Neritic Tuna and Seerfish Fisheries from Small-scale Purse Seiners in the Andaman Sea of Thailand

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Abstract

A study of neritic tuna and seerfish fisheries in the Andaman Sea of Thailand was carried out by collecting data from small-scale purse seiners landing at fishing ports along the Andaman Sea Coast of Thailand from January to December 2024. The objectives of the study were to analyze the catch per unit effort (CPUE), species composition, and fishing ground of neritic tunas and seerfishes. The results showed that the overall CPUE of small-scale purse seines was 3,997.49 kg/day. The CPUEs of neritic tunas and seerfishes were 514.44 and 15.21 kg/day, accounting for 12.87% and 0.38% of the total catch, respectively. The species composition of neritic tunas, namely bullet tuna (*Auxis rochei*), kawakawa (*Euthynnus affinis*), frigate tuna (*A. thazard*), and longtail tuna (*Thunnus tonggol*), were 6.34%, 3.16%, 1.85%, and 1.52% of the total catch, respectively. While the species composition of seerfishes, namely Indo-Pacific king mackerel (*Scomberomorus guttatus*) and narrow-barred Spanish mackerel (*S. commerson*), were 0.27% and 0.11% of the total catch, respectively. The fishing grounds for neritic tunas were mainly located within 50 nautical miles from the shoreline across the Andaman Sea and Strait of Malacca. In contrast, the fishing grounds for seerfishes were found closer to the shore, mainly within the Strait of Malacca.

Keywords: catch per unit effort, species composition, fishing ground, purse seine

1. Introduction

In Thailand, purse seine is used for catching small pelagic fishes. It is classified as small-scale purse seiner under IOTC definition because the vessel length is smaller than 24 and the operation occurs only in domestic waters. The purse seine net is 2.5 cm mesh size. Fishing operations are mostly conducted during nighttime. There are two methods for purse seine fishing: free-swimming school purse seine and purse seine with fish aggregating devices (FADs). The main species composition of the purse seiners is scads, mackerels, and sardines, while neritic tunas and seerfishes can also be caught with a low composition (Pheaphabrattana *et al*., 2024). There are four species of neritic tuna, i.e., bullet tuna (*Auxis rochei*), frigate tuna (*A. thazard*), kawakawa (*Euthynnus affinis*), and longtail tuna (*Thunnus tonggol*), and two species of seerfish, i.e., Indo-Pacific king mackerel (*Scomberomorus guttatus*) and narrow-barred Spanish mackerel (*S. commerson*), found in Thai waters. The objectives of this study were to analyze the catch per unit effort (CPUE), species composition, and fishing ground of neritic tunas and seerfishes.

2. Method
2.1 Sampling methods

The data were collected monthly from purse seiners landing at fishing ports along the Andaman Sea Coast of Thailand from January to December 2023 (Figure 1). When the vessels landed, the captain or fishing master was interviewed about fishing methods, fishing effort, fishing ground, and total catch. A sample of 40-50 kg of fish per vessel was taken to identify the species caught, which was done based on Carpenter and Niem (1998, 1999a, 1999b, 2001a, 2002b). Each species was weighed in grams (g). At least 10 vessels were sampled per month. The fishing logbook of sampled purse seiners was copied and fishing locations in the fishing logbook were used to analyze fishing positions.
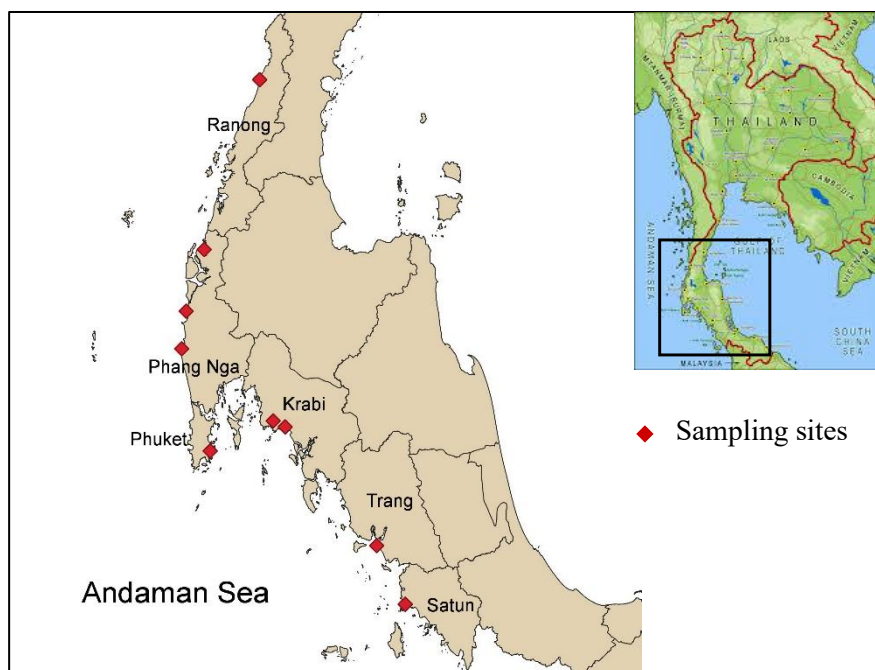
Figure 1 Sampling sites of purse seiners along the Andaman Sea Coast of Thailand in 2024

