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A study on shrimp fishing quantities offered in some markets of Basrah, Iraq

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ABSTRACT

The shrimp catch quantities offered in three markets; namely, Al-Basrah, Al-Ashar, and 5 Mile in Basrah, Iraq were studied. During 2018 and 2019, the percentages of marine and river fishing quantities were 80.00, 86.67%, and 20.00 and 13.33%, respectively. Shrimp percentage quantities supplied in the three Basrah markets during 2018 and 2019 were as follows: (75, 15, 5)%, and (80, 15, and 7)%, respectively. In addition, the percentage of the displayed catches of four shrimp species, including *Penaeus semisulctus*, *Metapenaeus affinis*, *Parapenopsis stylefera*, and *Macrobrachium nipponense* during the years 2018 and 2019 were as follows: (10, 50, 30, and 10)% and (12, 53, 32, and 3)%, respectively. During the study period, a fluctuation was detected in shrimp prices in the studied markets of El Basrah, the most expensive of which was (25,000 thousand / kg) that of the marine shrimp, while the river shrimp recorded the cheapest (1,000 thousand/kg) of river shrimp. Statistical analysis showed significant differences ($P< 0.05$) between the quantities of the two species of shrimp (*M. affinis* and *P. stylefera*) and between the two shrimp species. While, no significant differences were observed between the other two shrimp species (*P. semisulctus* and *M. nipponense*). Significant differences ($P < 0.05$) were recorded between the percentages of shrimp quantities offered in the Basrah market and between Al-Ashar, and 5 Mile markets, which had no significant differences ($P > 0.05$).

INTRODUCTION

International reports indicate that shrimp fisheries contain by catch using bottom trawl nets, which affects the nurseries of shrimp and other aquatic life. Shrimp fisheries are considered one of the most important economic resources with high nutritional value as a profitable fish product by exporting it as a commercial commodity to provide forein currency for many tropical countries **(Moffitt & Cajas-Cano, 2014; Ganesh & Chakravaty, 2016)**. Shrimp fishing has significantly increased since the 1980s in the eastern Indian Ocean compared to other regions **(FAO, 2020)**. By catch constitutes 27.3% of the 7.3 million tons of the global catch, especially in China and the rest of the

shrimp fisheries in the tropics **(Yang *et al.* 2015)**. Shrimp has great importance in the coastal countries including America, with an annual production of about 153,452 tons. This production is valued at 486 million US dollars, with a continuous change in prices depending on the caught quantities of supply and demand, as well as the import conditions of shrimp. The conditions of shrimp supply have not changed in the coastal areas. Its supply is under the control of fishermen and it varies according to the climatic conditions; many studies have focused on analyzing shrimp prices in the markets **(Houston & others, 1989)**.

Iraq and its South, in particular, are blessed with a network of rivers and inland water bodies such as the marshes, the Shatt al-Arab estuary, and the sea coast, with an opening to the marine waters in the northwest of the Arabian Gulf. Its area is restricted; it provides a vital window for the investment of marine resources. The boom of its trade statistics reveals that the fishing quantities in the Gulf ranged between 3000-5000 tons annually during the early fifties to the mid-sixties (1950-1965) of the last century, and then it increased during the seventies (1971-1978) to 13-17 thousand tons annually. Unfortunately, a remarkable decline was detected at the beginning of the eighties to reach only 4 thousand tons during 1982. Whereas, after the application of protection measures in some Gulf countries, it returned to rise reaching a record number of 20 thousand tons in 1989 **(Ali, 2015)**. In the current century, the rate has been witnessing an annual fluctuation (around 13,000 tons) **(Al-Matar *et al.*, 2009)**.

In the light of the estimates of **Ali and Ahmed (2015)** for the shrimp caught in Iraq from 2012 to 2014, recording an annual increase of more than thousands of tons, an important percentage of the total Gulf production was determined, and notably it is subject to increase. The latest information was recorded about the reality of the stock and caught off the migratory fat shrimp from the sea towards the internal waters of the Shatt al-Arab and Basra marshes. The quantities of shrimp fishing ranged between 1 to 5 tons per day during the migration season in the Shatt al-Arab and swamps. It was obvious that most of the fishing was of the small size; the larvae of two species; namely, *M. affinis* and *M. nipponense*, which are usually found in rivers and swamps for nursery and feeding, dominated in the shrimp stock, compared to the economical sizes caught from the sea.

