DISTRIBUTION, ABUNDANCE AND COMPOSITION OF SOME CARANGID FISH IN MON COASTAL WATERS

Thu Thu Min[1],Thant Zin[2],Lwin Mar Aung[3],Soe Thaw Thaw Tun[4]

Abstract

The composition of carangid fish species in the catches from bag net and drift gill net fisheries of three sampling sites, Kyaikkhami, Asin and Zeephyuthaung in Mon coastal waters were recorded during June 2013 and May 2015. A total of seventeen carangid species belonging to ten genera contributed to the catches of Mon coastal waters. Among the seventeen species of Mon coastal waters, the catches of Asin sampling site composed of fifteen species followed by 14 species (Zeephyuthaung) and 9 species (Kyaikkhami). The catch weight and catch effort was found to be highest in Asin with an average of 24829kg and 3.7kg/boat/day followed by Zeephyuthaung (21563kg, 3.1kg/boat/day) and Kyaikkhami (3724kg, 2.6kg/boat/day). The catches were high in November to January at Kyaikkhami, October to December at Asin and September to December at Zeephyuthaung. The highest average percentage of carangid species composition in total catch was observed at Asin (23.825%), followed by Zeephyuthaung (19.82%) and Kyaikkhami (8.8%).

Keywords: catch weight, catch effort, composition, carangid fish.

Introduction

The carangids are pelagic fish widely distributed in Indo-Pacific regions and live in diverse marine habitats. These carangid fish also locally known as Zar-kyan, Zar-byat, Hmee-war and Nga-chin-paung. The Family Carangidae includes ecologically and economically important species such as the jacks, scads, trevallies, pompano, amberjacks and queenfishes.

Carangid fishes are commercially caught in the study areas. Some species are abundant and large in size. They are marketed in fresh locally and dried under the sun. Good quality dried fishes are provided for local markets. Therefore, carangid fishes are valuable food resources for the local people of Mom coastal region. They are mostly taken in bag nets and drift gill net. Most of the study areas in Mon State covered with estuarine regions which are characterized by a variable salinity, a temperature range greater than the sea, and turbid water and muddy bottom. In these areas both of marine and freshwater fishery resources are rich. Thus fish is one of the important protein resources in Mon coastal areas. They can be utilized as food in many forms such as dried, salted, smoked, paste, sauce, and fresh state for local needs and also exported to many other countries to earn foreign currency. Hence they are of great demand by the local people of Myanmar. In the study areas, fish exploitation is almost entirely by traditional boats and gears. Most of the fishing boats were motorized with engines and fishing gears were made of nylon and polyethylene fibers. Most of the villagers of study areas earn their livelihood wholly or partially from marine and estuarine fishing.

Materials and Methods

Study areas and study periods

The study areas were chosen at three stations, namely Asin (Lat. 15°13′ N, Long. 97°47′ E), Zeephyuthaung(Lat. 15° 11′ N, Long. 97° 46′ E) and Kyaikkhami (Lat.16° 03′ N , Long. 97° 35′ E). Samples were collected monthly from June 2013 to May 2015.

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Data collection

For the estimation of species composition, data were collected from the commercial catches of drift gill net and bag net. Based on the catch data, catch rate or catch per unit effort (CPUE) was computed by dividing the total weight of carangids by the number of fishing boats and fishing days (kg/boat/day). Catch composition of species was estimated from the total weight (kg) of carangid samples and expressed in percentages. In the field survey, in addition to the fish collection, the fishery status such as fishing areas, fishing gears and fishing boats were recorded at the different coastal areas. Information regarding the fishery of carangid fish has been collected by visiting the fish landing sites in Mon coastal waters. During the visit fish species were collected from the landing sites. The information was gathered through field visit and inquiring directly to the fishermen about the details of the fishing boats, type of fishing implement and gears they used, mechanism of operation and the type of fish caught in the study areas. The fishing boats, fishing gears with accessories were taken photograph. Questionnaires were compiled and evaluated for the status of fishery. The samples were collected from the catches of bag net and drift gill net fisheries in Mon coastal areas for two successive years from 2013 to 2015.Some of the fishery data were recorded by investigating and questionnaires to local fishermen.