2.2 Data analysis

The catch per unit effort (CPUE) was analyzed as follows.

$$CPUE = \frac{\sum_{i=1}^{n} Catch_i}{\sum_{i=1}^{n} Effort_i}$$

where $Catch_i$ is the total catch of purse seiner i (kg), $Effort_i$ is the number of fishing days of purse seiner i, and n is the number of purse seiners sampled.

The species composition (%) was analyzed as follows.

$$Species\ composition_i = \frac{\sum_{i=1}^{n} Catch_{ij}}{\sum_{i=1}^{n} Total\ catch_i} \times 100$$

where $Catch_{ij}$ is the catch of species j from purse seiner i, Total catch$_i$ is the total catch of purse seiners i and n is the number of purse seiners sampled.

Fishing ground data from interviews and fishing logbooks were used to visualize fishing grounds using QGIS software.

3. Result

3.1 CPUE and catch composition of small-scall purse seiner

The total CPUE of small-scall purse seiner operated in the Andaman Sea of Thailand in 2024 was 3,997.49 kilogram/day. The CPUEs of neritic tunas and seerfishes were 514.44 and 15.21 kg/day, accounting for 12.87% and 0.38% of the total catch, respectively. The species composition of neritic tunas, namely bullet tuna (*Auxis rochei*), kawakawa (*Euthynnus affinis*), frigate tuna (*A. thazard*), and longtail tuna (*Thunnus tonggol*), were 6.34%, 3.16%, 1.85%, and 1.52% of the total catch, respectively. While the species composition of seerfishes, namely Indo-Pacific king mackerel (*Scomberomorus guttatus*) and narrow-barred Spanish mackerel (*S. commerson*), were 0.27% and 0.11% of the total catch, respectively (Table 1).

Table 1 Catch per unit effort (CPUE) and species composition of neritic tuna and seerfish caught by small-scale purse seine in the Andaman Sea of Thailand in 2024

Group / common name	Scientific name	CPUE (kg/day)	Composition (%)
Neritic tunas		**514.44**	**12.87**
Bullet tuna	*Auxis rochei*	253.46	6.34
Kawakawa	*Euthynnus affinis*	126.39	3.16
Frigate tuna	*Auxis thazard*	73.84	1.85
Longtail tuna	*Thunnus tonggol*	60.75	1.52
Seerfishes		**15.21**	**0.38**
Indo-Pacific king mackerel	*Scomberomorus guttatus*	10.95	0.27
Narrow-barred Spanish mackerel	*S. commerson*	4.26	0.11
Other species	-	**3,467.84**	**86.75**
Total	-	**3,997.49**	**100.00**

3.2 Fishing ground of neritic tuna and seerfish

Fishing grounds of bullet tuna were commonly found in the Andaman Sea, with high density located in the southern area of Phuket Island. In contrast, fishing activity in the northern Andaman Sea was less intensive, with lower catch per unit effort (CPUE) compared to the southern part (Figure 2).

Fishing grounds of kawakawa were found throughout the Andaman Sea, extending from the northern Andaman Sea near the border with Myanmar down to the southern boundary with Malaysia in the Strait of Malacca. CPUE is relatively consistent throughout the Andaman Sea (Figure 3).

Fishing grounds of frigate tuna were found throughout the Andaman Sea, with high density observed in the nearshores areas at the west and south of Phuket Island. In addition, one fishing ground was also found near the Exclusive Economic Zone in the northwestern part of Thai waters with relatively high CPUE (Figure 4).