Ali and Ahmed (2015) provided an information system that can be a successful basis for continuously tracking shrimp stocks and their catch, by collecting and counting basic information and data on the economic aspects of marine shrimp fishing in the Iraqi marine waters and the social activities associated with it. This is an indication that there are no special documentary statistics on shrimp marine catch in Iraq on the three species of shrimp: *M. affinis, P. stylefera*, and *P. semisulctus*. In addition, the afre- mentioned data reveal that the University of Basra and the Marine Sciences Center, in particular, constitute a major source of conducting studies and research on shrimp, and that the Al-Nasr Association in FAO is the basis for recording the fishing quantities entering from

the sea, and that between 150-250 boats are fishing for shrimp, with the participation of some other fishing operations. Furthermore, the confirmed shrimp are preferred in the Iraqi market, especially Basra, and the estimated catch was 545.2 tons/year caught by bottom trawls.

Thus, the present study aimed to know the quantities of shrimp offered in Basra markets and the desired species to give an idea of the real need for establishing shrimp farms and the extent of economic benefit from investing in this sector in our country, Iraq. Documented reports or studies on the quantities of shrimp offered in the local markets in Basra are few, and the current study was only a complementary part to those studies through a hypothetical estimate of the quantities of shrimp and the proportions of their species. Hence, the informative data would give a clear assessment of the importance of marine and river shrimp catches in providing income for those with limited financial supplies and maintain protein as well.

MATERIALS AND METHODS

The quantities of shrimp and shrimp species present in three selected markets (Basra, Al-Ashar, and 5 Mile) in Basra - Iraq were studied during 2018 and 2019, and a comparison was made for each of them depending on the source of the catch: the first source is marine shrimp caught from the waters of Iraq and the Arabian Gulf. The second source is the internal waters of the Shatt al-Arab, the marshes, and other rivers (Fig. 1). Shrimp are displayed in the markets with ice, and freezing is used to preserve shrimp for the longest possible period for marketing. The monthly follow-up of the studied markets was in the Aquaculture Laboratory - Marine Science Center - University of Basra.

By default, shrimp catches were calculated based on the total weight (Kg) **(Paighambari & Daliri, 2012)**; the estimated percentages of shrimp supplied were calculated in the three studied Basra markets. The estimated percentages of the quantities of shrimp offered in each market were determined and the percentages' average was assessed. Moreover, the total ratios of quantities of shrimps offered in Basra markets were calculated. The same applies to the availability of shrimp species in those markets. Shrimp prices were determined from the local market price. Additionally, the marine and river catches of shrimp were assessed by calculating the proportions of quantities of shrimp species offered (both combined and individually) in the three selected markets. Shrimp prices were hypothized by direct follow-up to their prices displayed in the selected markets during the study period **(Al-Maliky, 2013)**.

Statistical analysis: The results were statistically analyzed using the statistical program SPSS version 16 by one-way ANOVA for the studied factors, using the least significant difference (LSD) under a significant level of 0.05.

