ORIGINAL ARTICLE

Reef fish community of Prachuap Khiri Khan Province

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Abstract Reef fish communities were investigated at 16 stations, covering about 1.2 km^2, in Prachuap Khiri Khan Province in 2020 and 2021. This study aimed to examine the species and distribution of coral reef fishes of Prachuap Khiri Khan Province and to create a database of reef fish in this area. A total of 87 species of reef fishes belonging to 25 families were recorded. Pomacentridae were the most dominant family (21 species), of which *Neopomacentrus cyanomos* was the most abundant species followed by *N. filamentosus*. Labridae (11 species) were the common group of reef fishes found in this area. Considering the diversity, the community of coral reef fishes of Prachuap Khiri Khan Province had a moderate diversity (Simpson's diversity index = 0.68) which was dominated by only two species, *Pomacentrus cuneatus* and *Halichoeres nigrescens*.

Keywords: Coral reef fish, Species diversity, Species list

1. Introduction

Prachuap Khiri Khan Province is located in the central part of Thailand. The coral assemblages were formed on islands along the coast from Hua-Hin to Bang Sapan District. The total area of coral assemblages is approximately 572.73 acres (2.32 km^2). The development of coral assemblages was found more on the west side of the islands and they are influenced by high sedimentation from the Khlong Wan River (Department of Marine and Coastal Resource, 2018). The coral reef ecosystem is one of the most productive ecosystems, supporting various species of flora and fauna. The coral reef fishes use coral reef ecosystems as their habitat and food sources (Komyakova et al., 2013). In the Gulf of Thailand, more than 370 reef fish species from 61 families were recorded (Satapoomin, 2000). In Prachuap Khiri Khan Province, the study on coral reef fishes at Talu Island and the coast of Prachuap Khiri Khan Province was first reported in 2015 with 39 species from 18 families of reef fishes (Ruenthong et al., 2015). Later, Piyapattanakorn (2019) studied coral reef fishes at two stations at Talu Island, reporting 60 species from 20 families, in which Pomacentridae was the most dominant family (14 species), followed by Labridae (seven species). Meanwhile, the Chumphon Marine National Park Operation Center 1 (2019) reported that there were 24 species from nine families of reef fishes observed in the Khao Sam Roi Yot National Park and Hat Wanakon National Park of Prachuap Khiri Khan Province. Satapoomin (2000) also reported that at least 60 species of reef fish were found in the Prachuap Khiri Khan Province and those reef fishes accounted for 16.2% of the reef fishes in the Gulf of Thailand.

Unfortunately, the availability of reef fish information, especially on coral reef fish diversity in Prachuap Khiri Khan Province, is limited and it is crucial to the management of coral reef resource utilization. In this study, we aimed to examine the species and distribution of coral reef fishes in Prachuap Khiri Khan Province, Thailand.

2. Materials and Methods

Reef fish communities were investigated at 16 stations in Prachuap Khiri Khan Province from 2020 to 2021, under the annual survey plan of the Department of Marine and Coastal Resources (Figure 1). The video census technique (Hill and Wilkinson, 2004) was conducted at three replicates of 50 x 5 m^2 belt transect (Figure 2). Video datasets of coral reef fish were analyzed in the laboratory. The identification of coral reef fish was carried out based on key references, for example, Allen and Swainton (1988), Burgess et al. (1988), Allen (1991), Allen (1999), and Fishbase (Froses and Pauly, 2022). Simpson's diversity index (Simpson,1949) was then calculated using the data on species and abundance of fish from each station.

Figure 1. Sampling stations of coral reef fishes at Prachuap Khiri Khan Province (Google map, 2022).

