On comparison of the weight of the crabs in each size group collected during the new moon period with the weight of the individuals of the same size group collected during the full moon period, it was observed that there is not much variation in the weight of the crabs collected during the two moon phases.

TABLE 2. *Landings (in kg) of* P. pelagicus *in relation to lunar periodicity*

| | New moon | Full moon |
|---|---|---|
| January 1973 | 474.8 | 192.0 |
| February | 374.2 | 94.3 |
| March | 321.0 | 201.6 |
| April | 279.6 | 282.3 |
| May | 194.3 | 156.6 |
| June | 296.0 | 141.7 |
| July | 632.7 | 615.9 |
| August | 579.0 | 197.0 |
| September | 966.6 | 540.5 |
| October | 309.8 | 321.6 |
| November | 465.7 | 351.0 |
| December | 391.5 | 183.0 |

TABLE 3. *Lunar periodicity in relation to weight in* P. pelagicus

| Size group (Carapace width) 'mm' | New moon Crab weight (Mean) 'g' Male | Female | Full moon Crab Weight (Mean) 'g' Male | Female |
|---|---|---|---|---|
| 110-114 | 71.41 | 78.75 | 70.04 | 82.00 |
| 115-119 | 90.08 | 81.16 | 89.87 | 84.00 |
| 120-124 | 96.94 | 103.89 | 92.83 | 90.54 |
| 125-129 | 116.50 | 102.00 | 123.70 | 100.37 |
| 130-134 | 149.25 | 126.66 | 143.58 | 129.55 |
| 135-139 | 150.50 | 144.36 | 154.41 | 143.08 |
| 140-144 | 194.05 | 166.05 | 180.25 | 162.66 |
| 145-149 | 202.11 | 177.58 | 196.58 | 178.75 |
| 150-154 | 220.67 | 189.50 | 236.17 | 200.22 |
| 155-159 | 257.08 | 233.83 | 259.33 | 208.25 |
| 160-164 | 302.05 | 239.75 | 303.50 | 243.00 |
| 165-169 | 311.41 | 273.30 | 315.83 | 248.50 |
| 170-174 | 373.75 | 275.33 | 330.41 | 303.00 |
| 175-179 | 366.00 | 303.50 | 425.00 | —— |
| 180-184 | 414.00 | —— | 445.50 | —— |

TABLE 4. *Lunar periodicity in relation to moulting in* P. pelagicus

| | Moon phase | Moulted Crabs (%) Male | Female |
|---|---|---|---|
| January 1973 | New moon | 11.47 | 4.91 |
| | Full moon | 14.58 | 11.84 |
| February | New moon | 15.51 | 8.88 |
| | Full moon | 6.06 | 6.25 |
| March | New moon | 37.50 | —— |
| | Full moon | —— | 10.34 |
| April | New moon | 17.50 | 10.71 |
| | Full moon | —— | 1.66 |
| May | New moon | 13.33 | 11.90 |
| | Full moon | 3.63 | 6.06 |
| June | New moon | 8.33 | 2.35 |
| | Full moon | —— | 0.88 |
| July | New moon | 55.55 | 45.90 |
| | Full moon | 11.11 | 3.57 |
| August | New moon | 21.42 | 7.50 |
| | Full moon | 7.14 | 3.57 |
| September | New moon | 40.00 | 10.00 |
| | Full moon | 13.88 | 3.57 |
| October | New moon | 20.00 | 13.89 |
| | Full moon | 5,26 | 9.68 |
| November | New moon | 22.22 | 23.81 |
| | Full moon | 6.52 | 8.33 |
| December | New moon | 24.24 | 25.00 |
| | Full moon | 17.39 | 4.76 |

*Moulting*:

The percentage of recently moulted crabs in the commercial catches was relatively higher during the new moon phase than in full moon period (Table 4). This supports the author's observations made in the course of rearing of this species in aquarium conditions when all the crabs in the different series of experiments moulted during the darker half of the month. The moulted crabs were recorded maximum in July during the new moon phase.

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