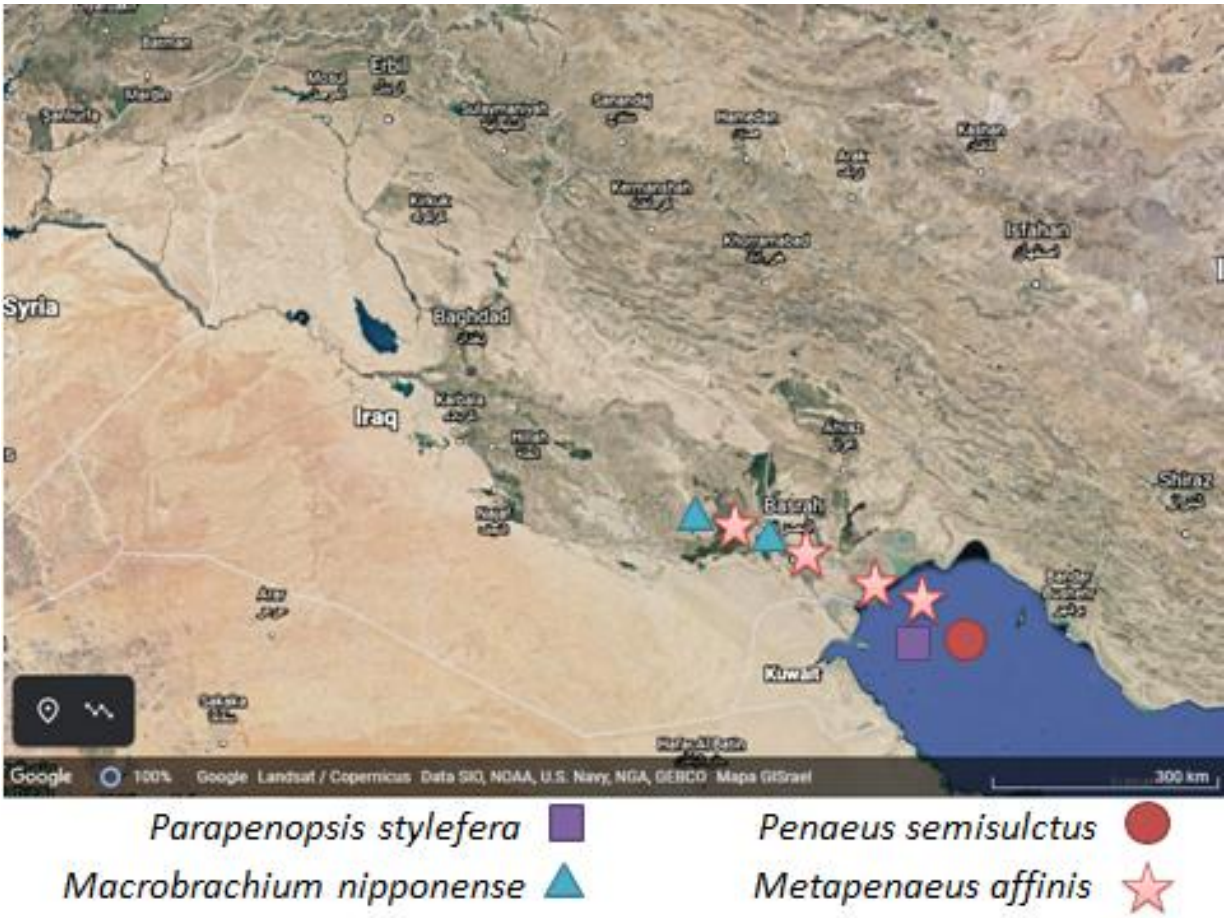

Fig. 1. Photographs of the distribution map of marine and river shrimp in Basra, Iraq (displayed in the market for the current study)

RESULTS AND DISCUSSION

Developing countries are at the fore in their production of shrimp, which are offered in world markets due to the increasing demand for shrimp, which has resulted in overfishing, and the most important commercial shrimp belongs to the Penaeidae family **(Pajkumar *et al*. 2015; Jin *et al*. 2018)**.

All shrimp species were recorded in the three study markets, except for *P. semisulcatus* which was not present in the 5 Mile market. This may be due to its high price and considering that the 5 Mile market is a popular market frequented by the vast majority of middle and weak people who cannot buy high-priced shrimp, and for this reason, the low-priced *M. nipponense* shrimp is present in this market **(Fig. 2)**. Thus, the studied markets can be divided into three sections: the first is the wholesale market, represented by the Basra market, the second is the merchants market, represented by the Al-Ashar market, and the third is the low-income market, represented by a 5 Mile market.

