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Fisheries Status of Halaieb / Shalatien area "RED SEA", EGYPT.

Hatem H. Mahmoud[1]; Ezzat A. Altaf[2]; Mohamed A. Ibrahim[1] and Abaza Kh. M.[1]

[1] *National Institute of Oceanography and Fisheries, Alex., Egypt.*
[2] *Oceanography Department, Faculty of Science, Alexandria University.*
Corresponding author: Dr. Hatem, H. Mahmoud, E-mail: hatemhanafy@hotmail.com.

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Abstract

Species composition of fish in Halaieb/Shalatien coastal zone was studied. A total of 58 species representing 23 families were identified. A checklist of all these identified species is given as well as their habitat of origin [Resident of the Red Sea (Native), Indo-pacific migrant (Migratory) or Lessepsian migrant (Migratory to the Mediterranean Sea)]. From the present study it was so clear that family Serranidae is the most dominant family in the study area contributing about 40% of the landed catch while most other species contributed less than 10% each [Lethrinidae (9.78%), Scaridae (9.67%), Gerridae (6.89%), Carangidae (5.68%), Haemulidae (5.42%), Lutjanidae (4.93%), Siganidae (4.64%), Mugilidae (4.55%), Belonidae (2.82%), Sphyrnidae (1.3%) and Sparidae (1.3%)], while the rest of other families represente less than 1% of the landed catch. The monthly landed catch together with the abundance correlations of the different fish families were studied in Halaieb/Shalatien area during the period of study for proposing a future plan to manage the fisheries of this virgin and promising area.

Keywords: Red Sea, Halaieb/Shalatien, Fisheries, abundance correlations, species composition.

1. Introduction

Halaieb/Shalatien fishing area is located in the South of Foul Bay at the southeastern region of Egypt on the Red Sea (Figure 1). It extends from latitude 22° near Ras Hedreba in the South up till Bir Shalatien 23° 8' N in the North. The coastal area of Halaieb and Shalatien triangle is characterized by the presence of coral reef terraces in many areas, these coral reefs help in breaking the waves and act as protection and feeding areas for different varieties of fishes (Mahmoud, 2005).

The main fishing cites in the area are Shalatien, Abu Ramad and Halaieb. Shalatien city is the biggest city in this area and it is considered as the main fishing site due to its central location.

Many authors studied the taxonomy of the different species in the Red Sea and compare them with others in different gulfs and oceans as Clark and Gohar (1953), Bayoumi (1972), Ghorab *et al*. (1983), Tortonese (1983), Baranees and Golani (1993), El Etreby *et al*. (1993), Faltas and Rizkalla (1995) and Khalaf and Kochzius (2002).

The area of Halaieb and Shalatien could be considered as virgin from the fisheries point of view, there are no previous fisheries studies had been done in this area. The present work aims to explore the fish populations in this area with respect to their present commercial catch rate and investigate the abundance correlations of the different families in the area of study during the period of the present investigation for proposing better fisheries management plans.

2. Materials and methods

To cover the main landing centers, seasonal field trips (10 days or more each) were carried out to the area of study between July 1997 and March 1999. During these field trips, fish samples were taken directly from the commercial fishing boats (around 404 fishing trips) to be identified using their distinguished external and internal characteristics (Randall, 1983). The Species composition of the landed catch was recorded.

Fishery statistics were recorded from several sources in the area including: "General Authority for Fish Resources Development (1990-2000)", the coast-guard office in the area, "The Egyptian Fish Marketing Co.", as well as incentive fishermen working in the area and the wholesalers who collect the fish from the area to be sold in other cities across Egypt (mainly Hurghada city).

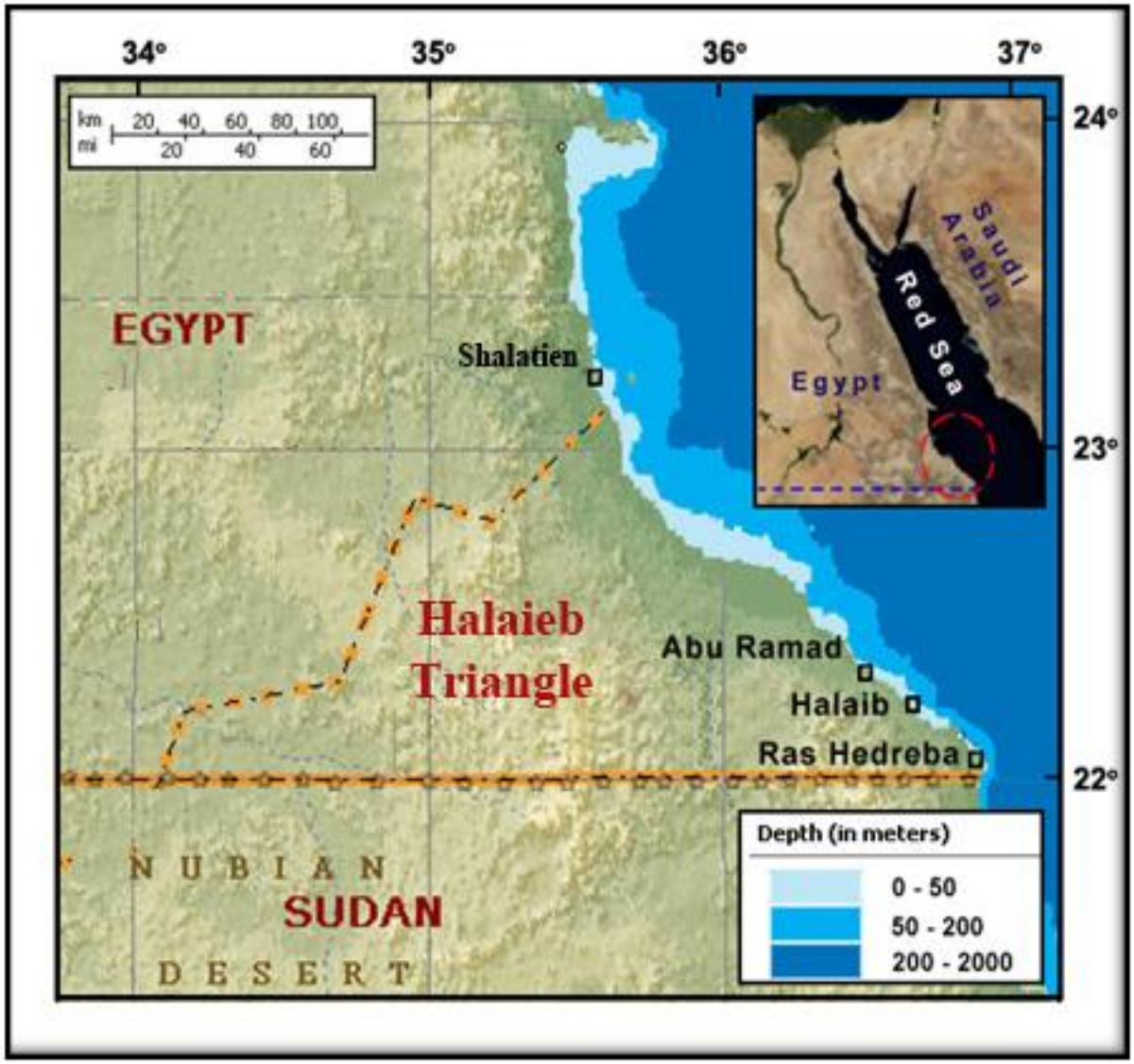

Figure 1: The study area (Halaieb / Shalatien area).

3. Results

3.1. Fisheries aspects in the area of study

Due to prevalence of patchy reefs, reef barriers and reef islands in the area of study, most commercial fishing operations take place in the near shore water using small sailing boats (Hory) equipped with an outboard motor of about 15 horse power and is operated by one or two fishermen. They normally spend between 2 or 3 nights fishing over these boats. Another type of fishing boats is built from fiberglass (Launch). A Launch reaches about 5-9 m in length and is equipped with an outboard motor of 20-40 horse power. A Launch trip extends up to 9 days but most of these trips last from 2 to 6 days and their crew may reach about 6 fishermen.

