



Upholding Local Knowledge for Sustainable Fishery of the Unicorn Leatherjacket Filefish *Aluterus monoceros*: A Case in Malaysia

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The unicorn leatherjacket *Aluterus monoceros* (Linnaeus 1758) is a filefish of the family Monacanthidae. Locally known as 'ikan barat-barat' in Malaysia, this species is a demersal fish found in sub-tropical areas around the world at depths that range from 1.0 m to 50.0 m. With lengths measuring up to 76 cm, this species is generally pale gray to gray-brown in color and is equipped with small hairs that cover the skin giving it a coarse texture like sand-paper (Froese and Pauly, 2006). In Malaysia, the fish is locally consumed as grilled fish or *asam pedas* (a Malay-style cuisine). The country's highest landing of this species was recorded in Terengganu State with Dungun District as the major contributor to the State's filefish landings.

Considerable quantity of unicorn leatherjacket filefish landings have recently been recorded in the States of

Terengganu, Pahang, Kelantan, East Johor, Perak, Sabah, and Sarawak in Malaysia. However, there has been very limited research on this species in the country. In fact, the species was only listed in Malaysia's Annual Fisheries Statistics Report starting in 2008. In Terengganu, recording of the main landing of this fish species also started in 2008, with Dungun District recording the highest landing compared to the other districts of the State. The reported rise in the production of this fish in early 2014 made it necessary to conduct land-based surveys on its fishery in the concerned districts of Terengganu State.

Parallel with the land-based surveys conducted from February to March 2014, compilation of secondary information was also carried out using the Annual Fisheries Statistics Reports of Malaysia (2008-2013) while the local



Unicorn leatherjacket filefish *Aluterus monoceros* (Linnaeus 1758)



Map of Malaysia showing the states where significant landings of the unicorn leatherjacket filefish had been recorded

knowledge on filefish fishery was recorded during the surveys. The data compiled revealed that in the East Coast of Peninsular Malaysia, abundant catch has been recorded from February to April and from August to November every year. The fish is caught using trawl nets, lift nets and traps. Based on their local knowledge, the fishers from Terengganu designed a unicorn lift net fishing gear which is a selective gear for the *A. monoceros*. The use of such gear could have contributed to the increasing catch trend of this fish in Terengganu. However, the fishers also reported that the unicorn lift net fishing gear is not yet licensed by the Department of Fisheries Malaysia (DOFM).

Results of the surveys included a recommendation that the unicorn lift net fishing gear should be licensed by DOFM as it is a selective fishing gear, and that the country's filefish resource should be managed efficiently to ensure the sustainability of its fishery. In addition, research on the unicorn leatherjacket filefish should be enhanced, especially on the biological aspects of the fish, oceanographic parameters and population dynamics as the results could provide detailed information necessary for the sustainable management of the filefish resource for improved economic returns in the future.

Characteristics of the Unicorn Leatherjacket Filefish

Unicorn leatherjacket filefish is categorized as demersal fish (reef-associated) from the family Monacanthidae. However, Bussing and Lavenberg (1995) and Kuitert and Tonozuka (2001) reported that the juvenile stage of the fish is pelagic. Feeding on benthic organisms (Sommer *et al.*, 1996), the fish populates the marine areas where the water depth reaches up to 80 m (Allen and Erdmann, 2012). In Malaysia, landing of leatherjacket fishes is dominated by the species *Aluterus monoceros* (Linnaeus 1758) which is known as “*ikan barat-barat*” or “*ikan ayam-ayam*” (Bernama Media News, 2013).

Moreover, Mansor *et al.* (1998) reported that other species of filefishes are also being captured in Malaysia such as the tassel filefish or prickly leatherjacket *Chaetodermis peniciliger*, fan-bellied leatherjacket *Monacanthus chinensis*, and the hair-finned leatherjacket *Paramonacanthus japonicus*. Morphologically, the unicorn leatherjacket filefish has two dorsal spines, 45-52 dorsal soft rays, and 47-53 anal soft rays. It has rudimentary pelvic spine that disappears during its adult phase (Figueiredo and Menezes, 2000) and snout is concave in adult fish (Myers, 1991). The fish is greyish-sandy in color with small brown spots on its upper part, pale yellow-brown dorsal and anal soft rays; and dark brown caudal membrane (Hutchins, 1986). There are no scales but the skin has



Top: skinned leatherjacket filefish ready for cooking
Above: grilled leatherjacket filefish, a popular menu for this kind of fish

rough texture which is usually removed before cooking (Mohammad Faisal Md Saleh, 2014). The fish could grow up to a maximum total length of 76 cm (Claro, 1994) and maximum weight of about 3.0 kg (IGFA, 2001).