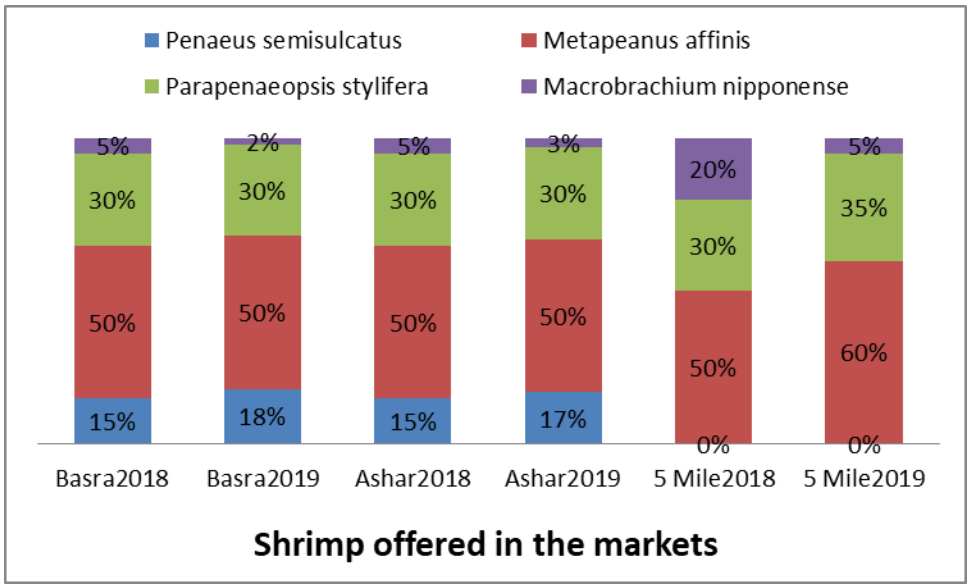

Figure 2. Percentage of shrimp species offered in the markets of Al-Basra, Al-Ashar, and 5 Mile in Basra during the years 2018 and 2019.

Showed study that the percentage (50 and 53)% of the presence of *M. affinis* shrimp, which was the highest among rested other shrimp species of shrimp, was followed by *P. stylifera* (30 and 33)%, *P. semisulcatus* (10 and 12)%, and *M. nipponense* (10 and 3)% in 2018 and 2019 respectively **(Fig. 3)**.

These percentages were expected in terms of the presence of shrimp in the marine and the river catches in southern Iraq, but a difference was observed in the presence of shrimp M. nipponense the percentages decreased during the two years of the current study compared to previous years, especially from 2006 to 2018 since the settlement of this species our internal waters, starting with the waters of Basra and then into the Iraqi internal waters **(Al-Maliky, 2010)**. While it differs from the quantities of shrimp in the waters of the Arabian Gulf on the Iranian side, according to a study **(Paighambari and Daliri, 2012)**, in which he mentioned that the percentage of shrimp catch composition in Iranian Bushehr included 71.45% of *P. semisulcatus*, 15.89% *M. affinis* and 12.66% *P. stylifera*, and this percentage are not It corresponds to the ratios of the current study, in which *M. affinis* is the highest hypothetical catch, followed by *P. stylifera* and the last *P. semisulcatus*, and the reason may be due to the depth of the Iranian catch water compared to its low with the catch of Iraq, and thus the availability of *P. semisulcatus* with the deepest water.