In general, line and hooks are the most dominant fishing gear in the area due to the presence of coral reefs; it is applied in all depths up to about 100 m. However, some fishermen who come from nearby areas use "gill" and "trammel" nets which are not usually used by local fishermen. Local fishermen may use gill to collect small fish as bait.

3.2. The Landed Catch in the Area of Study

Fisheries of "Halaieb and Shalatien area are still unknown with very limited fishery statistics. In this area, fifty eight teleostean fish species, belonging to twenty three families were identified (Plates A to H). Table 1 (a & b) represents these common fish species according to their habitat of origin [Resident of the Red Sea (native), Indo-pacific migrant (migratory) or Lessepsian migrant (migratory to the Mediterranean Sea)] (Froese, R. & D. Pauly, 2009).

The landed catch of the commercial fish families and their percentage abundance with respect to the total landed catch of Halaieb/Shalatien area during the period of study is represented in Figure (2).

It is clear that, family Serranidae ranks as number one in terms of contribution to the catch where it represents about (40%) of the landed catch, while most the other species contributed less than 10% each [Lethrinidae (9.78%), Scaridae (9.67%), Gerridae (6.89%), Carangidae (5.68%), Haemulidae (5.42%), Lutjanidae (4.93%), Siganidae (4.64%), Mugilidae (4.55%), Belonidae (2.82%), Sphyrnidae (1.3%) and Sparidae (1.3%)] while the rest of the fish families represent each less than 1% of the landed catch.

3.3. Monthly Abundance of the Commercial Fish Families

The monthly landed catch during the period of study is represented in Figure (3). The figure shows that from August to December (1997) a progressive increase in the landed catch was observed. A decrease occurred in the following four months from January to April (1998) followed by increase in May and June then it decreased continuously to the end of the period of study. Generally, it could be stated that there was no monthly catch pattern throughout the study period.

Figure 4 (a & b) shows the variations in the percentages of monthly abundance of each family in the catch during the period of study. The figures indicate that, family Serranidae was the most dominant in the fishing ground all the year round associated with coral reefs, followed by family Lethrinidae which lives on the bottom of both the open water and the coral reef beds and it is always available for fishing.

Family Gerreidae is represented in the area of study by only one species (*Gerres oyena*), this species is abundant in the fishing grounds during autumn and winter.

Family Carangidae is most abundant in the fishing grounds during autumn and spring months, while family Haemulidae is least abundant in the fishing grounds during summer and autumn months, they are abundance in winter and spring.

Family Lutjanidae is abundant in the fishing grounds all year round but are very rare during summer months and family Siganidae is abundant in the fishing grounds of the study area all year round with the exception of spring where they are of very low abundance. Some members of this family are pelagic species and are also seeking cooler water off-shore.

Family Mugilidae is less abundant in the fishing grounds during early spring then increases with the beginning of autumn and winter. Fish species belonging to this family are pelagic and they seek cooler off-shore water. On the other hand, family Belonidae is least abundant in the fishing grounds during spring and summer months. It is abundant during autumn and winter.

Family Sphyraenidae is more abundant in winter and spring than in summer and autumn. Both families Sparidae and Mullidae were more abundant during autumn and winter and almost absent from the fishing grounds during spring and summer. Some members of these families are pelagic species and are also seeking cooler water off-shore.

Family Labridae is the least abundant of all fish families cited above. It shows some degree of increase in abundance during winter, while family Scombridae is almost absent from the fishing grounds during summer months, however it is more or less frequent during winter and spring months.

3.4. Abundance Correlations of Different Fish Families

Table (2) shows the abundance correlations of the different fish families in the area of study during the period of the present investigation. It could be noticed that some positive correlations existing between some families. Family Haemulidae and Sphyraenidae are highly correlated ($r > 0.824$, $P < 0.005$). This shows that, they either have the same habitat or occur in the same

season and in fact both are pelagic. Sphyraenidae comprises carnivorous fishes, where as Haemulidae are bottom feeders. Hence there is no competition for food between them. Occurring in the same season is the reason for this high correlation.

There is other high correlation ($r > 0.893$, $P<0.005$) between family Carangidae and family Scombridae due to their abundance in the same months.

More highly significant relations could be also noticed between Lutjanidae, Lethrinidae, Gerridae and Mugilidae. This could be attributed to their common association to coral reefs or their abundance in the same season. It should be noted that, Lutjanidae, Lethrinidae and Gerridae are bottom feeders, whereas Mugilidae are known to feed on detritus materials and fine algae found within the surface of bottom sediments.

Table 1a: Check list of the common fish species in Halaieb/Shalatien area ["Red Sea Native" (N), "Indo-pacific migrant" (M) and "Lessepsian migrant" (R)].

No.	Case	Family	Species	Local name (in Arabic)
1	M & R	Belonidae	*Tylosurus choram*	خرم
2	N & M	Bothidae	*Bothus pantherinus*	سمكة موسى
3	M	Carangidae	*Carangoides malabaricus*	سليخ بياض حمام
4	M	Carangidae	*Carangoides chrysophrys*	بياض – حمام
5	M	Carangidae	*Caranx heberi*	جرم بياض
6	N & M	Carangidae	*Caranx sexfaciatus*	ضيمة
7	M	Carangidae	*Scomberoides commersonianus*	نسخة
8	N & M	Carangidae	*Scomberoids lysan*	عضاض
9	N & M	Carangidae	*Trachinotus blochii*	ضيمة
10	M	Chanidae	*Chanos chanos*	سمكة الخني
11	N & M	Chirocenrtidae	*Chirocentrus dorab*	سمكة السيف
12	N & M	Clupeidae	*Amblygaster sirm*	سردين
13	N & M	Gerreidae	*Gerres oyena*	قاصة
14	M	Haemulidae	*Plecorhynchus gaterinus*	قطرينة
15	M	Haemulidae	*Plecorhynchus pictus*	شطف
16	M	Haemulidae	*Plecorhynchus shotaf*	شطف
17	N & M	Holocentridae	*Sargocentron spiniferum*	بصيلي
18	N	Labridae	*Anampses caeruleopnctatus*	ملص
19	N & R	Lethrinidae	*Lethrinus borbonicus*	بنقص
20	N & M	Lethrinidae	*Lethrinus lentjan*	شركسة
21	N & M	Lethrinidae	*Lethrinus mahsena*	شعور محسنى
22	M	Lethrinidae	*Lethrinus miniatus*	خرمية
23	N & M	Lethrinidae	*Lethrinus nebulosus*	شعور
24	N & M	Lethrinidae	*Lethrinus variegates*	دريني
25	N & M	Lethrinidae	*Monotaxis grandoculis*	شعور أبو عيون
26	N & M	Lutjanidae	*Lutjanus bohar*	*بهار*
27	N & M	Lutjanidae	*Lutjanus fulviflamma*	حبرية
28	N & M	Lutjanidae	*Lutjanus gibbus*	عصمود
29	M	Lutjanidae	*Lutjanus lunulatus*	شخرم

Table 1b: Check list of the common fish species in Halaieb/Shalatien area ["Red Sea Native" (N), "Indo-pacific migrant" (M) and "Lessepsian migrant" (R)].