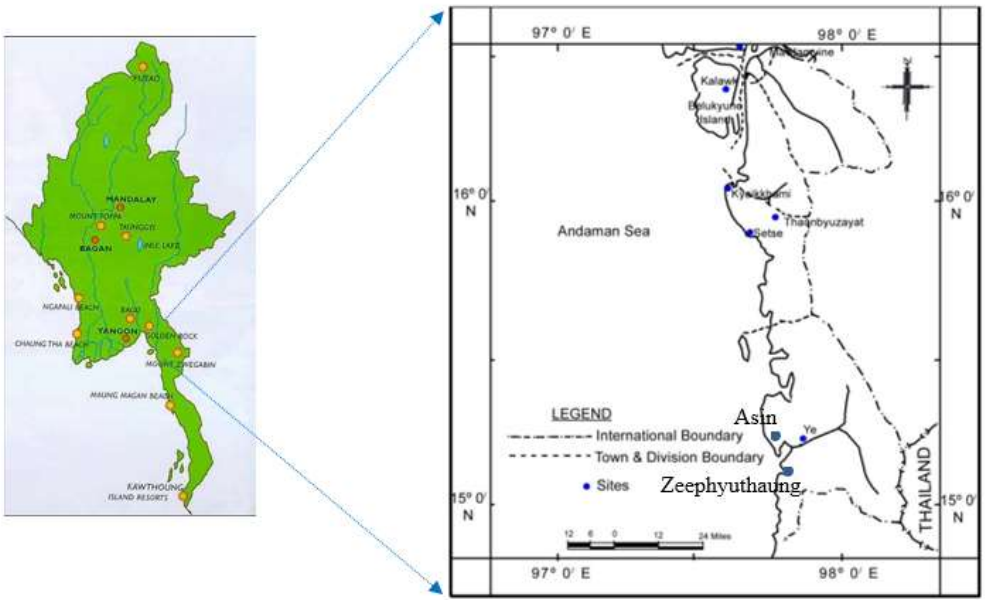

Figure 1 Map showing the sample collection sites in the study areas

Result

Group wise occurrence in the study areas with different gears during the study period

For the group wise occurrence, observation and data collection were made during the study period of June, 2013 to May, 2015. Data used for this study were collected from the drift gill net and bag net fishery. During this study, altogether 23 families including family Carangidae with their catch weight were recorded.

Group wise occurrence in Kyaikkhami areas by drift gill net and bag net

According to this study, altogether nine families with shrimp and trash were caught by drift gill net. Among these families, family Sciaenidae stood first in the catch, estimated 14482 kg (19.3%) of total catch, followed by 12381 kg (16.5%) of Polynemidae, 9605 kg (12.8%) of Lutjanidae and 7879 kg (10.55%) of Engraulidae. Altogether six families with shrimp and trash were caught by bag net. Among these families, family Synodontidae stood first in the catch,

estimated 3756 kg (18.8%) of total catch, followed by 3297 kg (16.5%) of Engraulidae, 2638 kg (13.2%) of shrimp and 2538 kg (12.7%) of Sillaginidae.

Group wise occurrence in Asin areas by drift gill net and bag net

In Asin landing site, the data were collected from drift gill net and bag net. According to data collected by drift gill net, altogether ten families with shrimp and trash were recorded. Among these families, family Polynemidae stood first in the catch, estimated 10402 kg (17.5%) of total catch, followed by 8203 kg (13.8%) of Engraulidae and 7846 kg (13.2%) of Carangidae. Seven families were collected with trash and shrimp by bag net. Among these families, family Carangidae stood first in the catch, estimated 9976 kg (19.5%) of total catch, followed by 8953 kg (17.5%) of Sciaeneidae, 6753 kg (13.2%) of Clupeidae and 5986 kg (11.7%) of Lutjanidae.

Group wise occurrence in Zeephyuthaung areas by drift gill net and bag net

In Zeephyuthaung landing site, the data were collected from drift gill net and bag net. During this study, altogether eleven families with the catch weight percentage were recorded by drift gill net. Among these families, family Sciaeneidae stood first in the catch, estimated 10059 kg (14.8%) of total catch, followed by 7764 kg (11.5%) of Polynemidae and 7223 kg (10.7%) of Carangidae. Altogether twelve families with the catch weight percentage were recorded by bag net. Among these families, family Carangidae stood first in the catch, estimated 8666 kg (12.5%) of total catch, followed by 8112 kg (11.7%) of Polynemidae, 7973 kg (11.5%) of Engraulidae and 7280 kg (10.5%) of Sciaeneidae.