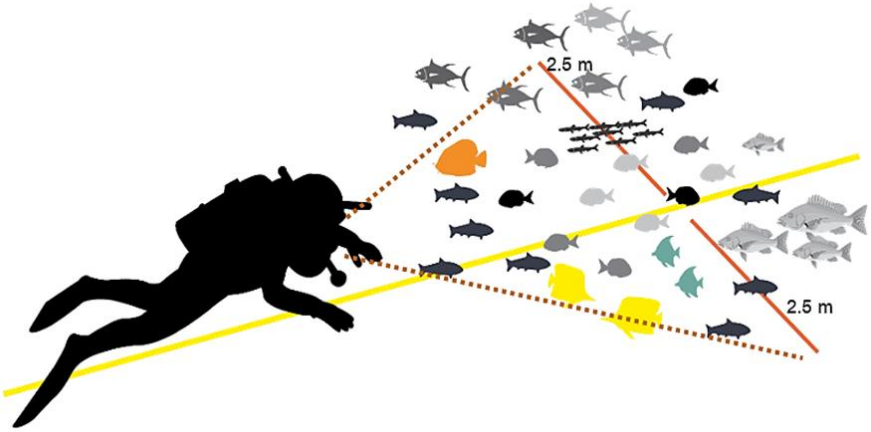

Figure 2. The Video Census Method (Hill and Wilkinson, 2004) used for investigating coral reef fishes

3. Results

A total of 48,067 fishes from 87 species and 25 families were recorded from 16 stations in Prachuap Khiri Khan Province from 2020 to 2021 (Table 1). The Pomacentridae (21 species) and Labridae (11 species) were dominant families in Prachuap Khiri Khan. The regal demoiselle (*Neopomacentrus cyanomos*) was the most dominant species, with 100±20 individuals/100 m^2 (25.0%). While brown demoiselle (*N. filamentosus*) was the second dominant species with 86±16 individuals/100 m^2 (21.5%), and silver Demoiselle (*N. anabatoides*) was the third with 77±22 individuals/100 m^2 (19.2%). In terms of occurrences, however, wedgespot damsel (*Pomacentrus cuneatus*) and bubblefin wrasse (*Halichoeres nigrescens*) were the only two fishes that were found at all stations.

Table 1. Check list of coral reef fishes at Prachuap Khiri Khan Province

Families/species	St 1	St 2	St 3	St 4	St 5	St 6	St 7	St 8	St 9	St 10	St 11	St 12	St 13	St 14	St 15	St 16
Dasyatidae																
Taeniura lymma										●					●	
Diodontidae																
Diodon liturosus																●
Plotosidae																
Potosus lineatus												●				
Holocentridae																
Myripristis hexagona															●	
Sargocentron rubrum			●				●			●	●			●		●
Scorpaenidae																
Pterois russelii							●									
Scorpaenopsis oxycephala			●													
Serranidae																
Epinephelus fasciatus						●			●							
Epinephelus quoyanus						●										
Cephalopholis boenak		●	●	●	●	●	●	●	●							●
Cephalopholis formosa		●	●		●	●	●		●			●				●
Diploprion bifasciatum	●				●	●						●				
Lutjanidae																
Lutjanus russellii			●	●												
Lutjanus vitta					●							●	●			
Lutjanus lutjanus			●		●											
Blenniidae																
Ecsenius namiyei		●			●			●	●	●			●		●	
Ecsenius bicolor									●							
Gobiesocidae																
Diademichthys lineatus								●	●					●		●
Mullidae																
Upeneus tragula								●						●		
Gobiidae																
Istigobius decoratus						●	●							●		
Cryptocentrus caeruleopunctatus							●									
Amblygobius nocturnus							●							●		

Table 1. (cont.)