No.	Case	Family	Species	Local name (in Arabic)
30	M	Lutjanidae	*Lutjanus quinquelineatus*	حبرية
31	M	Mullidae	*Upeneus sulphureus*	عنبر أصفر
32	M	Mugilidae	*Liza macrolepis*	بوري عربي
33	M	Paralichthyidae	*Pseudorhombus arsius*	سمكة موسى
34	M	Priacanthidae	*Priacanthus tayenus*	أبو شرارة
35	M	Scaridae	*Scarus ghobban*	حريد
36	M	Scaridae	*Scarus rubroviolaceus*	فرهود
37	N	Scombridae	*Euthynnus affinis*	كوسكومري
38	N	Scombridae	*Scomber japonicus*	شك الزور
39	N & R	Scombridae	*Scomberomorus commerson*	دراك
40	M	Scombridae	*Scomberomorus guttatus*	دراك عادي
41	N, M & R	Serranidae	*Cephalopholis miniata*	كشر
42	N & M	Serranidae	*Cephalopholis oligosticta*	كشر أم ربان
43	N & M	Serranidae	*Epinephelus areolatus*	كشر أبو عدس
44	N & M	Serranidae	*Epinephelus chlorostigma*	كشر أبو عدس
45	N, M & R	Serranidae	*Epinephelus tauvina*	كشر توينة
46	N & M	Serranidae	*Plectropomus areolatus*	ناجل (طراد أزرق)
47	M	Serranidae	*Plectropomus maculatus*	ناجل (طراد أحمر)
48	N & M	Serranidae	*Variola louti*	كشر شريف
49	M	Siganidae	*Siganus javus*	سيجان
50	N, M & R	Siganidae	*Siganus luridus*	سيجان
51	N, M & R	Siganidae	*Siganus rivulatus*	سيجان
52	N, M & R	Sparidae	*Acanthopagrus bifasciatus*	رباق
53	N, M & R	Sparidae	*Crenidens crenidens*	حفار
54	M & R	Sparidae	*Diplodus sargus sargus*	بطيط بنقطة
55	N & M	Sparidae	*Rhabdosargus sarba*	دنيس
56	N & M	Sphyraenidae	*Sphyraena barracuda*	باراكودا
57	N & M	Sphyraenidae	*Sphyraena jello*	عقام
58	M	Terapontidae	*Terapon jarbua*	جعبول خيط

Table 2: The abundance correlations of the identified fish families in Halaieb/Shalatien area during the study period.

Scombridae	Labridae	Mullidae	Sparidae	Sphyraenidae	Belonidae	Mugilidae	Siganidae	Lutjanidae	Haemulidae	Carangidae	Gerriedae	Scaridae	Lethrinidae	Serranidae	
0.493*	-0.131	-0.218	0.111	0.349	0.146	0.216	0.295	0.43	0.506*	**0.710****	0.178	0.503*	**0.553****	1	**Serra.**
0.316	-0.004	0.013	**0.664****	0.308	**0.692****	**0.717****	**0.724****	**0.849****	0.486*	0.495*	**0.677****	0.316	1		**Lethrin.**
0.141	0.067	-0.191	-0.102	-0.074	-0.038	-0.086	0.535*	0.025	0.159	0.136	-0.11	1			**Scarid.**
-0.106	-0.004	0.077	**0.718****	0.153	**0.657****	**0.977****	**0.696****	**0.903****	0.231	0.093	1				**Gerried.**
0.893**	-0.059	-0.005	0.042	**0.684****	0.225	0.117	0.109	0.394	**0.745****	1					**Carang.**
0.712**	0.425	0.277	0.194	**0.824****	0.470*	0.248	0.278	0.440*	1						**Haemuli.**
0.138	0.058	0.104	**0.704****	0.306	**0.741****	**0.926****	**0.722****	1							**Lutjani.**
-0.012	0.138	0.126	**0.573****	0.033	**0.567****	**0.710****	1								**Sigani.**
-0.084	-0.014	0.064	**0.767****	0.177	**0.672****	1									**Mugilid.**
0.059	0.540*	**0.584****	**0.669****	0.169	1										**Belonid.**
0.673**	0.037	-0.028	0.001	1											**Sphyraen.**
-0.056	0.038	0.295	1												**Sparid.**
-0.037	**0.717****	1													**Mullid.**
-0.081	1														**Labrid.**
1															**Scomb.**

*: Correlations are significant ($p < .01$) **: Correlations are highly significant ($p < .005$).

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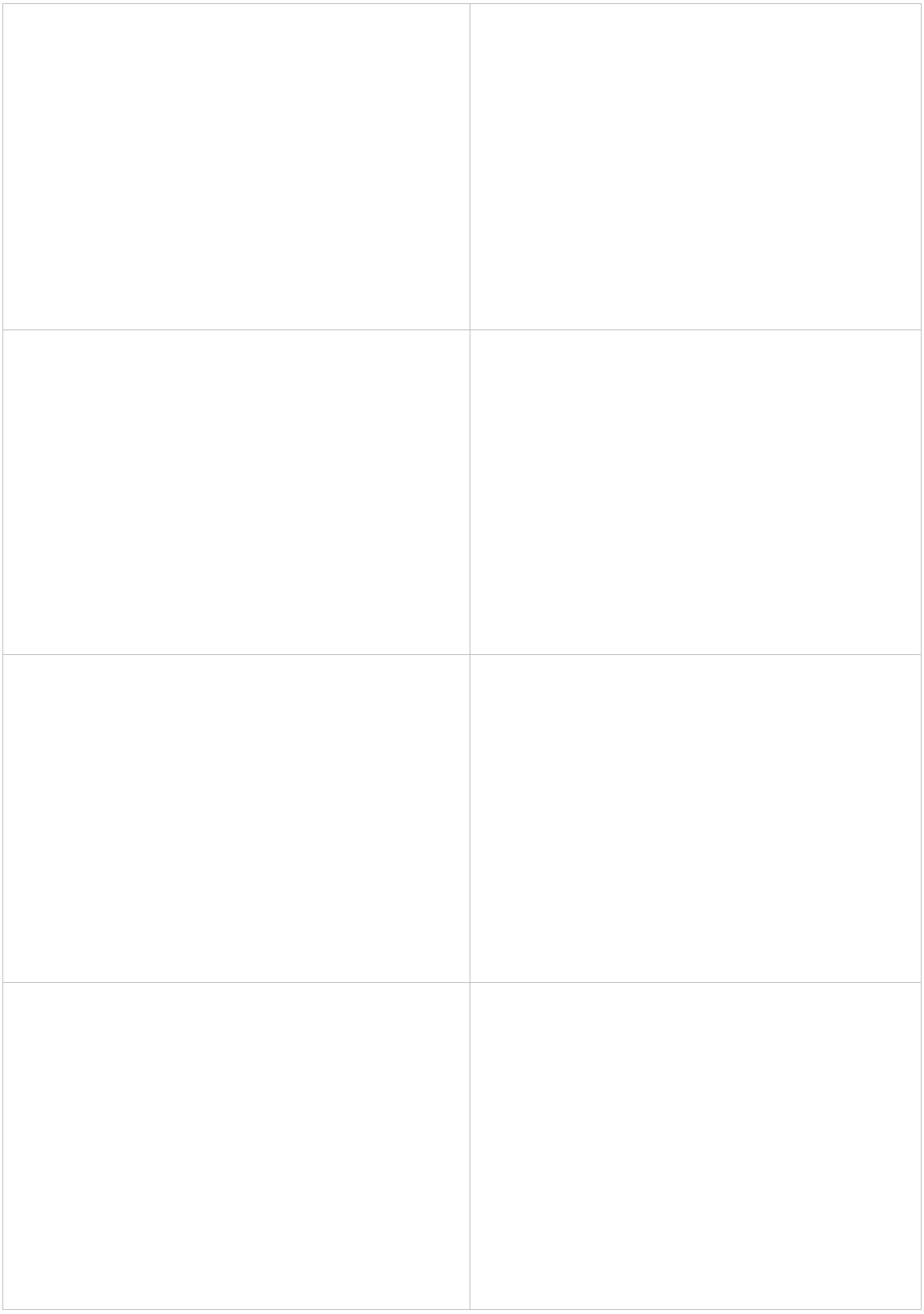


Plate a (1 - 8): Common fish species present in the landed catch of the study area.