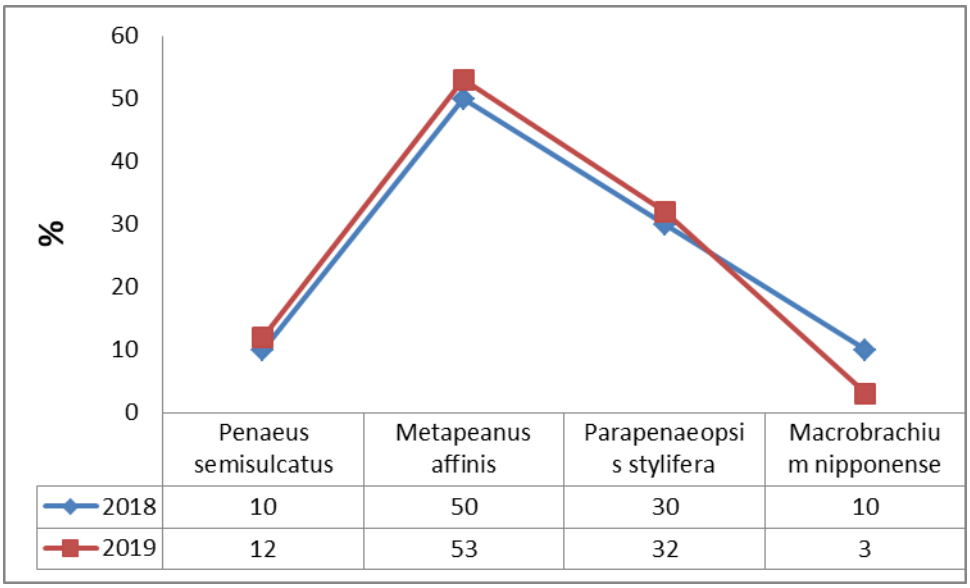

Figure 3. Percentage of catch quantities of four species of shrimp displayed in the three Basra markets (Al-Basra, Al-Ashar, and 5 Mile) during 2018, 2019.

Al-Sabah (2021) stated that the overfishing of shrimp reduces its stock, which affects the ways of supplying stocks and aquaculture, and others, which requires work on good management of the catch.

The current study indicated that the proportions of most of the shrimp species offered in the selected markets in Basra were similar, but they differed only in the quantities of *M. nipponense* shrimp in 2019, which showed a gradual decrease in the catch rates. This may be due to several reasons, including a decrease in its flow from the common Iranian waters, an increase in the fishing effort in inland waters, and its consumption of it by other neighborhoods.

The current study showed in **table 1.** that the prices were divided into three categories, the first included large shrimp; Jumbo shrimp (*P. semisucatus*) whose price ranges between 15 and 25 thousand Iraqi dinars, and the second is marine shrimp; *M. affinis*, and *P. stylifera*. Its price ranges from 5 to 15 thousand, and the third includes river prawns; M. affinis, and *M. nipponense* at cheap prices from 1 to 4 thousand dinars.

It almost agrees with the study of **Ali and Ahmed (2015)**, which indicated that the price of one kilogram of marine shrimp ranged between 8-15 and 15-25, and jumbo shrimp (*P. semisucatus*) got the most expensive price, while the price of river shrimp ranged between 3-5 thousand dinars. Shrimp prices in Bahrain range between 1 and 3 dinars/kilogram and most of its catch are from *P. semisulcatus*, which constitutes (58, 38, and 5)% of the marine catch according to the fishing area **(Ali and Abhsin, 2013)**.

The present study showed that the percentages of marine shrimp including *M. affinis* offered in the three selected markets were the highest, followed by the percentages of *P.*

stylifera and then *P. semisulcatus*, while it was noted that *M. nipponense* had the lowest percentages with a slight increase in percentages observed This shrimp during 2018, while there was a slight change in those quantities during 2019 due to the decrease in the quantities of *M. nipponense* and the dominance of other local species.

The producers determine the shrimp prices in the market, and the increase in these prices is due to the increased demand for shrimp **(FAO, 2012)**.

Showing of current study slight differences in shrimp ratios quantities in marine and river fisheries presented during 2018 and 2019 in study markets where rates of marine fishing quantities reached (80 and 87) *% showing this increase in quantities of shrimp offered, and the probably due to the increased demand for shrimp, which led to actives in the shrimp market and a clear decrease in quantities of river shrimp observed, amounting to (20 and 13) *% the reason this maybe due to deterioration of internal aquatic environment during that period (* an approximate value).

Its noted during the follow-up to the shrimp offers in the three Basra markets there were shops and street vendors in the Al-Ashar and Basra markets, it was noted in 5 Mile market only street vendors and this is due to the increased demand, purchasing power, and high profitability of shrimp in the Al-Ashar and Basra markets compared to the 5 Mile market, which was a popular market where people shop most of whom were poor, low-income people.