Fishing grounds of longtail tuna were least common compared to other neritic tunas, with only a little fishing ground in the lower Andaman Sea and very limited occurrence in the northern Andaman Sea (Figure 5).

Fishing grounds of Indo-Pacific king mackerel were only found in the Strait of Malacca, with very few fishing grounds observed at the southeastern part of Phuket Island with very low CPUE. However, fishing grounds in the southern area were more densely concentrated, and the CPUE was higher than in the northern area (Figure 6).

Fishing grounds of narrow-barred Spanish mackerel were mainly found in the Strait of Malacca with less widespread compared to Indo-Pacific king mackerel. However, a few fishing grounds were found in the northern Andaman Sea, with very low CPUE (Figure 7).
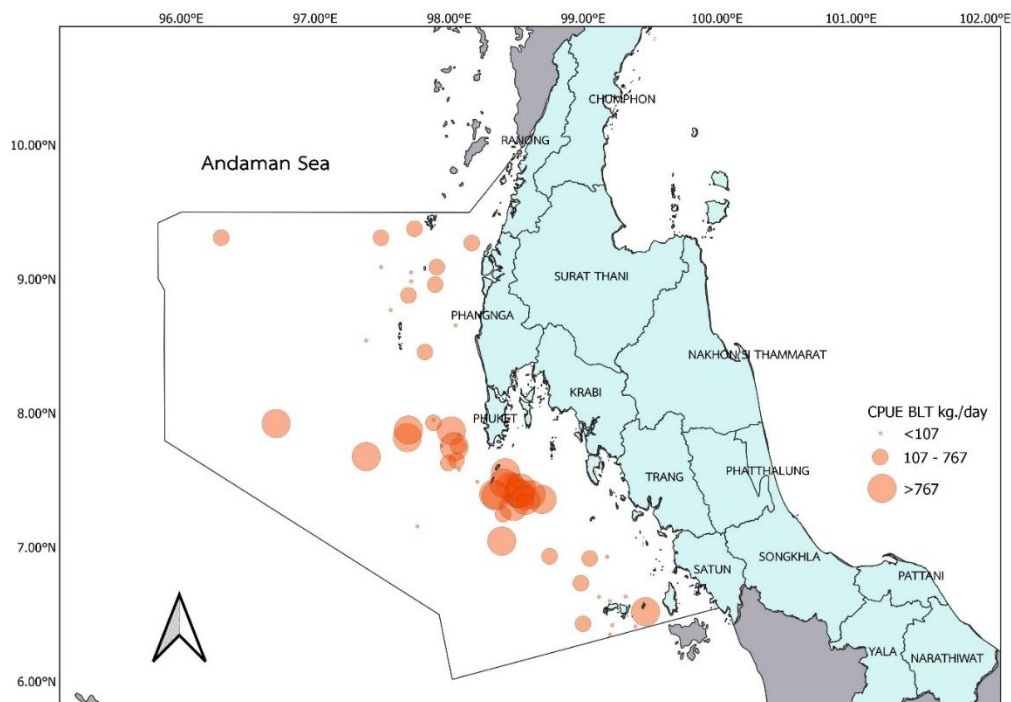
Figure 2 Fishing grounds of bullet tuna (*Auxis rochei*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024
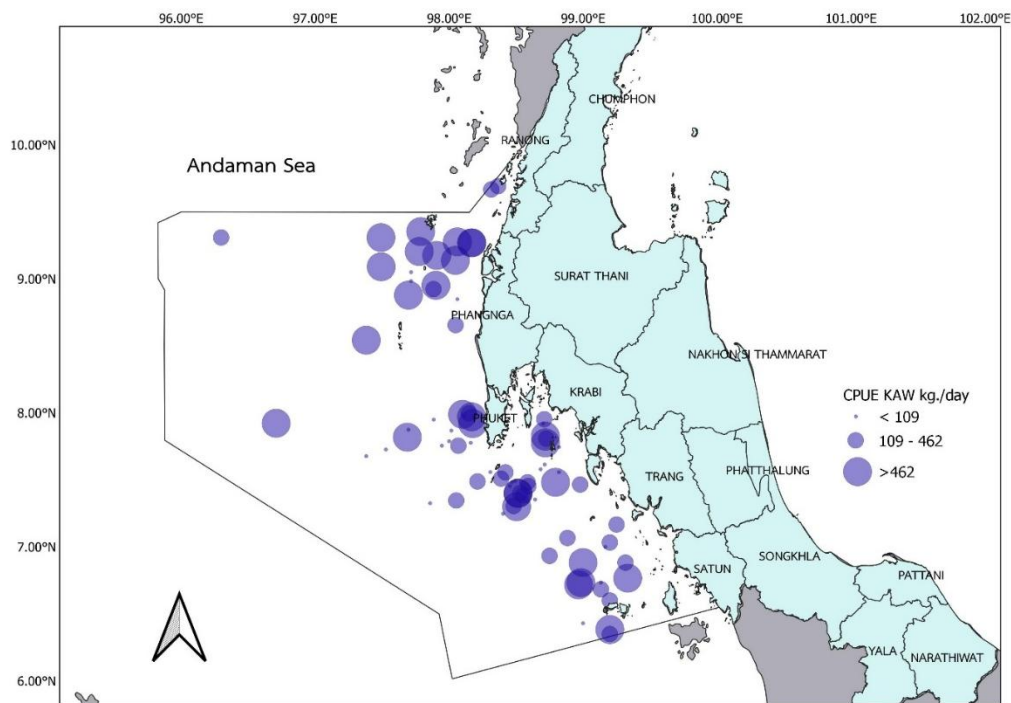