Families/species	St 1	St 2	St 3	St 4	St 5	St 6	St 7	St 8	St 9	St 10	St 11	St 12	St 13	St 14	St 15	St 16
Valenciennea muralis														●		
Gobiodon histrio							●									
Microdesmidae																
Parioglossus philippinus	●	●	●	●	●	●	●	●	●		●		●	●	●	●
Ptereleotris microlepis			●											●		
Ptereleotris heteroptera					●											
Apogonidae																
Ostorhinchus endekataenia			●	●	●	●	●							●		●
Cheilodipterus quinquelineatus	●		●		●		●		●		●			●		
Cheilodipterus artus					●		●		●							
Cheilodipterus macrodon																
Taeniamia fucata									●		●	●	●	●	●	
Taeniamia macroptera					●		●		●				●	●		
Pempheridae																
Pempheris oualensis		●	●	●			●		●					●		
Nemipteridae																
Scolopsis monogramma															●	
Scolopsis vosmeri										●					●	
Scolopsis ciliata					●	●		●	●		●		●	●	●	●
Scolopsis margaritifera			●					●								
Caesionidae																
Caesio cuning			●		●			●			●		●		●	●
Pterocaesio chrysozona												●				●
Caesio caerulaurea											●					
Chaetodontidae																
Chaetodon octofasciatus	●		●		●	●	●	●	●	●	●	●		●	●	●
Chaetodon wiebeli					●					●	●	●	●	●		
Heniochus acuminatus					●						●				●	
Chelmon rostratus								●		●			●			
Pomacanthidae																
Pomacanthus annularis														●		
Pomacentridae																
Amphiprion perideraion									●			●				●
Abudefduf bengalensis	●	●	●		●	●	●	●	●	●	●			●	●	
Abudefduf sexfasciatus			●		●	●		●	●			●	●			
Abudefduf vaigiensis					●				●							
Pomacentrus cuneatus	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pomacentrus moluccensis						●		●	●			●		●		
Pomacentrus chrysurus		●	●			●	●	●	●							●
Pomacentrus trilineatus							●		●							
Chromis cinerascens			●		●				●		●	●	●	●		●
Chrysiptera rex							●		●							
Dascyllus reticulatus									●	●	●	●			●	●
Dascyllus trimaculatus						●	●		●		●	●				●
Neopomacentrus cyanomos	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Neopomacentrus filamentosus	●	●	●	●	●	●		●		●		●	●	●	●	●
Neopomacentrus anabatoides			●		●	●	●		●		●	●	●	●		●
Neopomacentrus bankieri			●		●									●		●
Neoglyphidodon melas								●	●							
Hemiglyphidodon plagiometopon									●							
Neoglyphidodon nigroris											●					
Stegastes lacrymatus								●								
Plectroglyphidodon obreptus			●		●	●	●	●	●		●					
Labridae																
Halichoeres nigrescens	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Halichoeres marginatus										●						
Halichoeres chrysotaenia									●			●				
Halichoeres chloropterus			●					●	●			●				
Halichoeres melanurus								●	●							
Halichoeres leucurus								●								

Table 1. (cont.)

Families/species	St 1	St 2	St 3	St 4	St 5	St 6	St 7	St 8	St 9	St 10	St 11	St 12	St 13	St 14	St 15	St 16
Halichoeres bicolor					●				●							
Hemigymnus melapterus									●							
Stethojulis strigiventer					●				●					●		
Thalassoma lunare								●	●		●	●	●		●	●
Labroides dimidiatus									●		●		●			
Monodactylidae																
Monodactylus argenteus					●	●										
Haemulidae																
Diagramma pictum																●
Siganidae																
Siganus javus		●	●	●	●	●	●			●	●		●	●	●	●
Siganus corallinus									●							
Siganus canaliculatus			●													
Siganus guttatus					●						●		●		●	
Scaridae																
Scarus rivulatus								●	●		●	●		●	●	
Scarus ghobban													●			
Sphyraenidae																
Sphyraena obtusata			●						●					●		
Species richness	9	13	29	10	33	22	26	26	43	15	25	23	21	30	21	26
Evenness index	0.53	0.42	0.48	0.60	0.42	0.73	0.67	0.25	0.42	0.42	0.60	0.42	0.49	0.49	0.44	0.59
Simpson's diversity index	0.63	0.58	0.72	0.69	0.69	0.85	0.84	0.31	0.68	0.57	0.78	0.64	0.72	0.74	0.63	0.81

Considering the species richness and diversity of coral reef fish at Prachuap Khiri Khan Province (Table 1), the north of Koh Talu in 2021 (Station 9) showed the highest number of reef fish species (43 species), and Koh Lak in 2020 (Station 1) had the lowest number of coral reef fish species. Considering the diversity, the community of coral reef fishes at Khiri Khan Province could be described as moderate diversity (0.68). The highest diversity was found at Koh Phang in 2021 (Station 6, Simpson's index = 0.85), followed by Koh Ram Ra in 2021 (Station 7, Simpson's index = 0.84). The lowest reef fish diversity was in the north of Koh Talu in 2020 (Station 8, Simpson's index = 0.31) (Figure 3).

