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## Fresh water crab *Barytelphusa cunicularis* as a food commodity: Weekly crab market study of Nanded city, Maharashtra, India

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### Abstract

Freshwater Crab (*Barytelphusa cunicularis*) has always been a nutritional food commodity, rich in proteins, carbohydrates, vitamins, having great medicinal properties as well. This crab species is collected from the nearby fishing sites and brought for sale in the nearby weekly markets with high demand. The present investigation was carried out in weekly local markets of Nanded city, Maharashtra, India to know the number of crab sellers, price, weight and also the number of crabs brought for sale. In the present paper, collection sites, packaging methods, transportation of crabs is also discussed through the interviews with the crab sellers. The data was also collected from the crab consumers to record their preferences for crab purchase. The highest recorded mean price for a pair of crab was INR 125.47 while it was 102.86 to be the lowest. The lowest and highest mean number of crab sellers observed from the markets were 3.16 and 6.83 respectively while the lowest mean number of crabs in the markets was 4.87 and 50.5 as the highest mean. The weight of available crabs was observed in a range of 125.83 to 161.66.

**Keywords:** Crab, *Barytelphusa cunicularis*, Food, Markets, Nanded.

### 1. Introduction

There are 6,700 species of crabs distributed all over the world, of these 1,306 are fresh water crabs, 600 marine water and brackish water crabs. Tropical region has a maximum diversity of crabs in the world [1, 2]. In India, about 389 different crab species were reported [3]. In Marathwada region of Maharashtra state, Godavari river Basin supports a major site for providing animal proteins in the form of fishes, crabs and prawns. Alongwith the fishes, to some extent, fresh water crabs are also marketed in the local markets of Nanded. From the two commonly occurring crab species of India i.e. *Barytelphusa cunicularis* (Westwood, 1836) and *Barytelphusa guerini*, the former species grow larger and with considerably large sized muscular chelate legs; whereas the later is smaller in size and has less body mass and it is delicate crab species. *Barytelphusa cunicularis* is a commonly occurring black coloured crab species, which is collected by special crab catching communities or experts belonging to 'Koli', 'Bhoi', 'Banjara', 'Vaidu', 'Matang' Casts and Tribes living in the region. Collected crabs are sold in the nearby weekly markets. The crab species, *B. cunicularis* is hardy to withstand without water in moist and muddy burrows and can air breathe and remain live without food for 3-4 days. Therefore, as compared to fishes, this crab species is easy to maintain for marketing as a durable food commodity having good demand in local fish markets. As a whole after removing carapace, the crab is crushed using electrically operated mixer and grinder and the body extract is used to prepare 'crab curry' by using locally available common condiments [4]. The residue containing carapace is thrown as discard. There is no special market or a large stall for crab selling in Marathwada region. The crabs are marketed in fish markets itself. It was observed that there were hardly one to three crab sellers in each weekly fish markets in the region. The crab sellers were observed to occupy a specific spot near the fish market. The crab sellers carry this crab species from the catch sites in locally made bamboo baskets by covering it with cloth. Crab market survey in weekly markets in various parts of Nanded city was conducted in year 2014-2015. In this survey, crab catch sites, packaging and processing of crabs to prepare recipe, price per pair of crabs, monthly variations in its availability in different local weekly markets, type of market chain as crab catcher to dealer and consumer, how the chelate legs are locked for preventing the injury by chelate cutting, all these aspects of crab Market were investigated as a first report.

## 2. Materials and Methods

**2.1 Study area:** Nanded city is one of the fast developing cities of Marathwada region of Maharashtra, India. It is located on the geographical coordinates at 19°10'N and 77°19'E. The study area, Nanded city is heavily populated city with four (04) major weekly markets for crab sale as Friday bazar near Railway Station, Taroda Naka on Wednesday, Kautha on Tuesday, and Itwara on Sunday, etc. Nanded is the central place for the Crab catchers to sale freshwater crabs, collected from various water bodies and river Godavari.