Distribution of carangid fishes along the study areas

A total of 17 species belonging to 10 genera of family Carangidae were recorded from three sampling sites namely Kyaikkhami, Asin and Zeephyuthaung during the study period. The highest species distribution was found at Asin and with 15 species (*Alectis cliaris*, *Alepes djeddaba*, *A. vari*, *Atropus atropos*, *Carangoides chrysophrys*, *Carangoides ferdau*, *Carangoides malabaricus*, *Decapterus macrosoma*, *Decapterus russelli*, *Megalaspis cordyla*, *Parastromateus niger*, *Scomberoides commersonnianus*, *Scomberoides tol*, *Selar crumenophthalmus*, and *Selaroides leptolepis*). The lowest distribution was found at Kyaikkhami with nine species species (Table.1).

Table 1 Stationwise composition of carangid fishes in Mon coastal waters

Sr No.	Species Name	Kyaikkhami	Asin	Zeephyuthaung
1	*Alepes djeddabs*	+	+	+
2	*A. vari*	+	+	+
3	*Alectic ciliaris*	_	+	+
4	*Atropus atropus*	+	+	+
5	*Carangoides chrysophrys*	_	+	+
6	*C. dinema*	_	_	+
7	*C. ferdau*	+	+	+
8	*C. malarbaricus*	+	+	+
9	*Decapterus kurroides*	_	_	+
10	*D. macrosoma*	_	+	_
11	*D. russelli*	_	+	_
12	*Megalaspis cordyla*	+	+	+
13	*Parastromateus niger*	_	+	+
14	*Selar crumenophthalmus*	+	+	+
15	*Selaroides leptolepis*	_	+	_
16	*Scomberoides commersonnianus*	+	+	+
17	*S. tol*	+	+	+

+ = Present; - = Absent

Catch composition of carangid species in Mon coastal waters

Monthly catches of carangids ranged from the minimum of 740 kg (June) to the maximum of 8860 kg (November) in Kyaikkhami fish sampling station with an average catches of 3871 kg. The maximum catch of carangids was found in November (8860 kg) and it decreased slightly to (8270 kg) December and 7880 kg (January) and then sharply decreased to 4480 in February. In 2014-15, the maximum catch was found in December (7960kg) and the amount was slightly lower than 2013-14. The minimum amount (650 kg) was found in June and increased slightly to (675 kg) and then sharply increased to (2050 kg) in August. It was slightly decreased to (7550 kg) in January from the maximum amount and then sharply decreased to (3950 kg) in February.

According to the monthly catch weight of Asin sampling site, it varied from the range of 8800 kg (June) to 51600 kg (December) with an average catches of 25933 kg in 2013-14. The catch weight 8800 kg of June increased to 14400 in July and then slightly decreased to 13500 (August). In September the catch weight reached 30800 kg and then gradually increased to maximum range of 51600 kg in December. After that, it decreased to the 36400 kg (January). In 2014-15, the maximum amount was also found in December (48700 kg) and minimum amount was 6400 kg in June. The catch amounts were lower than the previous year. It was sharply increased to 12500 kg (July) from the minimum of 6400 kg (June). It was slightly decreased to 33600 kg (January) from the maximum of 48700 kg (December) and then increased again to 42300 kg (February). The average catch amount in 2014-15 was 23752 kg which was slightly lower than average catch (25933 kg) in 2013-14. (Figure. 2)

The range of monthly catches of carangids of Zeephyuthaung was from 2900 kg (July) to 48200 kg (December) with an average catches of (22583 kg) in 2013-14. The catches slowly increased from July (2900 kg) to August (4300 kg) and then gradually increased to maximum catch (48200 kg) in December. From the maximum catch, it decreased again to (29000 kg) in January and then slightly increased to (33700 kg) in February. It was found that the maximum catch (45500 kg) in 2014-15 was slightly decreased from the maximum catch of 2013-14. From the maximum catch the amount decreased slowly to 32500 kg (January), 29500 kg (February), 28700 kg (March) and then sharply decreased to 6850 kg (April). The average catch amount was 20541 kg in 2014-15. (Figure. 3)