The fish is distributed mainly in tropical and sub-tropical waters (Harmelin-Vivien and Quéro, 1990) including the West Atlantic, East Atlantic, East Pacific, Northwest Indian, East Indian Oceans, and South China Sea (Guallart and Vicent, 2009). In spite of such wide distribution of filefishes, there has been very limited information available on the research of unicorn leatherjacket species, especially in Malaysia. In fact, the fish has never been listed in the country's Annual Fisheries Statistics Reports, not until its 2008 issue.

Current Catch Performance of the Unicorn Leatherjacket in Malaysia

Based on the Annual Fisheries Statistics of Malaysia starting in 2008, the unicorn leatherjacket filefish was mostly landed in the East Coast of Peninsular Malaysia, with Terengganu recording the highest quantity of landing followed by Pahang. In the West Coast of Peninsular Malaysia, Perak had also recorded landings of this particular species, while small landings were noted in Sabah, Sarawak and Johor Timur (Table 1).

Malaysia's Annual Fisheries Statistics Reports (2008-2013) indicated that on the average, the landing seasons of the unicorn leatherjacket filefish in the East Coast of Peninsular Malaysia were the periods from February to April and August to November (Fig. 1). However, a different situation was observed in Perak where the landing months differed but showed a constant trend. Meanwhile, landings of this filefish in Sabah showed fluctuating trend with catch peaks in February, April, June and September while in Sarawak, the peak appears to occur only in July (Fig. 2).

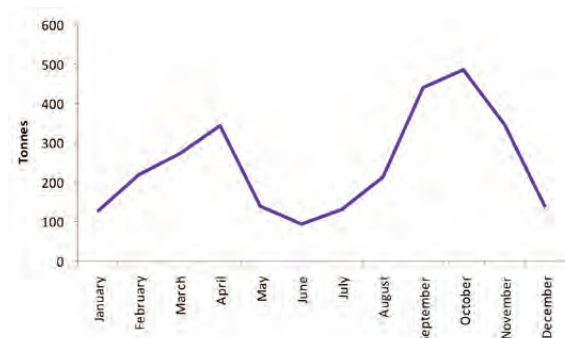


Fig. 1. Average monthly landings in the East Coast of Peninsular Malaysia (2008-2013)

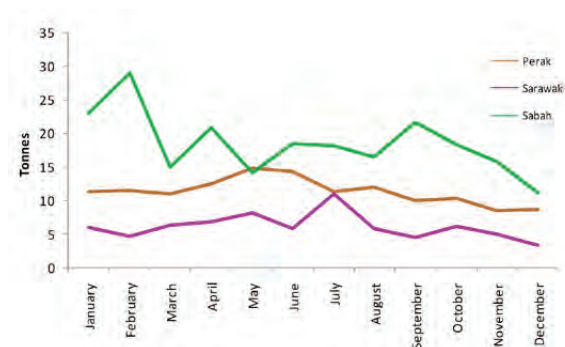


Fig. 2. Average monthly landing in Perak, Sarawak and Sabah (2010-2013)

Landing Performance of the Unicorn Leatherjacket Filefish in Terengganu

Based on the data from Malaysia's Annual Fisheries Statistics Reports (2008-2013), landing of unicorn leatherjacket filefish in the State of Terengganu contributed about one percent to the total marine fish landing for the State. On the average, 1,547 MT had been landed in Terengganu per year since 2008 and the trend has been increasing since then, by six out of the State's seven districts. In particular, Dungun District had the largest number of fish landed at 5,475 MT from 2008 to 2013, followed by Marang and Kuala Terengganu, while the three remaining districts recorded similar landings within the same period (Fig. 3). Comparing the total amount of the fish landed in five districts (excluding Dungun) with the quantity landed in Dungun, it can be observed that the

Table 1. Unicorn leatherjacket filefish landing in Malaysia, 2008-2013 (in metric tons (MT))

Year	Kelantan	Terengganu	Pahang	Johor Timur	Perak	Sarawak	Sabah
2008	-	732	58	-	-	1	-
2009	23	1,102	1,371	11	18	15	-
2010	116	235	2,007	6	182	44	147
2011	127	1,262	1,182	4	108	65	277
2012	256	4,148	1,269	5	127	121	232
2013	745	1,795	1,349	8	129	62	232
Total	1,266	9,274	7,236	34	564	308	888

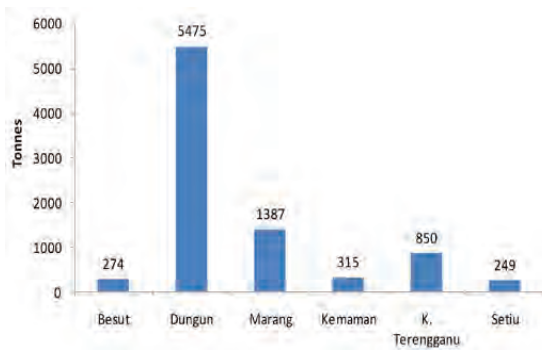


Fig. 3. Unicorn leatherjacket filefish landings by districts of Terengganu (2008 to 2013)