Table 1. Shrimp prices record from percentages for marine and river shrimp in the three Basra markets and also a description of each market during 2018 and 2019.

Data	Price (dinars)	%	Shop	Street sellers
Spices of shrimp				
P. semisulcatus	15000-25000			
M. affinis and *P. stylifera*	5000-15000			
M. affinis and *M. nipponense*	1000-4000			
2018				
Marine shrimp		80		
River shrimp		20		
2019				
Marine shrimp		86.67		
River shrimp		13.33		
Markets				
Ashar			✓	✓
Al-Basra			✓	✓
5 Mile			-	✓

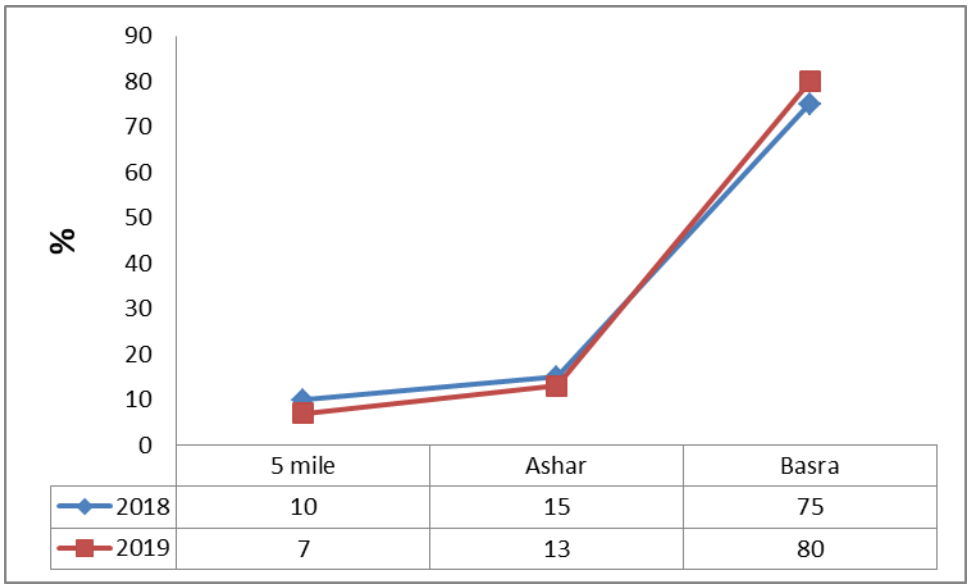

Figure 4. The percentage of shrimp quantities offered in the three Basra markets (Al-Basra, Al-Ashar, and 5 Mile) during 2018 and 2019.

It can see **(Fig. 4)** the hypothetical distribution of shrimp quantities in the Basra markets and the contribution of the Basra market ranged by percentages (75 and 80%), Al-Ashar market with percentages (15, 13)%, and 5 Mile market with rates (10 and 7%) during 2018 and 2019 respectively. This indicates that the Basra market is the most important in Basra for the sale of marine and river shrimp, while the other markets are secondary markets for the sale of shrimp. The displayed catch quantities are distributed to the rest. From the markets of Basra and other governorates in Iraq, Basra is unique in the marine fishing offered in its markets. Therefore, it requires focusing on the Basra market in documenting shrimp fishing, and quantity data.

Shrimp can be exported by taking advantage of the surplus shrimp supplied in local markets, as is the case in neighboring countries. And Kuwait's exports of shrimp decreased by half due to the increase in local demand for it, as it is sold in the markets without processing, while the export is processed (whole or without head), **(Al-Sabah, 2021)**.