With regard to monthly catch per unit effort of carangids in Kyaikkhami, it ranged from 1 kg/boat/day to 4.9 kg/boat/day and average effort was 2.7 kg/boat/day in 2013-14. In 2014-15, it ranged from 0.9 kg/boat/day to 3.9 kg/boat/day and average effort was 2.4 kg/boat/day. At Asin, it ranged from 1.6 kg/boat/day to 6.9 kg/boat/day with average effort of 3.9 kg/boat/day in 2013-14. In 2014-15, it ranged from 0.7 kg/boat/day to 6.4 kg/boat/day with average effort of 3.5 kg/boat/day. At Zeephyuthaung, it ranged from 1.5 kg/boat/day to 5.6 kg/boat/day with average effort of 3.1 kg/boat/day in 2013-14. In 2014-15, it ranged from 0.9 kg/boat/day to 6.7 kg/boat/day with average effort of 3.1 kg/boat/day. Average effort was found to be highest at Asin (3.7 kg/boat/day) followed by Zeephyuthaung (3.1 kg/boat/day) and Kyaikkhami (2.5 kg/boat/day).

At Kyaikkhami, the percentage composition of carangids varied from the minimum of 3.9% (June) to the maximum of 14.8% (December) of the total catch with an average composition of 8.8% in 2013-14. In 2014-15, the percentage composition of carangids varied from the minimum of 3.5% (June) to the maximum of 17.4% (December) of the total catch with an average composition of 8.5%. At Asin, the percentage composition of carangids varied from the minimum of from 11.5% (April) to 32.2 % (February) with an average composition of 23.8% in 2013-14. In 2014-15, the minimum percentage was 11% (March) and the maximum percentage was 38.3% (June) with an average of 23.1%. At Zeephyuthaung, the percentage composition of carangids varied from the minimum of from 8.2% (August) to 35% (November) with an average composition

of 19.8% in 2013-14. In 2014-15, the minimum percentage was 5.8% (August) and the maximum percentage was 36.8% (November) with an average composition of 8.1%. (Figure. 2)