Figure 3 Fishing grounds of kawakawa (*Euthynnus affinis*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024
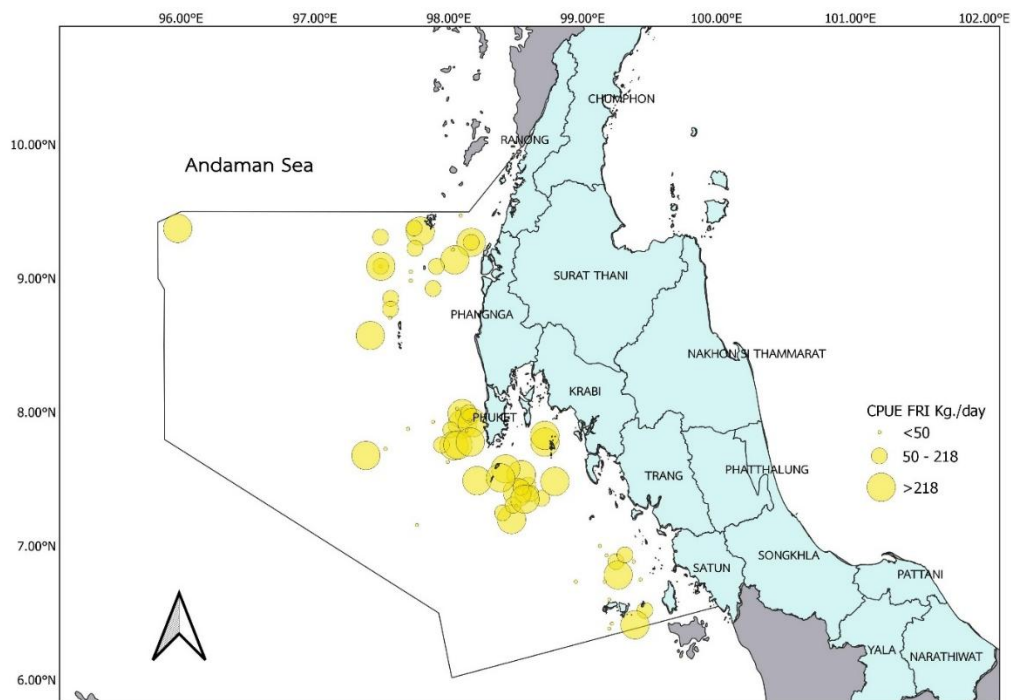
Figure 4 Fishing grounds of frigate tuna (*Auxis thazard*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024
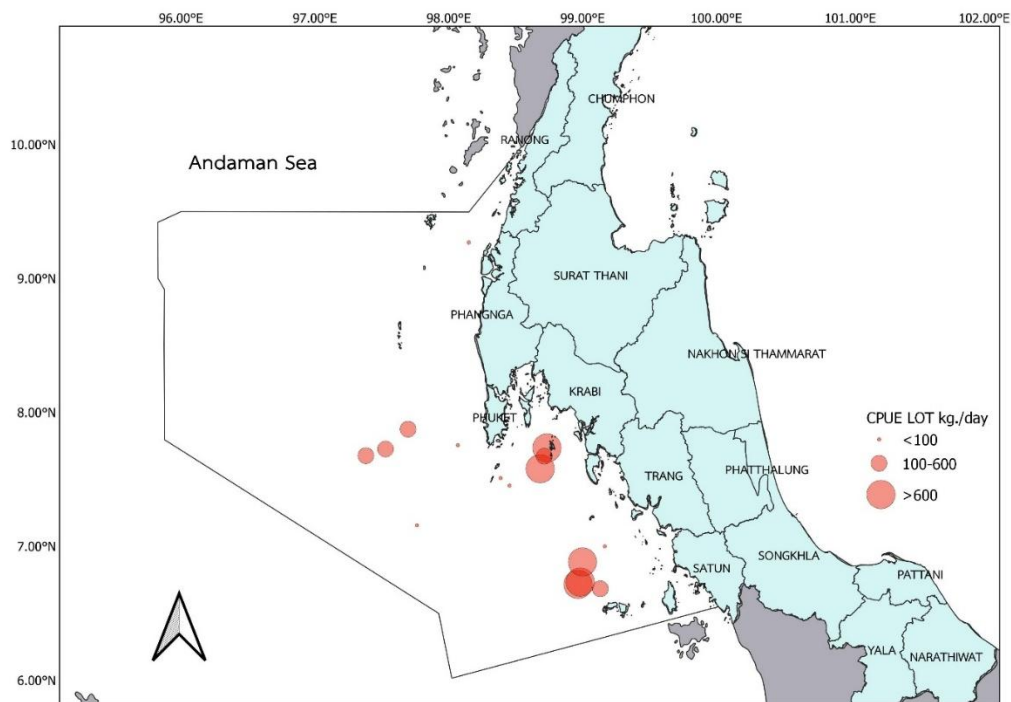