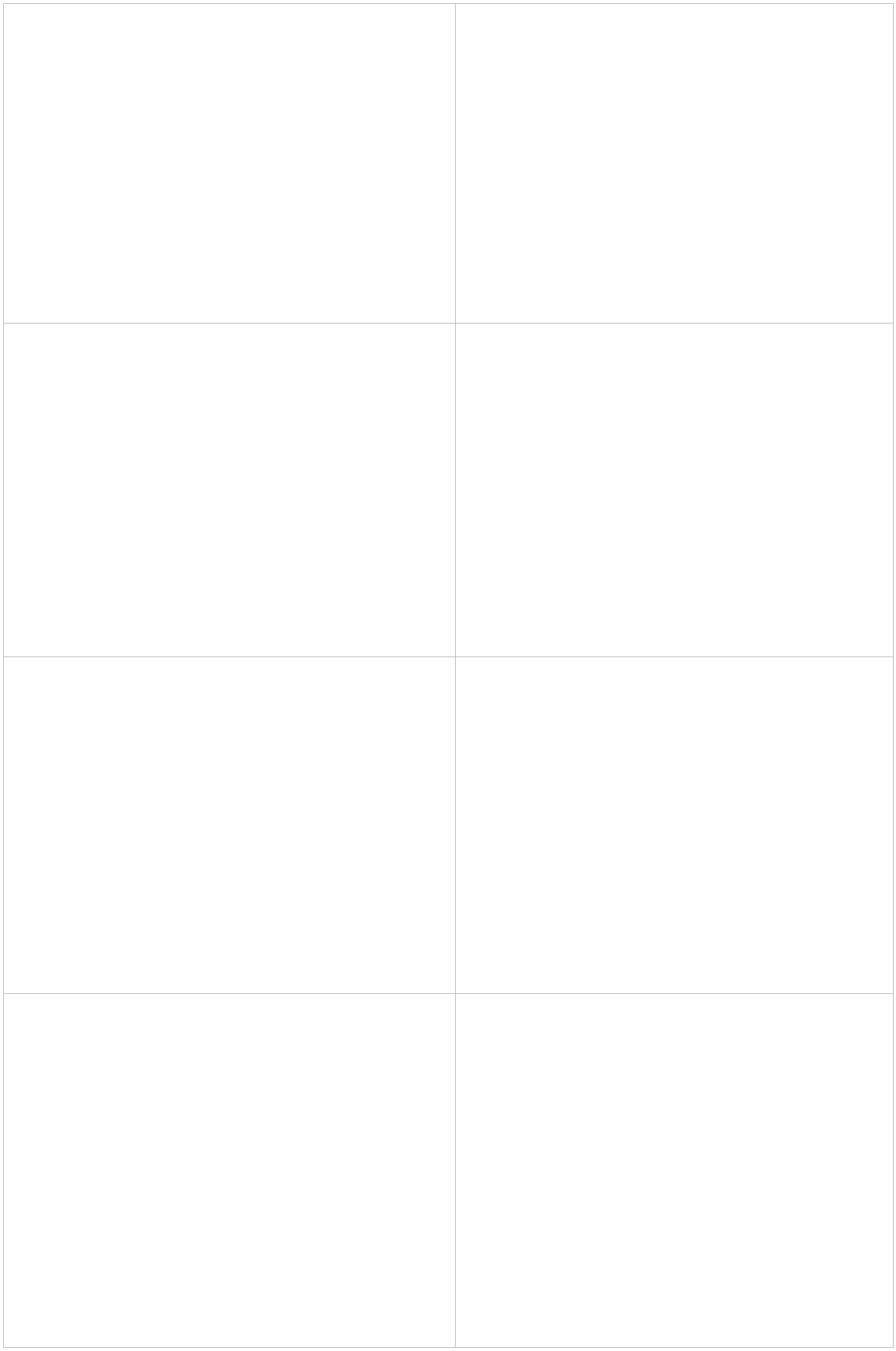


Plate B (9 - 16): Common fish species present in the landed catch of the study area.

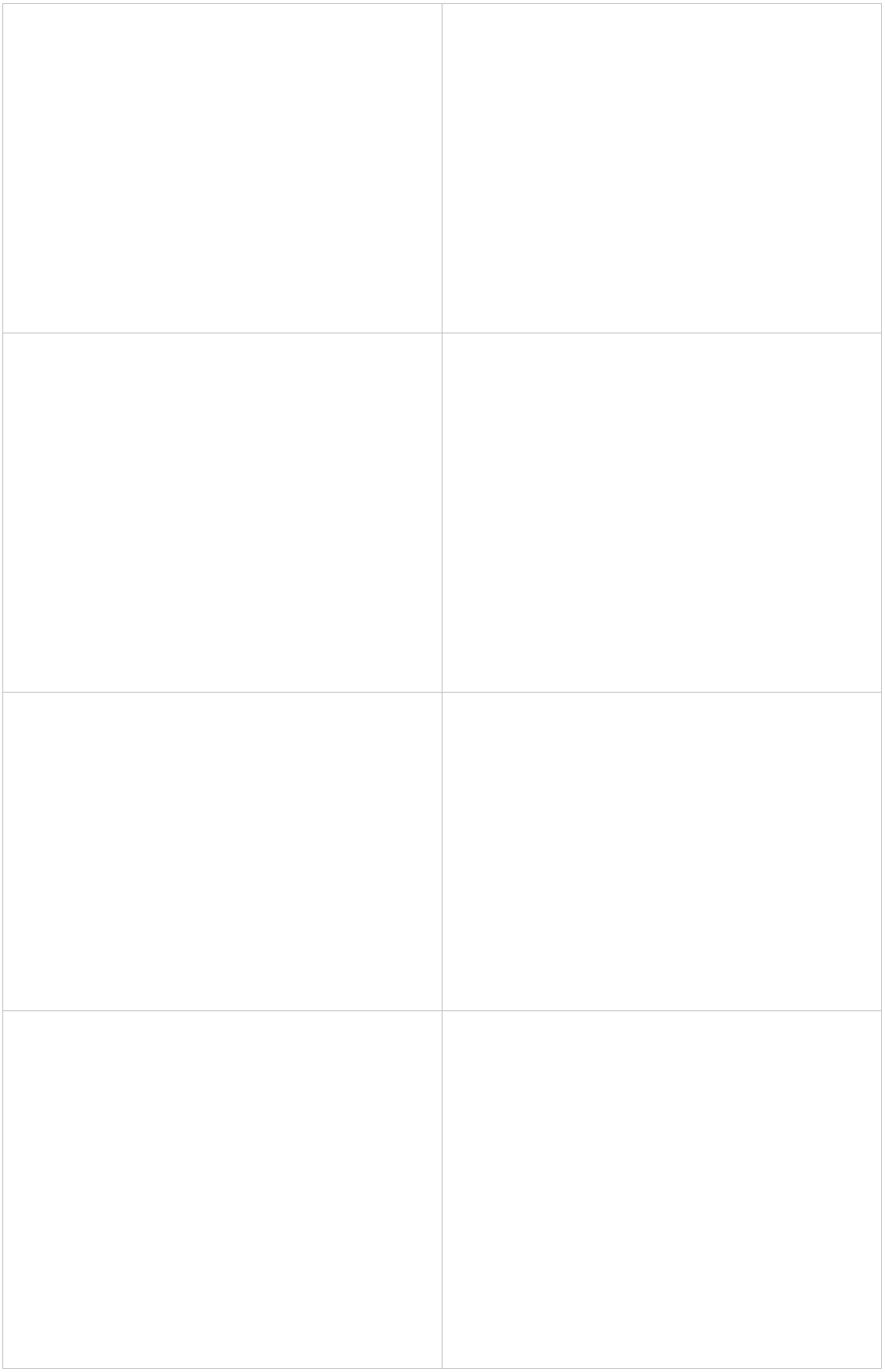


Plate C (17 - 24): Common fish species present in the landed catch of the study area.