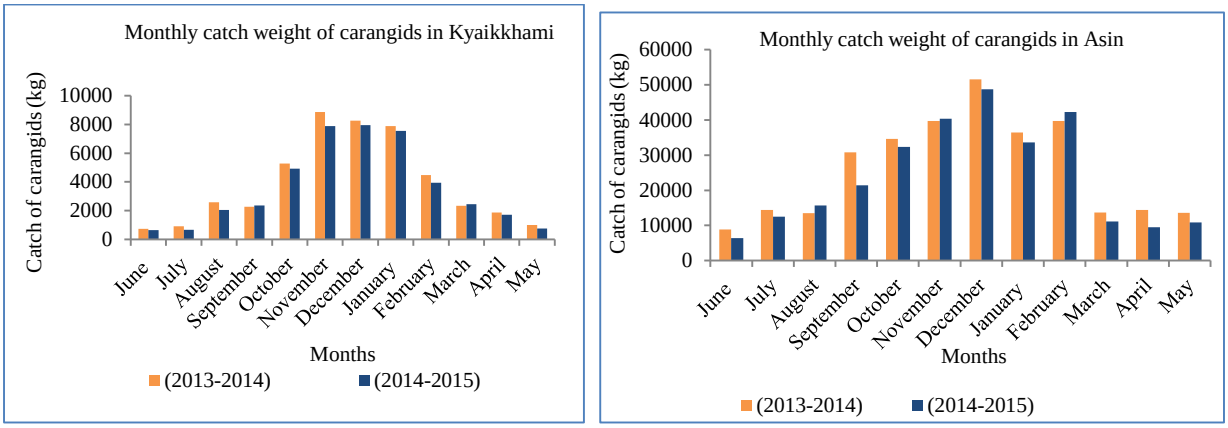

Figure 2 Monthly catch weight of carangids in Kyaikkhami and Asin

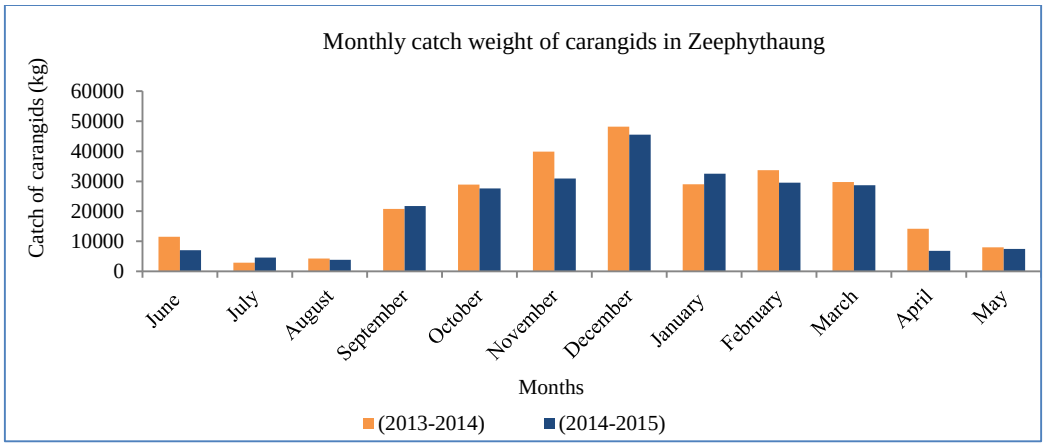

Figure 3 Monthly catch weight of carangids in Zeephyuthaung

Species composition of carangid fishes in Mon coastal waters

The catch composition of species was estimated from the total weight (kg) of carangid samples. *Alepes djdedaba* constituted almost all months except in June, October and May in 2013-14. The highest composition of 13.7% was recorded in January of 2013-14 and 12.5% was highest composition in January of 2014-15. The catch composition of *A. vari* ranged from 4.7% (August) to 19.3% (May) in 2013-14. In 2014-15, the catch composition of *A. vari* ranged from 5.7% (August) to 11.8% (December). The maximum catch composition of *Carangoides ferdau* was 11.4% in January. The catch composition of *Carangoides ferdau* ranged from 7.3% (July) to 13.3% (January). *Megalaspis cordyla* and *Selar crumenophthalmus* occurred in all months. The composition of *M. cordyla* ranged from 17.8% (July) to 34% (September) of 2013-14. In 2014-15, the catch composition of *Megalaspis cordyla* ranged from 19% (July) to 36.3% (May). The distribution of *Scomberoides commersonnianus* to the carangid catches was largest in September (17.2%) of 2013-14. In 2014-15, the catch composition of *Scomberoides commersonnianus* ranged from 9.8% (October, February and April) to 13.7% in March. Fifteen carangid species were contributing to the catches of Asin sampling site. Among them, the catch composition of *Alepes djedaba* ranged from 6.2% (December) to 16.7% (April) in 2013-14. In 2014-15, the catch composition of *Alepedjeddaba* ranged from 6.2% (December) to 20.8% in March. *Aletic ciliaris*