Figure 5 Fishing grounds of longtail tuna (*Thunnus tonggol*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024
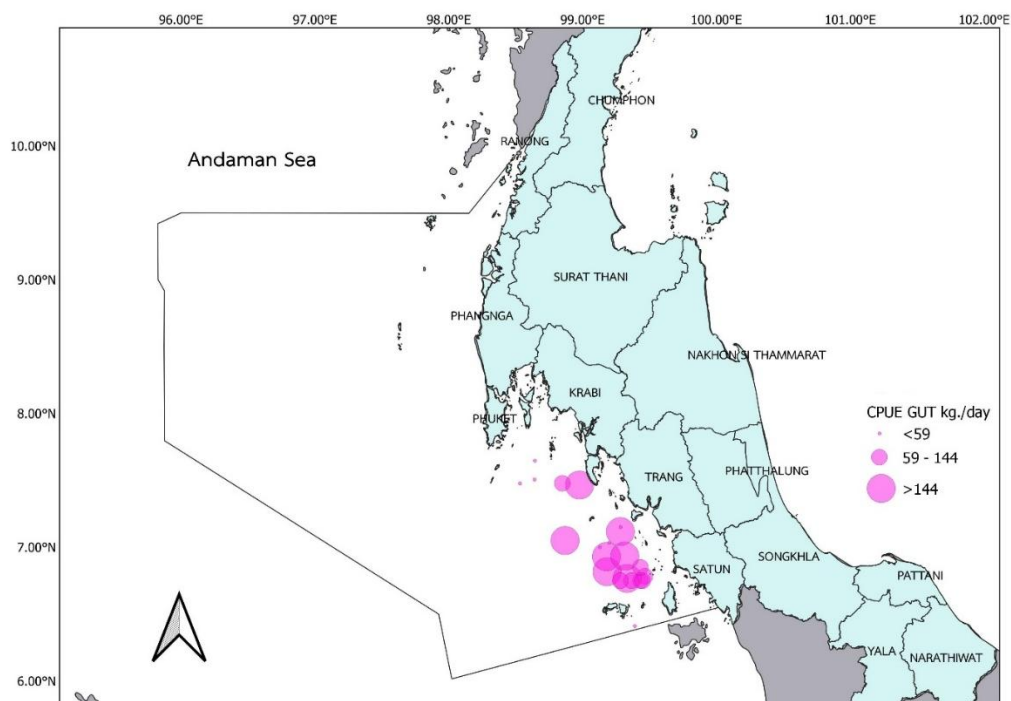
Figure 6 Fishing grounds of Indo-Pacific king mackerel (*Scomberomorus guttatus*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024
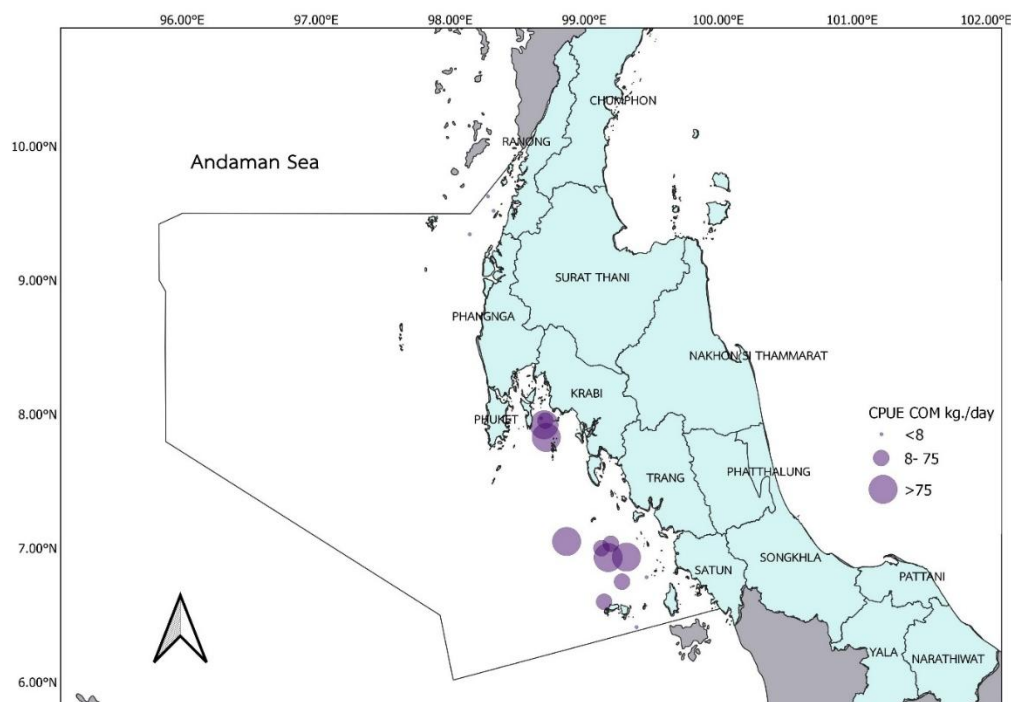