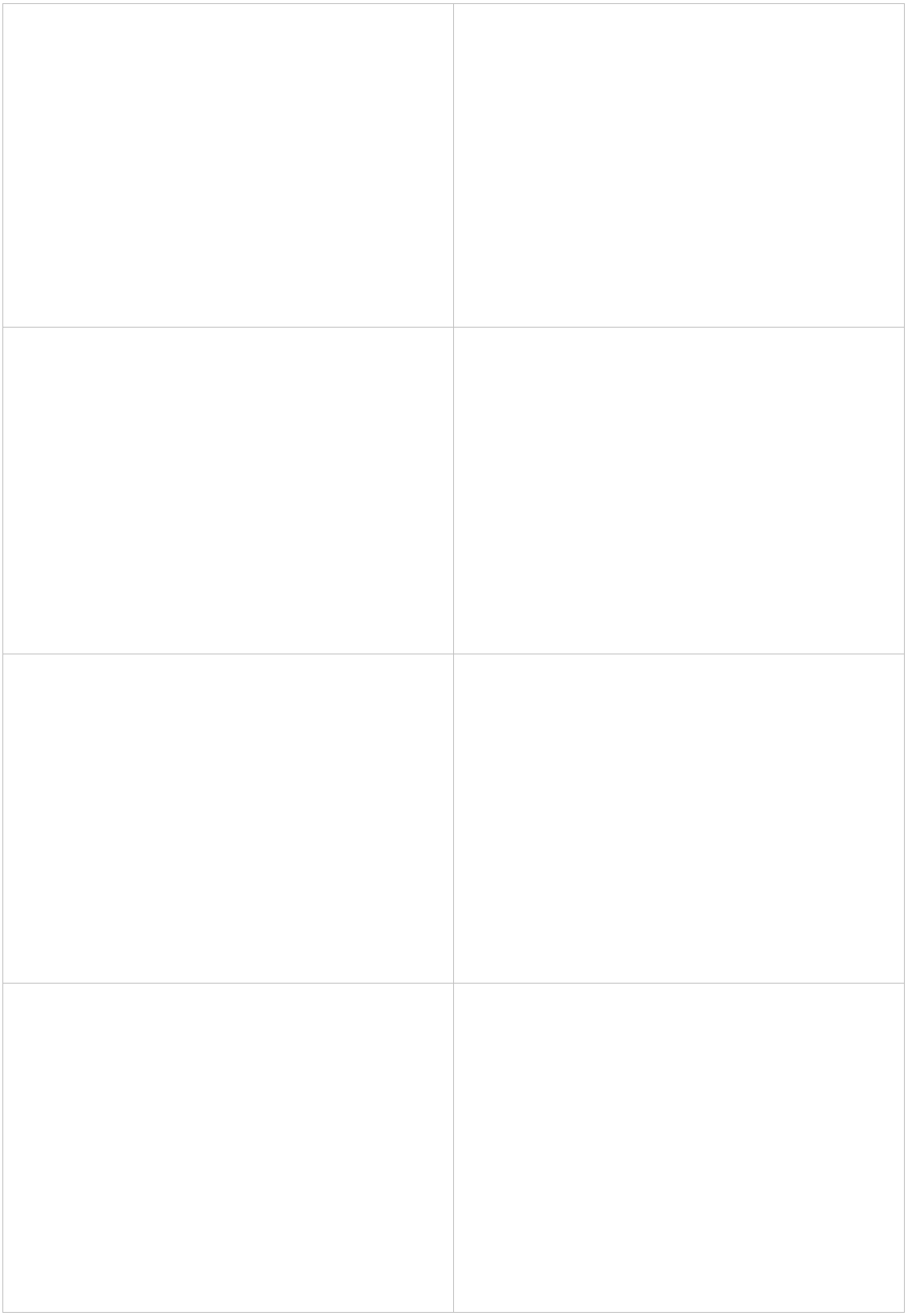


Plate D (25 - 32): Common fish species present in the landed catch of the study area.

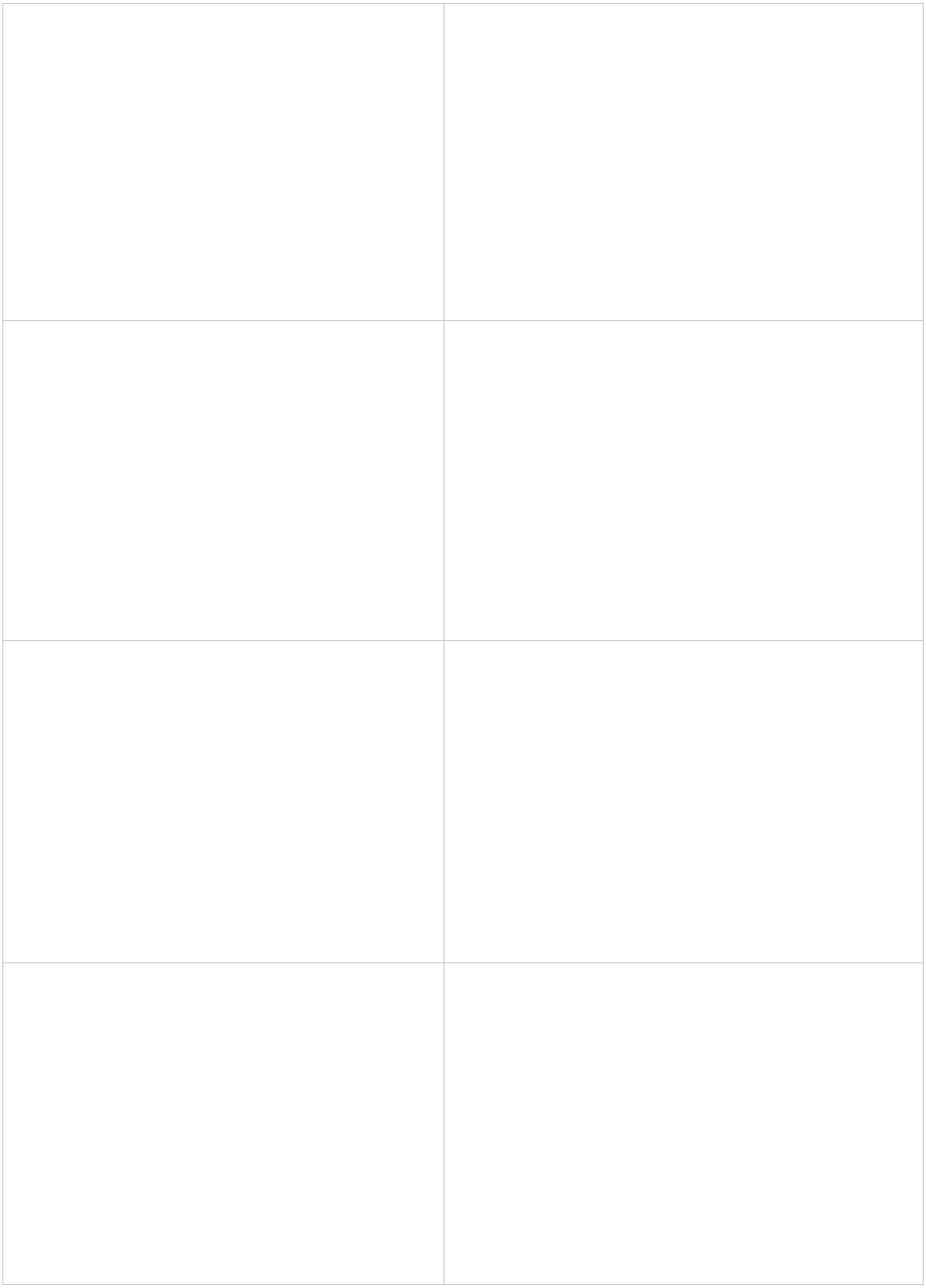


Plate E (33 - 40): Common fish species present in the landed catch of the study area.