composed the highest percentage of carangid catches was 12.6% (July) in 2013-14. In 2014-15, the catch composition of *Aletic ciliaris* ranged from 3.6% (December) to 13.5% in April. The contribution of *Carangoides chrysophrys* was ranged from 7.2% (December) to 24% (March) in 2013-14. In 2014-15, the catch composition of *Carangoides chrysophrys* ranged from 8.5% (February) to 23.7% (March). The highest percentage of *C. malabaricus* was 13.3% (September) in 2013-14. In 2014-15, the catch composition of *C. malabaricus* ranged from 6.4% (October) to 14.7% (September). *M. cordyla* and *S. crumenophthalmus* were occurred in all months of carangid catches. The maximum composition of *M. cordyla* was found in June (11.4%) in 2013-14. In 2014-15, the catch composition of *M. cordyla* ranged from 2.8% (July) to 14.3% (October). The maximum composition of *S. crumenophthalmus* was 26.4% (May) in 2013-14. In 2014-15, the catch composition of *S. crumenophthalmus* ranged from 9.5% (November, December) to 24% (April). The contribution of *Parastromateus niger* was ranged from 7.2% (November) to 12.1% (May) in 2013-14. In 2014-15, the catch composition of *Parastromateus niger* ranged from 6.7% (November) to 18.4% (April). The maximum catch compositions of *Scomberoides commersonnian*us was 26.4% (February) in 2013-14. In 2014-15, it was ranged from 5.3% (June) to 22.4% (February). Monthly catch weight (kg) and species composition (%) of carangids of Zeephyuthaung was shown in Appendix 8 and 9. The percentage of *Alepes djeddaba* was ranged from 4.7% (August) to 7.5% (October) in 2013-14. In 2014-15, the catch compositions of *Atropus atropus* in 2013-14 was ranged from 5.9% (July) to 7.7% (December, April). In 2014-15, the catch compositions of this species ranged from 5.3% (January)) to 11.4% (August). *Carangoides chrysophrys* were highest in March (9%) and January (18.6%) January in 2013-14. In 2014-15, the catch compositions of this species ranged from 9.2% (March)) to 18.3% (January). The maximum catch composition of *C. ferdau* was found in August (23.3%) and minimum composition was in June (6.2%) in 2013-14. In 2014-15, the catch compositions of this species ranged from 8.6% (June)) to 22.7% (August). The catch compositions of *Megalaspis cordyla* in 2013-14 was ranged from 6.7% (September) to 18.2% (April). In 2014-15, the catch compositions of this species ranged from 7.5% (September) to 18.5% (May). The percentage of *Parastromateus niger* was ranged from 9.6% (November) to 15.8% (September) in 2013-14. In 2014-15, the catch compositions of this species ranged from 9.5% (June) to 15.4% (December). The catch composition of *Selar crumenophthalmus* was ranged from 5% (February) to 14% (August) in 2013-14. In 2014-15, the catch compositions of this species ranged from 5.2% (February) to 13.7% (August).The maximum catch compositions of *Scomberoides commersonnianus* was 19.3% (October) in 2013-14 and 14.6% (June) in 2014-15. The minimum catch compositions of *S. commersonnianus* was 6.9% (July) in 2013-14 and 6.2% (July) in 2014-15. The highest and lowest compositions of *S. tol* were 18.9% (April) and 7.7% (March) in 2013-14. In 2014-15, the highest and lowest compositions of this species were 15.3% (April) and 3.7% (July) respectively.

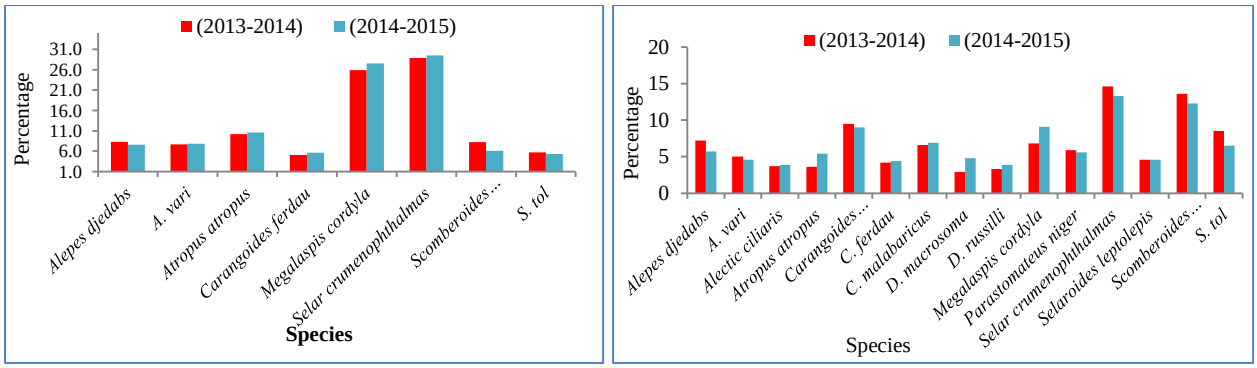

Figure 4 Average percentage species composition of carangids in A) Kyaikkhami and B) Asin