Fig. 4. Average monthly catch of the unicorn leatherjacket filefish in Terengganu (2008-2013)

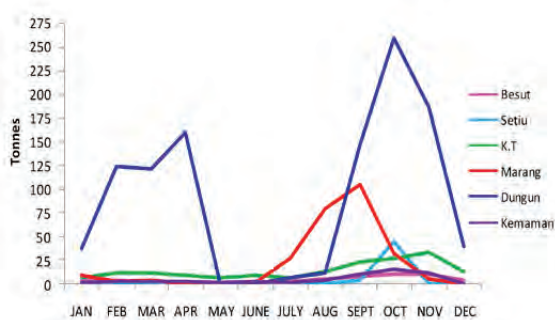


Fig. 5. Average monthly landing of the unicorn leatherjacket filefish by districts of Terengganu (2009-2013)

catch in Dungun still surpassed with a large difference of 2,399 MT. The seventh district which is Hulu Terengganu has no record of filefish landing because it is terrestrial with no marine ecosystem.

Thus, the two periods with abundant catch of unicorn leatherjacket filefish in Terengganu State are during the early and later parts of the year (Fig. 4). Abundant catch during the early part of the year was recorded from February until April, while the end of year phase was from September to November. In particular, the highest catch was recorded in October of 2008 until 2013. Overall, it could be gleaned that high average landings occur in months which are usually during the approaching year-end for all districts except in Dungun where high average catch occurred not only at the early part of the year but also towards the end of the year (Fig. 5). From the aforementioned catch performance, it could be concluded that the landing performance in Terengganu for this particular fish had been influenced by the landing performance in Dungun.

Fishing Gears

The fishing gears used to catch the filefish *A. monoceros* are trawl nets, lift nets, traps and many more, but the main fishing gear used in the East Coast of Peninsular Malaysia is dominated by trawl nets and lift nets (Table 2). Meanwhile the fish is caught in Perak and Sabah using the trawl nets only, and a small catch has been reported in Sarawak using traps (Table 3).

The unicorn lift net, known locally as “*tangguk barat*” or “*sauk barat*” (in Bahasa Melayu) is a selective gear which catches almost 100% unicorn leatherjacket filefish only. Unique and designed by fishers from Terengganu, this gear is made of a round stainless steel frame with a large diameter. The net can either be made of catgut strings or polyethylene. The bait is usually hung at the center of the net at the same level as the stainless steel frame. Baits used are jellyfish or fresh squid.

Table 2. Catch of unicorn leatherjacket filefish according to gears used in the East Coast of Peninsular Malaysia (2008-2013), in metric tons (MT)

Year	Trawl Nets	Purse Seines	Drift Nets	Lift Nets	Traps	Hook &Line	Bag Net
2008	445	13	223	1	70	38	-
2009	1768	28	561	-	127	19	3
2010	1524	52	45	-	28	710	4
2011	1382	55	76	946	25	90	-
2012	1334	6	448	3327	45	518	-
2013	2075	34	169	901	101	617	-
Total	8,528	189	1,522	5,174	396	1,992	7

Table 3. Catch of unicorn leatherjacket filefish by gears used in Perak, Sabah and Sarawak (2008-2013), in MT

Year	Perak	Sabah	Sarawak	
	Trawl nets	Trawl nets	Trawl nets	Traps
2008	-	-	1	-
2009	18	-	15	-
2010	182	147	44	-
2011	108	277	65	-
2012	127	232	24	97
2013	129	232	1	62
Total	564	888	149	159

Table 4. Summary of gears used to catch the unicorn leatherjacket filefish, baits used and price by survey areas

	Dungun	Marang	Merang, Setiu	Kuala Terengganu
Fishing gear	<i>Tangguk barat</i>	<i>Tangguk barat</i>	<i>Sauk barat</i>	<i>Tangguk barat</i>
Bait	Jellyfish; Squid	Jellyfish; Squid	Jellyfish	Jellyfish; Squid
Price at jetty (1 kg)	RM 8-10	RM 5 (S); RM 7 (B)	RM 7	RM 8-10

Note: S = Small; B = Big

Local Knowledge of the Filefish *Aluterus monoceros* among Fishers from Terengganu, Malaysia

Local information regarding *A. monoceros* had been gathered on the field by interviewing representatives from Dungun, Marang, and Merang, Setiu in February until March 2014. Results of the interview conducted by Mohammad Faisal Md Saleh (2014) indicated that the fish caught by fishers from Dungun was heavier, weighing about 700-1300 g each compared to the fish caught in Marang, which weighs 350-500 g only.