### 2.2 Market Survey

The survey was carried out in four weekly crab markets of weekly bazars on a specific day in Nanded city were visited in year 2014- 2015 and the crab sellers from these four markets were interviewed, with a view of gathering information related to crab availability, site of collection, crab catching methods, packaging methods, transportation and price per pair of crabs. The consumers purchasing crabs were also interviewed for their preferences of crab purchase and use after purchase. Both the crab sellers and consumers were informed about the purpose of study. The identification of available crabs from weekly markets of Nanded city was done by using standard literature [5].

### 2.3 Interaction with consumer on crab purchase

After discussion with the consumers in the markets in all four weekly bazars (markets) on type of recipe they prepare from crabs. Out of 60 consumers interviewed, 95% informed that they prepare a locally named crab recipe called 'crab curry'. Crab curry is one of the traditional recipe of this region whereas few consumers roast only the crab chelate legs on burning firewood and consume muscles by breaking the carapace of chelate legs. Majority of crab consumers reported that crab curry has medicinal property in the treatment of cold, fever, headache, hepatitis and backache [6]. This crab species is a rich source of naturally available, vitamins, proteins, carbohydrates, assimilable fats, calcium, antioxidants and anticancer food material hence it acts as nutraceutical [7]. Few of them also reported that the crab consumption is useful in the prevention and treatment of joint pains and sexual impotency problems like erectile deficiency (ED).

### 2.4 Crab Catch Methods

In all these crab markets, the crab seller themselves are crab catchers; they informed that on the market day, they go to

rivers, streams, and reservoirs in their area (study area) in early morning 5 a.m. and with the help of specially designed iron rod with terminal hook and by hand picking they collect the crabs. The hook used is locally named as 'Aakada', it is of 3-4 feet long and 3 cm thick, flexible iron rod with anterior terminal end designed into a single pronged short hook which is inserted into the crab burrows to drag out the crab from inside. Usually, they try to fish out the crabs intact i.e. without damaging the carapace and detachment of legs because, damaged crab may die hence, dead crab have no or less market demand and less price. Same is the case with damaged crabs as they are not preferred. The collected crabs are carried in the locally made bamboo baskets covered with piece of cloth and also packed in to the empty, washed, nylon porous bags of synthetic inorganic fertilizers in the study area. There was no crab culture farm in the study area hence source of this crab species in all observed markets was only from natural habitat like streams, rivers, ponds and reservoirs. A few crab sellers also reported that they get these crabs from a stream which carry 75% drainage water and sewage at Parbhani city, Maharashtra State called 'Pingalgadh Nala' that flow from Parbhani city and merge into river Purna, the tributary of river Godavari.

### 2.5 Transport, Packaging during Selling of the Crabs

Nylon made porous bags used for packaging helps to maintain natural aeration and to keep the crab in live condition. To prevent any accidental or mechanical damage to the crabs. Crab sellers use traditional methods of packaging during selling of the crabs locally called as 'claw locking'. The crab sellers themselves break claws of swimming legs of same crab and inserts in the third segment of both the chelate legs. Due to this, crab cannot rotate the chelate leg and stops its leg movement. So, the consumers are prevented from crab claw cutting injury. It is easy to handle and easy to carry for consumers at its destination i.e. kitchen. At these markets, crab pair or a single crab is packed by wrapped-rolling of 1-2 crab into a piece of cloth or handkerchief carried by consumers. Generally, one consumer found to purchase 1-2 pair of crabs from these weekly local markets.

## 3 Results

The current study was done for a period of six month in different weekly markets of Nanded city to know the market price per pair, number of crab seller, number of crabs brought by each seller was recorded (Table 1,2,3,4) the results are represented graphically (fig. 1, 2, 3, 4).