Figure 7 Fishing grounds of narrow-barred Spanish mackerel (*Scomberomorus commerson*) by small-scale purse seiners along the Andaman Sea coast of Thailand in 2024

References

Carpenter, K. E. and V. H. Niem (Eds.). 1999a. FAO Species Identification Guide for Fishery Purposes. The living marine resources of the Western Central Pacific. Vol. 3. Batoid fishes, chiamaeras and bony fishes part 1 (Elopidae to Linophrynidae). FAO, Rome. p. 1397–2068.

Carpenter, K. E. and V. H. Niem (Eds.). 1999b. FAO Species Identification Guide for Fishery Purposes. The living marine resources of the Western Central Pacific. Vol 4. Bony fishes part 2 (Mugilidae to Carangidae). FAO, Rome. p. 2069–2790.

Carpenter, K. E. and V. H. Niem (Eds.). 2001a. FAO Species Identification Guide for Fishery Purposes. The living marine resources of the Western Central Pacific. Vol 5. Bony fishes part 3 (Menidae to Pomacentridae). FAO, Rome. p. 2791–3380.

Carpenter, K. E. and V. H. Niem (Eds.). 2001b. FAO Species Identification Guide for Fishery Purposes. The living marine resources of the Western Central Pacific. Vol. 6. Bony fishes part 4 (Labridae to Latimeriidae), estuarine crocodiles, sea turtles, sea snakes and marine mammals. FAO, Rome. p. 3381–4218.

Pheaphabrattana, S., K. Maeroh, and P. Noranarttragoon. 2024. Small-scale Purse Seine with FADs Fishery in the Andaman Sea of Thailand. IOTC-2024-WPNT14-12_Rev1. 8 pp.