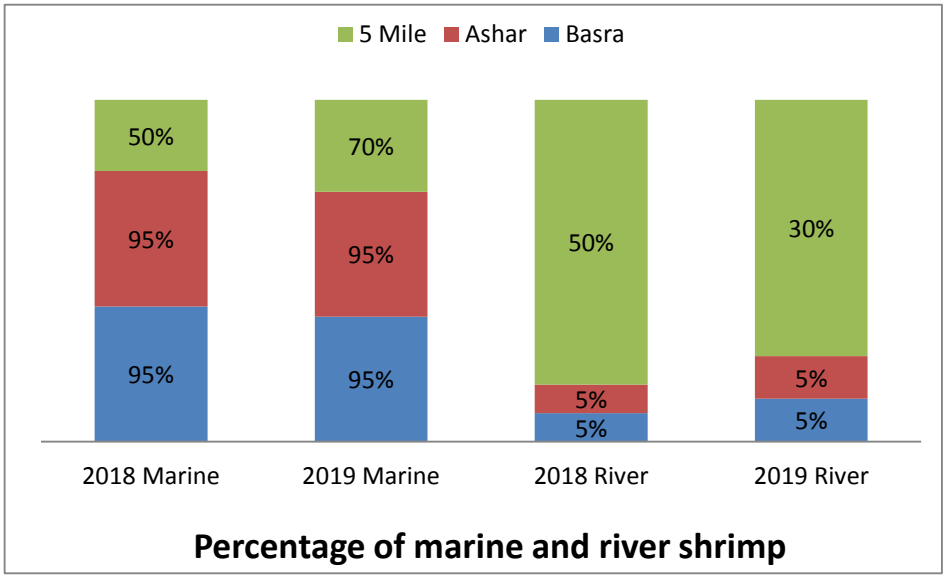

Figure 5. A comparison between the approximate quantities of marine and river shrimp in selected markets in Basra during 2018 and 2019.

It was mentioned that shrimp caught and exported from Mexico to America in large sizes (21-25)g and quantities dominated the American market many years ago, but in recent years these exports have declined due to consumers' alienation and abundance of Asian shrimp of large sizes and competition and the shape of the product where consumers prefer shelled shrimp **(Sachton, 2020)**.

The current study clarified the differences between the fishing quantities of marine shrimp compared to the quantities of river fishing during the main markets in Al-Basra and Al-Ashar markets, while the quantities of shrimp offered in the 5 Mile market were from river shrimp, and they were similar during 2018 and somewhat different in 2019 and it is noted that most of the shrimp Its source is a marine catch **(Fig. 5)**, this maybe due to the consumer's desire to eat large-sized shrimp, which offered in the market, with all parts of the shrimp, or in shellless form..

CONCLUSION

The results showed that the Basra market was the main source of the quantities of shrimp offered in the Basra markets, it was frequented by different segments of society most of them from middle and poor families, and also frequented by traders who work to distribute shrimp to the rest of other local markets inside and outside Basra city. The Al-Ashar market contained different shrimp species but in limited quantities most of the residents of Basra buy them, but in smaller numbers than the Basra market, and people frequent it for shopping, mostly from rich and middle-income families. In the 5 Mile market, the quantities of shrimp offered were few, as showed results were the dominance of riverine species due to the market's location near rivers and swamps and being a

distinguished popular market. Due to the desire of the people of Basra to buy shrimp, which gives an impetus to the importance of the economic feasibility of establishing shrimp farms in Basra to support shrimp fishing in Basra, and the production will export to the rest of Iraq. Shrimp species in this current study were considered to represent most of the shrimp supplied in the local markets in Basra, southern Iraq. Suggesting that records were will open to document data on marine and river fishing quantities of commercial shrimp displayed in local markets to certainly data on a real fishing quantity in Basra. Records to the current study, species shrimp were four, the most important and prevalent They must document records data on marine and river fishing quantities of commercial shrimp offered in local markets.

The shrimp industry is promoted by exploiting the available quantities of local shrimp and converting them into shrimp products with economic returns that can be exported to provide the country with hard currency. The establishment of shrimp farms should be encouraged because its success leads to a decrease in shrimp prices in the local market and the export of shrimp, thus providing hard currency for the country, and providing job opportunities for many citizens and others. And the measures to protect shrimp stocks in Iraqi regional and internal waters as, the plans develop must determine the season for preventing shrimp fishing during the breeding season.

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