Fishers from Dungun had to go as far as 65 to 80 nautical miles from the shore to catch the filefish spending three to four nights during each trip but fishers from Marang travel only around 5 to 20 nautical miles offshore to fish and preferred a one-day trip only. In addition, the Chief of Dungun Fishermen's Association (personal comm., 2014) cited that the landing season for the fish in Dungun is from September until March of the following year, and the operation areas is near the 'unjam' (FADs).

On the other hand, the landing season in Marang is from July until September, and in Setiu, the season usually starts in June and lasts until September. The gear used by the fishers for catching the unicorn leatherjacket filefish by fishers from these three districts, is the unicorn lift net (*tangguk barat* or *sauk barat*). Moreover, while the

wholesale price for this fish is between RM8 and RM10 per kg in Dungun and Kuala Terengganu, the price is RM7 per kg in Marang and Setiu, (Table 4).

Products from the Unicorn Leatherjacket Filefish *Aluterus monoceros*

The unicorn leatherjacket filefish is full of meat with no small bones, making this fish very famous among grilled-fish lovers in Malaysia as well as in Indonesia. Besides grilling, the fish can also be pan fried or cooked the asam pedas style (a Malay cuisine). The fish is reported to be exported to China and Singapore where it is known as Gé tún in Mandarin. In China, the fish is usually steamed or as one of the ingredients in famous Chinese soups. In Thailand, the fish in fillet form is used for collagen and gelatin production. Ahmad *et al.* (2010) reported that pepsin-solubilized collagen (PSC) and acid-solubilized collagen (ASC) had been successfully extracted from the skin of the fish. Thus, the skin of the fish could be an alternative source for collagen. Advanced research found that the gelatin film extracted from the fish's skin contained antimicrobial properties and could be incorporated with bergamot oil and lemongrass oil for active antibiotic packaging (Ahmad *et al.*, 2012).

Discussion and Recommendations

The unusual landing of filefish *A. monoceros* in Dungun, Terengganu in early 2014 has created much attention to this fish species. Although landing of such fish species had contributed only about one percent of total marine fish landing for the State of Terengganu since 2008 with the highest landing contributed by Dungun District, the fish caught in Dungun was much heavier compared with the catch from the other districts. Differences in the total landings of the catch could have been influenced by the size of fishing boats, capability of boat crew, and number of days per trip. As mentioned earlier, fishers from Dungun had to travel up to 80 nautical miles offshore to fish for three to four nights per trip, thus, catching more fish not only in terms of quantity but also in terms of weight. Therefore, it could be assumed that heavier fish is found offshore while fish inshore could be lighter in weight. Furthermore, the use of unicorn lift net fishing gear by fishers from Terengganu could have helped in landing greater amount of the filefish since it is a selective gear catching mostly *A. monoceros* compared with non-selective fishing gears like trawl nets and traps.

However, since the unicorn lift net fishing gear is not yet licensed by the Department of Fisheries Malaysia (DOFM), it is therefore suggested that the DOFM could consider taking the necessary actions by licensing the gear and

subsequently incurring fees from the use of the unicorn lift nets. Such action could pave the way for preserving the filefish resource as the unicorn lift nets have proven to be efficient, effective and selective. Nevertheless, fishers are strongly encouraged to use the lift nets that should not be more than 8 feet in diameter, to ensure sustainability of the fishery, and that fishers are required to land only commercial sized fish and let go of the small ones. Releasing small fish and juveniles is however possible with the use of the lift net because it is selective and small fishes still survive after capture. Furthermore, future research on this filefish should be conducted, focusing on selected biological aspects, oceanographic parameters and population dynamics. In addition, the State Government should play active role in promoting the sustainable fishery and consumption of the filefish by organizing local and international events. Moreover, DOFM and local fishers' groups should organize discussions and dialogues to look for ways and means of enhancing partnerships in the sustainable management of the filefish resource for continuous economic gains and returns from this resource in the future.

Conclusion

As shown in the Fisheries Statistics Reports, Terengganu State had been landing the highest quantity of *Aluterus monoceros* or 'ikan barat-barat' in Malaysia. In particular, Dungun District accounted for the most abundant amount of the fish compared with the other districts. Most of the fishers from Terengganu use the unicorn lift nets or 'tangguk barat' to catch the filefish. This fishing gear is very effective to catch the filefish as it is selective and delivers almost 100% of unicorn leatherjacket filefish catch only. Therefore, the Department of Fisheries Malaysia is requested to license the unicorn lift net fishing gear as soon as possible so that catching the filefish could be controlled and sustainability of the filefish resource is assured.

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