**Table 1:** Survey of crab market near Nanded railway station (Friday).

| Month     | No. of Crab Sellers | No. of Crabs (average) | Price per pair of Crabs ( Average in INR) | Weight of Crabs (gm) |
|-----------|---------------------|------------------------|---|----------------------|
| August    | 05                  | 35.5                   | 90  | 120                  |
| September | 08                  | 87.25                  | 105                                       | 105                  |
| October   | 03                  | 16.25                  | 82.2                                      | 130                  |
| November  | 13                  | 57.75                  | 95  | 140                  |
| December  | 07                  | 100.75                 | 120                                       | 140                  |
| January   | 01                  | 5.5                    | 125                                       | 135                  |
| Total     | 37, Mean=6.16       | 303, Mean=50.5         | 617.2, Mean=102.86                        | 770, Mean=128.33     |

In a Survey of Crab Market near Nanded Railway Station, the average number of crab sellers was observed to be 6.16, average number of crabs was 50.5, price per pair of crabs was

102.86 INR and weight of crabs in gms was 128.33 in a duration of six months.

**Table 2:** Survey of crab market at Taroda Naka (Wednesday).

| Month     | No. of Crab Sellers | No. of Crabs (Average) | Price per pair of Crabs (Average in INR) | Weight of Crabs (gm) |
|-----------|---------------------|------------------------|--|----------------------|
| August    | 05                  | 42.25                  | 80                                       | 110                  |
| September | 03                  | 22.0                   | 95                                       | 130                  |
| October   | 10                  | 42.25                  | 105                                      | 120                  |
| November  | 08                  | 41.75                  | 95                                       | 140                  |
| December  | 12                  | 61.25                  | 115                                      | 125                  |
| January   | 03                  | 48.85                  | 135                                      | 130                  |
| Total     | 41, Mean=6.83       | 258.35, Mean=43.05     | 625, Mean=104.16                         | 755, Mean=125.83     |

A survey was carried out at Taroda Naka Nanded city continuously for six months, through which average number crab sellers was recorded as 6.83, average number of crabs

was 43.05, price per pair of crabs was 104.16 INR and weight of crabs was 125.83 gm.

**Table 3:** Survey of crab market at Kautha weekly Bazar of Nanded City (Tuesday).

| Month     | No. of Crab sellers | No. of Crabs( Average) | Price per pair of Crabs (Average in INR) | Weight of Crabs (gm) |
|-----------|---------------------|------------------------|--|----------------------|
| August    | 03                  | 12.5                   | 82.5                                     | 90                   |
| September | 05                  | 26.5                   | 95                                       | 100                  |
| October   | 08                  | 33.85                  | 125                                      | 120                  |
| November  | 10                  | 18.0                   | 105                                      | 200                  |
| December  | 04                  | 4.5                    | 135                                      | 250                  |
| January   | 02                  | 3.0                    | 130                                      | 210                  |
| Total     | 32, Mean=5.33       | 98.35, Mean=16.39      | 672.5, Mean=112.08                       | 970, Mean=161.66     |

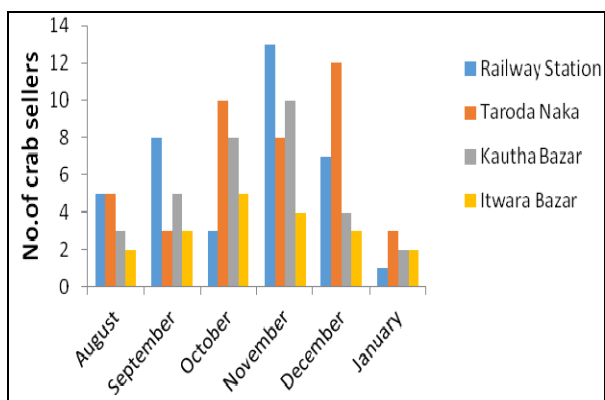
Survey of Crab market at Kautha, near new over bridge on Godavari river, average number crab sellers was 5.33, average

number of crabs was 16.39, price per pair of crabs was 112.08, and weight of crabs was 161.66 gms.