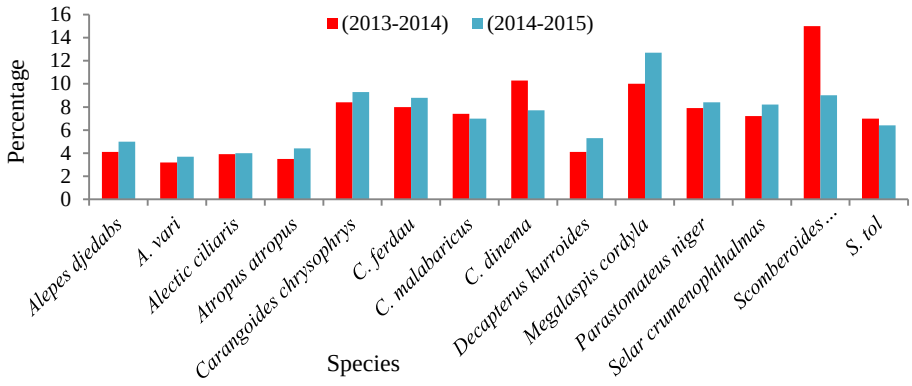

Figure 5 Average percentage species composition of carangids in Zeephyuthaung

Discussion

According to the data based on the fishery, drift gill net and bag net fishing methods were used in the study areas as a major fishing gear although the other fishing apparatus were used. Fishing was operated throughout the year in the sea. The main fishing gears used in this area were bag net, drift gill net and seine net. Among the fishers both genders were involved in the fisheries with the male gender dominating the pre and fish harvesting sectors and the female gender dominating the post-harvest preservation and marketing sectors.

From the information obtained from the field survey, carangid fishes were widely distributed along the study areas of Mon coastal water. In Asin and Zeephyuthaung, the highest species compositions were found with 15 and 14 species respectively. It was found that *M. cordyla* and *Selar crumenophthalmus* observed in almost all sampling stations throughout the study periods. Monthly species distribution of carangids was recorded from three stations of Kyaikkhami, Asin and Zeephyuthaung. Among the seventeen species of carangid occurring in Mon coastal waters, the highest species distribution was found in Asin sampling station with fifteen species, followed by Zeephyuthaung station with fourteen species. *Megalaspis cordyla* and *Selar crumenophthalmus* were observed in all sampling sites throughout the study period. *Decapterus russilli* and *Selaroides leptolepis* were only recorded in the catches of Asin sampling site. There were nine species recorded at Kyaikkhami during the study period. According to the research by Nair *et al* (2000), *Carangoides* was the most diverse group with nine species followed by *Caranx* with seven species in Cochin,Kerala.

According to monthly species distribution in Kyaikkhami, it was found to be highest in July and August with eight species and followed by February with seven species while lowest in May with four species. With regard to the monthly species distribution in Zeephyuthaung, it was found to be highest in June and February with twelve species and lowest in April with seven species. According to monthly catch weight, it was found to be highest in Asin with an average catch of 24829 kg followed by Zeephyuthaung with 21563 kg and Kyaikkhami with 3724 kg. Monthly abundance of carangids in the present study showed that the catches were high during October to January at Kyaikkhami, October to February at Asin and October to December at Zeephyuthaung.

Catch per Unit of effort (CPUE) and catch per unit area (CPUA) are the basic quantity to compute stock density in assessments, and these estimations are utilized to acquire other evaluations such as biomass approximations and abundance indices for essential commercial fish stocks (Hinton and Maunder 2003). With regard to monthly catch per unit effort of carangids, the average CPUE declined from 2.7 to 2.4 kg/boat/day within the study periods in Kyakkhami while

average CPUE decreased from 3.9 to 3.5 kg/boat/day in Asin. In Zeephyuthaung, it was found that average CPUE was 3.1 kg/boat/day in both years. In the results by Hosseini *et al* (2018), CPUE for *Caranx ignobilis* and *S.Crumenophthalmus* were 0.159 and 0.078kg/hr, while the results of CPUA were 2.44 and 1.91 kg/km^2 respectively in the Motaf fishing grounds, Bushehr Province, Persian Gulf, Iran. A decline in CPUE reflects a state of over-exploitation, with a fishing pressure exceeding the carrying capacity of the ecosystem (Kantoussan *et al* 2014). So, declining CPUE in Kyaikkhami and Asin showed that the fish population cannot support the level of harvesting. Unchanging CPUE in Zeephyuthaung indicates the sustainable harvesting.

Conclusion

In the present study, a total of 17 species of 10 genera belonging to family Carangidae were collected from the Mon coastal waters. Among these species, some species were dominant in the catches in some areas while others were collected in moderate quantity in the catch and some were found rarely in the catches. Carangid fishes are not exported to foreign country and they are less commercially important. But these fishes were locally marketed and they offer the important source of fish meal and food. Finally, findings of this study gave basic information on the distribution, abundance and composition of carangid fish in the Mon Coastal Waters.

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