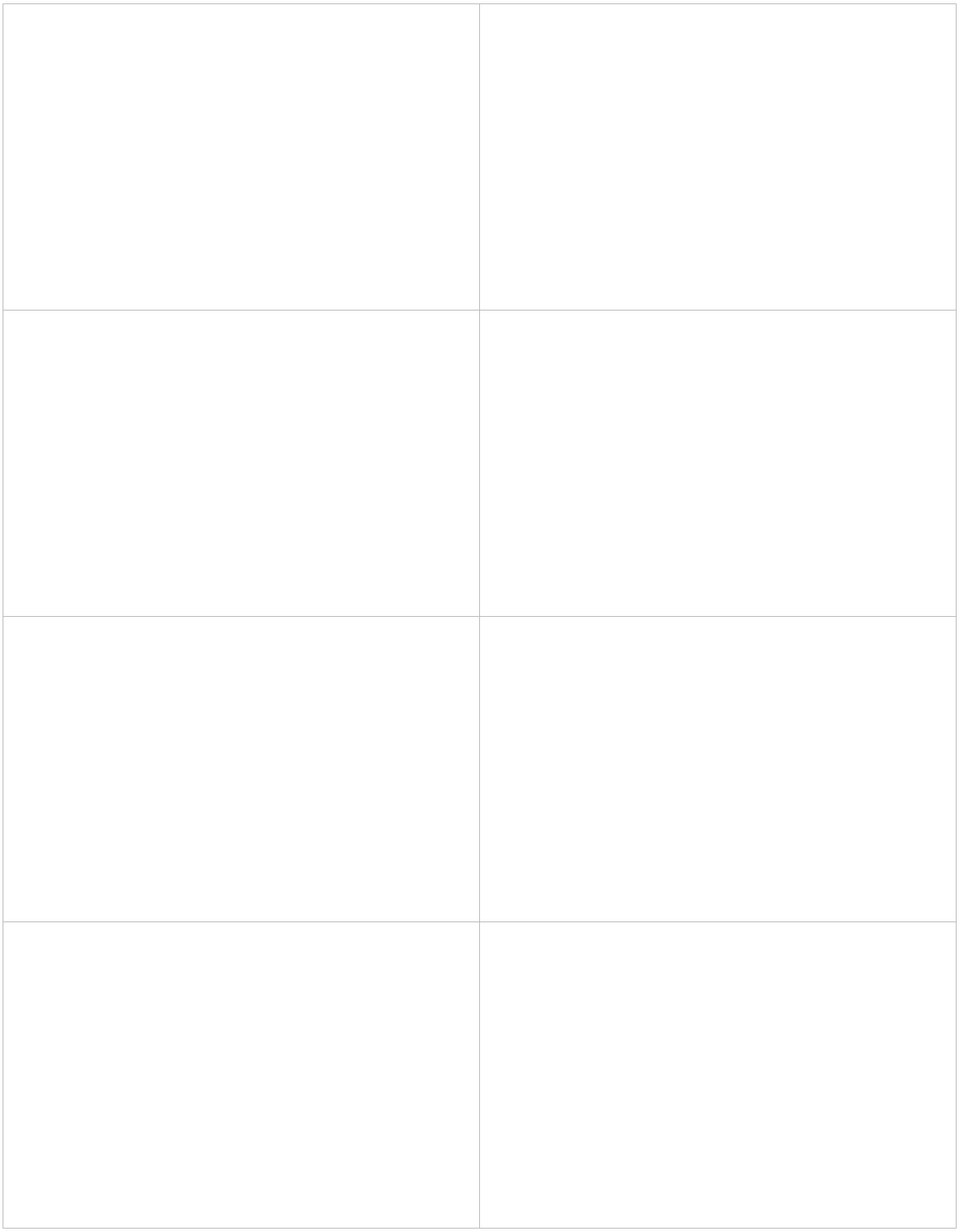


Plate F (41 - 48): Common fish species present in the landed catch of the study area.

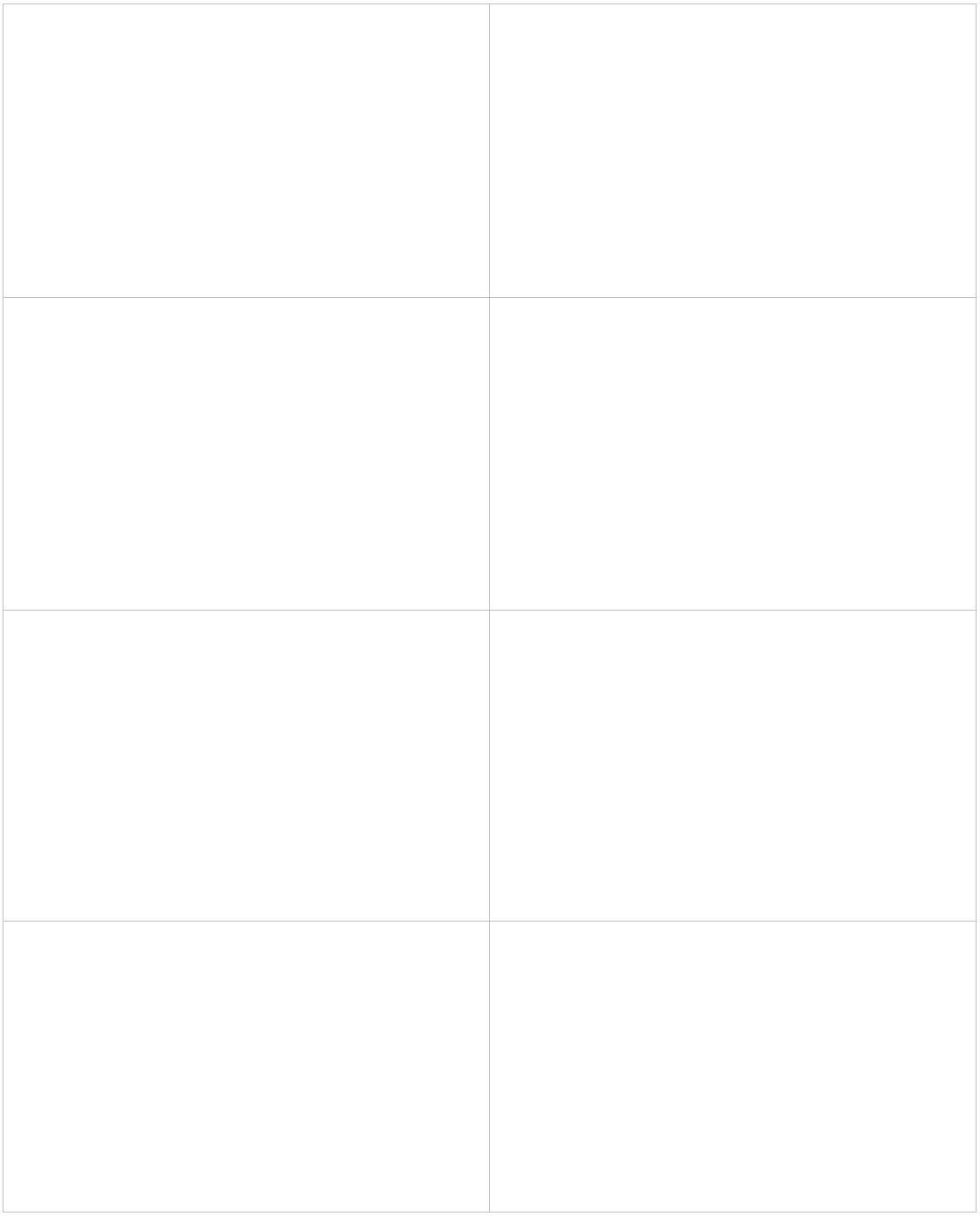
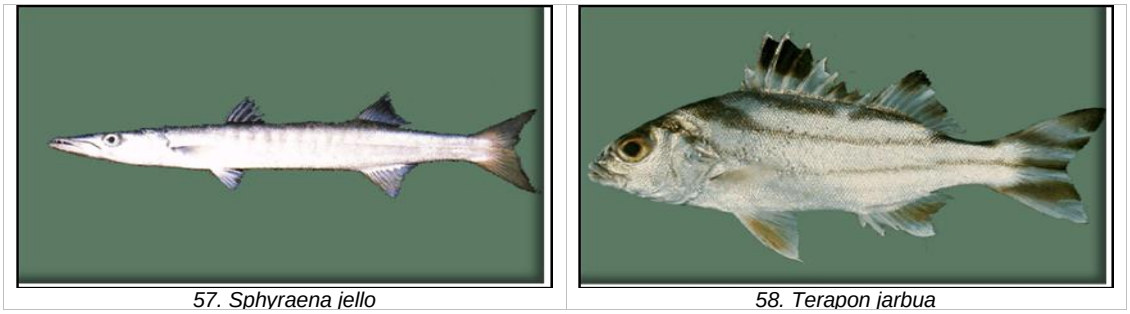


Plate G (49 - 56): Common fish species present in the landed catch of the study area.