**Table 4:** Survey of crab market at Itwara weekly Bazar, Nanded City (Sunday)

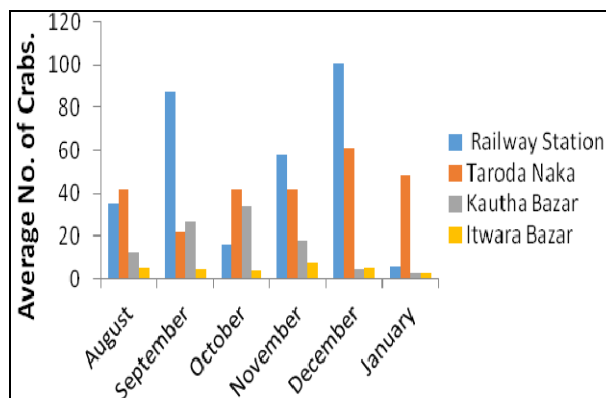
| Months    | No. of Crab sellers | No. of Crabs (Average) | Price per pair of Crabs ( Average in INR) | Weight of Crabs (gm) |
|-----------|---------------------|------------------------|---|----------------------|
| August    | 02                  | 5.0                    | 105                                       | 120                  |
| September | 03                  | 4.75                   | 122.5                                     | 140                  |
| October   | 05                  | 3.75                   | 125                                       | 110                  |
| November  | 04                  | 7.75                   | 142.5                                     | 100                  |
| December  | 03                  | 5.25                   | 127.5                                     | 180                  |
| January   | 02                  | 2.75                   | 130                                       | 120                  |
| Total     | 19, Mean=3.16       | 29.25, Mean=4.87       | 752.5, Mean=125.41                        | 770, Mean=128.33     |

Survey of Crab market at Itwara, main old city in Nanded, average number crab sellers was 3.16, average number of crabs was 4.87, price per pair of crabs was 125.41 INR and weight of crabs was 128.33 gm.



**Fig 1:** Number of Crabs Sellers in four weekly Markets at Nanded.

The number of crab sellers was highest in Month of November near Railway station whereas it was lowest in January at the same place.



**Fig 2:** Average Number of Crabs in four weekly Markets at Nanded.

The average number of crabs was maximum in month of December near Railway Station, while it was lowest in month of January at Itwara Bazar.

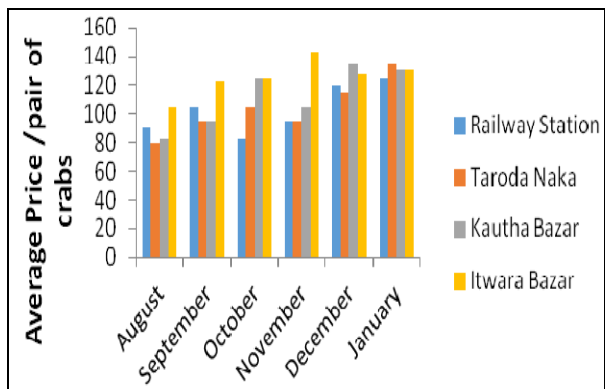


Fig 3: Average Price per pair of Crabs in weekly market at Nanded.

The average price per pair of crabs in INR was maximum in November at Itwara Bazar, whereas it was minimum in October near Railway station.

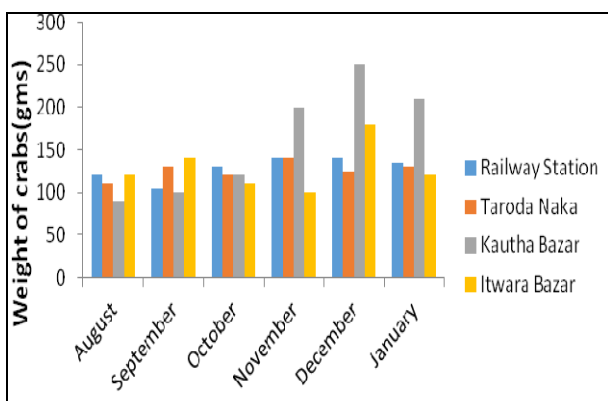


Fig 4: Average weight of crabs (in gm) in four weekly markets at Nanded.