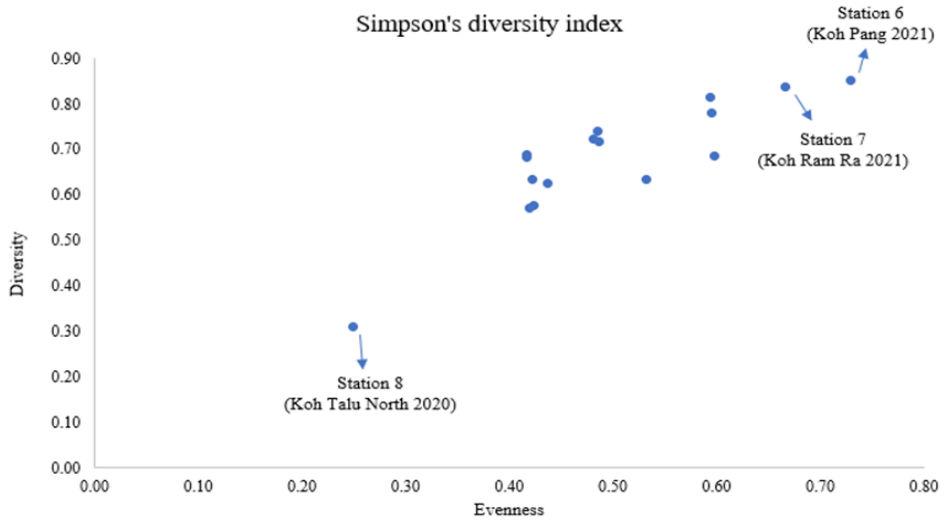

Figure 3. Species diversity and evenness of coral reef fish on coral reef at Prachuap Khiri Khan Province.

4. Discussion

There were 87 species of coral reef fishes found in Prachuap Khiri Khan Province in 2020 and 2021. They belonged to 25 families, of which Pomacentridae (21 species) and Labridae (11 species) and both were the dominant families of reef fish in Prachuap Khiri Khan Province. These results agreed with the previous studies reported by Piyapattanakorn (2019) stating that Pomacentridae and Labridae were the most diverse family in the coral reefs at Koh Talu, Prachuap Khiri Khan Province and also in the Gulf of Thailand. (Songploy, 2006)

Considering an abundance of coral reef fish in Prachuap Khiri Khan Province, Regal Demoiselle (*N. cyanomos*) was the most dominant species, followed by Brown Demoiselle (*N. filamentosus*) and Silver Demoiselle (*N. anabatoides*). This result could relate to habitat characteristics, food sources and fish-feeding behaviors. The diets of *Neopomacentrus* spp. are small plankton, both phytoplankton and zooplankton (Fishbase,2022). These fishes usually form a large school above the rocky habitat (Robertson et al., 2021). Then, *Neopomacentrus* spp. was found in an area with a large number of massive coral especially *Porites lutea* (Fulton and Hendrickson, 2011). Plankton can be found where the current is weak and long residence time rather than strong currents. Large massive corals can slow down the currents, allowing plankton to accumulate in this area and the plankton accumulation attracts *Neopomacentrus* spp. to utilize this area for feeding.

In terms of occurrence, however, Regal Demoiselle (*N. cyanomos*), Wedgespot damsel (*P. cuneatus*) and Bubblefin wrasse (*H. nigrescens*) were found at all stations. This corresponds to the previous studies i.e., Ruenthong et al. (2015), Piyapattanakorn (2019) and Chumphon Marine National Park Operation Center 1 (2019). In this study, there were at least 26 new records of coral reef fishes found in Prachuap Khiri Khan Province.

In terms of diversity, Koh Phang in 2021 had the highest diversity (0.85) followed by Koh Ram Ra in 2021 (0.84), while the lowest reef fish diversity was in the north of Koh Talu in 2020 (0.31). This may be influenced by the structural differences of coral reef habitats (Meenapha et al., 2018; Meenapha et al., 2021) and also the effects of physical factors such as geographic position, waves and turbidity on fish diversity (Beger & Possingham, 2008). Meenapha et al. (2018) and Meenapha et al. (2021) reported that the coral communities at Samaesan Islands, Chon Buri Province and Kut Islands, Trat Province were dominated by *Porites lutea* in terms of area coverage. In contrast, the diversity of coral reef fish was low in the coral communities with a less live coral cover but with high habitat complexity.

The complexity of habitats, live coral, dead coral, sand, rocks, and algae, provides sub-habitats for different guilds of fishes to inhabit. In this study, however, the coral reef habitats were dominated by massive corals, sub-massive coral, and encrusting coral (Marine and Coastal Resources Administration Office 3 Phetchaburi, 2021), providing less complexity of habitats for fishes and then causing less diversity of coral reef fish community in Prachuap Khiri Khan Province.

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