57. Sphyraena jello *58. Terapon jarbua*

Plate H (57 - 58): Common fish species present in the landed catch of the study area.

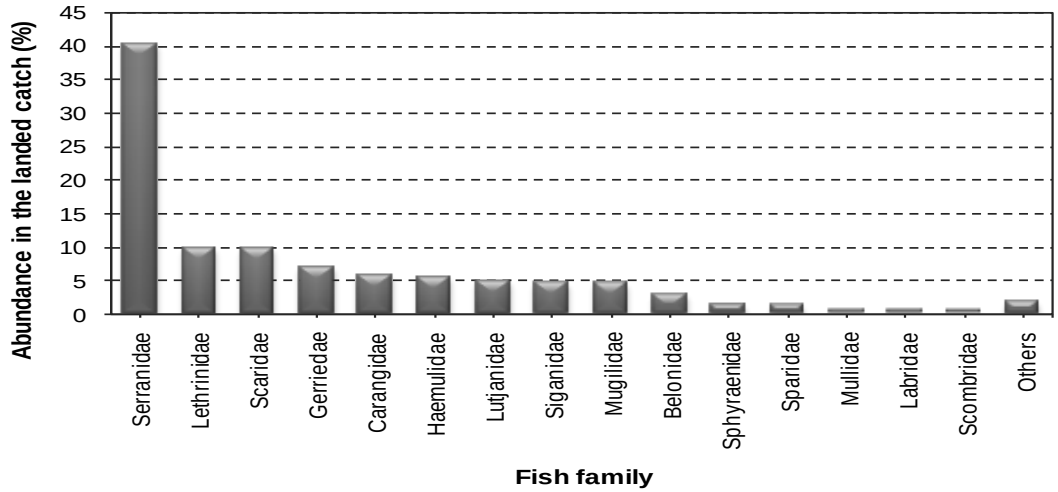


Figure 2: Percentage abundance of different fish families with respect to the total landed catch from Halaieb/Shalatien area through the study period.

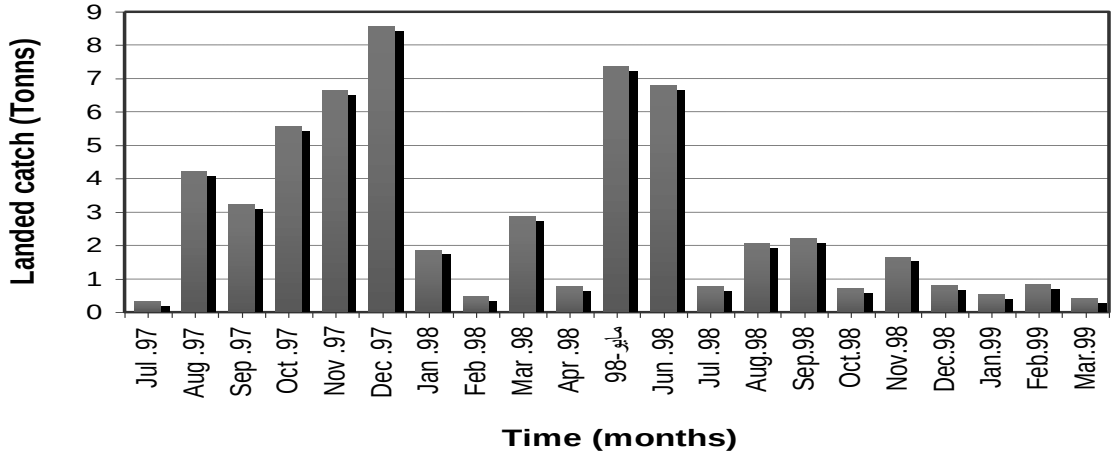


Figure (3): The monthly landed catch from "Halaieb/Shalatien area during the period from July 1997 to March 1999.

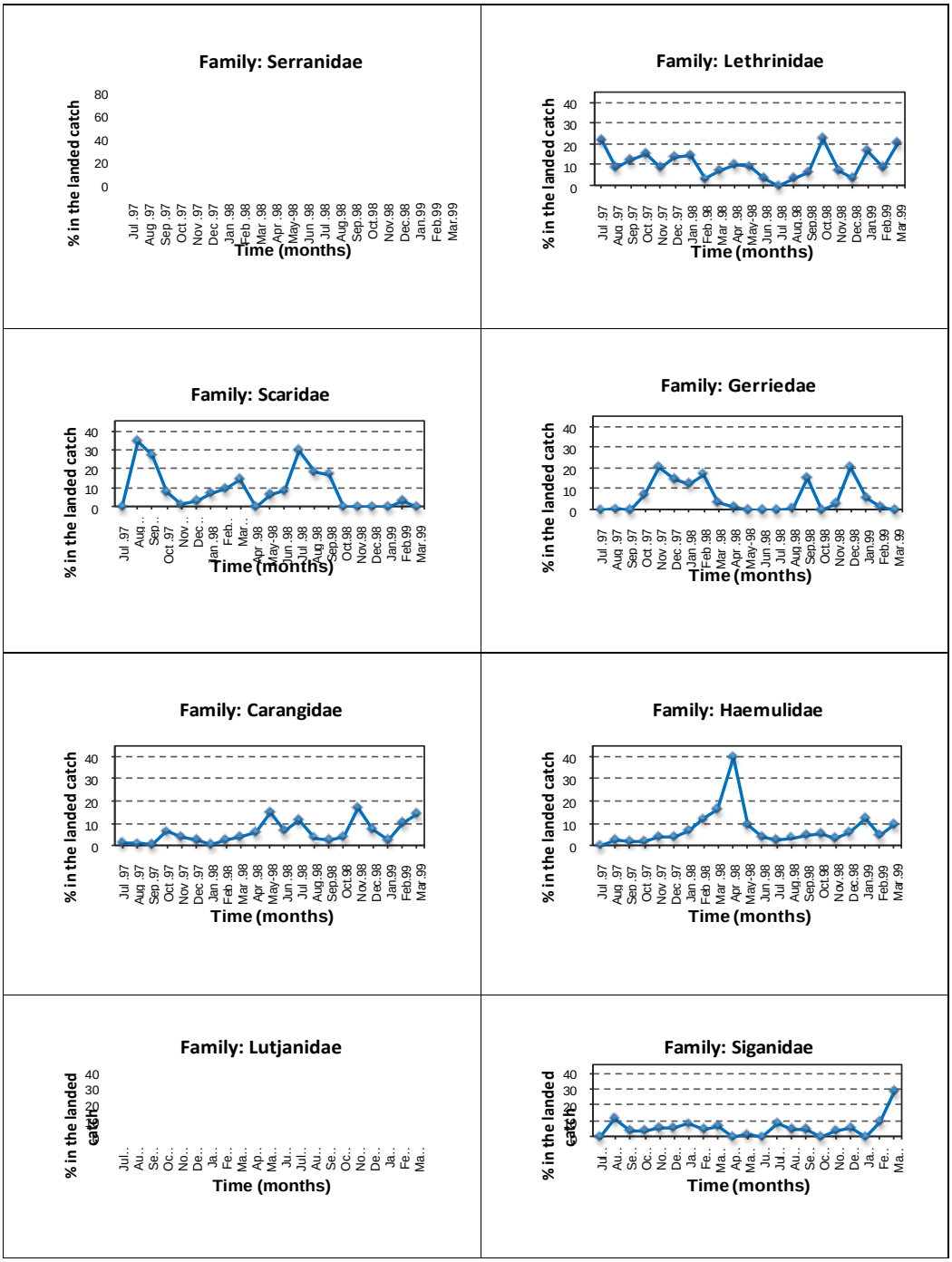


Figure 4a: Abundance (%) of the identified fish families in Halaieb/Shalatien area with respect to the monthly landed catch of the area.