The Average weight of crabs ( in gms) was studied and it was found that the crabs sold in Kautha weekly market in Nanded had highest body weight in December while it was least in November from Itwara weekly market.

Through the present study, total number of crab sellers, number of crabs, price per pair of crabs (INR) and weight of crabs were recorded. It was found that mean number of crab sellers were 3.16 to be the least from Itwara bazar crab market while, it was recorded to be the highest mean number of crab sellers was 6.83 from Taroda bazar crab market.

The next parameter was to observe crabs in four markets. The lowest mean of crabs was recorded as 4.87 from Itwara bazar while, Bazar near Nanded Railway station was observed to have highest mean as 50.5.

Through the current study, price per pair of crabs in Indian National Rupees (INR) was also investigated. Itwara market was recorded to highest 125.47 price per pair whereas, 102.86 was found to the lowest mean from bazar near railway station. The highest mean weight of crabs was observed as 161.66 gms from Kautha bazar crabs market, and 125.83 as the minimal weight in gms from Taroda bazar crabs market. In winter months like November and December, the crab sale increased to a considerable limit but afterwards, it was found to decline due to reduced water level at the crab catch sites.

The crab sellers reported that the crab markets are available throughout the year in Nanded city. Occasionally crab sellers were found selling their crabs other than weekly market days in Nanded city.

#### 4 Discussion

In the present study of weekly markets of Nanded city, the crabs were sold as per their sizes. The crabs were charged a price range between 60-200/pair INR to be the highest price. It is also observed that there was variation in the sizes of crabs available in four weekly markets of Nanded city. Crab study carried out on the Marketing flow and trading practices for mud crabs in Bangladesh. Through this study, it was observed that crabs were sold as per the grades. The price of mud crabs was dependent on the sex and also the weight of mud crabs [8]. Through the current study of weekly crab markets, monsoon season was observed to be the most productive season in terms of number of crabs brought for sale by the crab sellers from the nearby area. Similar findings in Bangladesh on crab selling were recorded that maximum number of crabs were available in the monsoon season, they were minimum in summer season [9]. In Nanded city, through regular visits to the weekly crab markets, it was found that *Barytelphusa cucicularis* was the only freshwater crab brought for sale. In similar study, in five district of Maharashtra State, it was reported that *Barytelphusa cucicularis* was the most preferred and abundant freshwater crab species [10]. In Nanded city, crabs directly sold by crab catcher to consumers, in average selling price range between 60-200/pair of crabs, which depends upon the crab body size. Marketing channel of mud crabs from Khulna region to international markets and people involved in marketing of crabs were studied in Bangladesh, i.e. crab supply chain such as-Crab farmer (field worker)→ mediators→ suppliers→ exporters or companies. It was also studied that average selling price of crabs from farmer to intermediaters are in between 120 to 500/kg Bangladesh Takka (BDT) depending on size and grades [11].

#### 5 Conclusion

Through the results obtained from the current work, it can be concluded that the actual demand of the fresh water crabs in the local markets of Nanded city by the consumers is very low. This may be understood as there were very few numbers of crab sellers observed selling their crabs in the weekly markets. The crab sellers were common in different weekly markets studied; this may be the reason of the uniformity in the price per pair of the crabs in those markets. This is first report on the crab market, marketing and various details regarding the crabs as a food commodity available for common man from this region. It also indicates that, there is good demand for this well muscular crab for this species. Marathwada as a drought prone region, alongwith fish culture, the culture of *Barytelphusa cucicularis* can be a good option for the investors and fish culturist in this region.

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