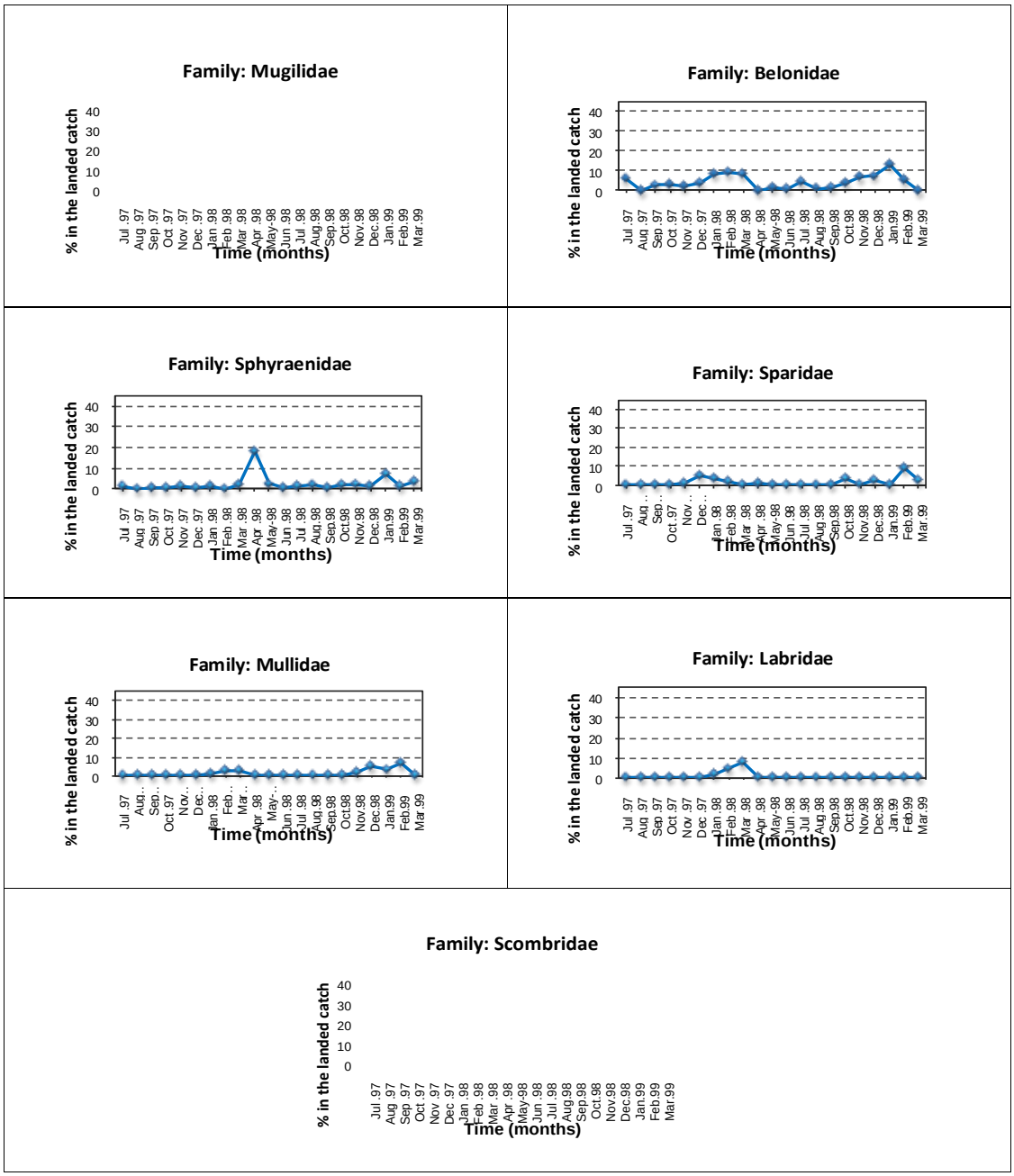


Figure 4b: Abundance (%) of the identified fish families in Halaieb/Shalatien area with respect to the monthly landed catch of the area.

5. Discussion

In the area of study fifty eight fish species, belonging to twenty three families were identified, some of these species proved to be lessepsian migrant and are now frequent members of Mediterranean fishes (Froese, R. & D. Pauly, 2009). All the recognized species were cited before by Goren and Dor (1994) who mention that, the number of fish species in the Red Sea may reach about 1250 species belonging to 156 different families and Randall (1983) who gave a detailed description of the most common reef fishes. He recorded a total of 325 species belonging to 57 families in the Red Sea; about 87% of these fish families are demersal, while the rest (about 13%) are pelagic.

Various authors were concerned with the study of these families, i.e. their taxonomy, biology, ecology, fisheries and stock assessment in the Red Sea and other reef locations. Among those authors Gulland (1969), Grofit (1971), Neve and Aiidy (1972), Hashim and Shakour (1981), Ezzat *et al.* (1982), Young *et al.* (1982), Sanders *et al.* (1984), El Etreby (1986), El Agamy *et al.* (1987), Abu Hakima (1987), Salem (1990 (a & b)), Wassef and Bawazeer (1990 & 1992), Wassef (1991), Andaloro and Rinaldi (1992), Ezzat *et al.* (1996), Brown and Sumpton (1998), Golani (1998), Rathacharen *et al.* (1999), Pilling *et al.* (2003), Westera *et al.* (2003), Mahmoud (2005) and Mahmoud *et al.* (2009).

Kuo and Shao (1999) studied the species composition of fish in the coastal zones of the Tsengwen estuary, Taiwan. They gave a checklist of 80 families and 244 species of inshore fishes. Among these families Gobiidae, Carangidae, Apogonidae and Clupeidae were the most dominant families.

The abundance correlations of the different fish families in the area of study during the period of the present investigation shows that, the fish families which are found in one season have higher positive abundance correlations, while families which are found all over the year have weak correlations with the exception of those families which live in the same ground.

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دراسة مصايد الأسماك فى منطقة حلايب / الشلاتين بالبحر الأحمر

حاتم حنفى محمود*, ألطاف عبد العزيزعزت محمد أمين إبراهيم***
و خالد محمد أباظة*

*المعهد القومى لعلوم البحار والمصايد بالأسكندرية
** قسم علوم البحار – كلية العلوم – جامعة الإسكندرية

تقع منطقة حلايب/شلاتين في الجزء الجنوبي الشرقي لمصر على ساحل البحر الأحمر حيث تمتد بين خطى عرض 22 إلى 23.8 شمالاً. وتعتبر هذه المنطقة من المناطق القليلة الأستغلال من وجهة نظر المصايد. لذا فإن الدراسة الحالية تهدف إلى الحصول على بيانات حقلية واقعية عن أنواع وكمية الإنتاج من الأسماك في هذه المنطقة.

ومن خلال هذه الدراسة تم التعرف علي أنواع الأسماك المصادة من المنطقة ومواعيد ونسب تواجدها في المصيد. ومن واقع الدراسات الحقلية تم رصد وتصنيف 58 نوع من الأسماك تنتمي الي 23 عائلة من عائلات الأسماك تم جدولتها مع توضيح أصل تواجدها. وقد تبين من النتائج أن عائلة Serranidae (أسماك الكوشر أو الوقار) تمثل 39.8% من جملة المصيد بينما أغلب العائلات الباقية يمثل كل منها أقل من 10% من جملة المصيد وبالتحديد عائلات:

[Lethrinidae (9.78%) Scaridae (9.67%), Gerridae (6.89%), Carangidae (5.68%), Haemulidae (5.42%), Lutjanidae (4.93%), Siganidae (4.64%), Mugilidae (4.55%), Belonidae (2.82%), Sphyrnidae (1.3%) and Sparidae (1.3%)].

وكذلك تم دراسة كمية المصيد الشهري الكلي للمنطقة ومدي أرتباط التواجد الشهري لهذه العائلات من الأسماك بعضها ببعض، وذلك لوضع خطط مستقبلية لتنظيم وادارة المصايد في هذه المنطقة البكر الواعدة.