

ADDITIONAL VALID RECORD OF MARBLED HAWKFISH, *Cirrhitus pinnulatus* (BLOCH & SCHNEIDER, 1801) (PERCIFORMES: CIRRHITIDAE) FROM NORTH SULAWESI

Teguh Peristiwady¹⁾

¹⁾ Technical Implementation Unit for Marine Biota Conservation, Indonesian Institute of Sciences, Bitung
Received September 16-2008; Received in revised form October 28-2008; Accepted November 7-2008

ABSTRACT

The specimen of marbled hawkfish, *Cirrhitus pinnulatus* (Bloch & Schneider, 1801) (136.30 mm SL) was collected by spear gun from reef flat of Kema, Bitung, North Sulawesi. Some valid record of this species were found and recorded from Indo-Pacific and Indian Ocean. From Indonesian waters were recorded this species from Pariaman, Bali, and Talaud. The recent Indonesian records were mostly recorded by census visual study such from Rajaampat Islands, Bali Island, Komodo, and Manado. Its morphological features and diagnostic characters are discussed and illustrated.

KEYWORDS: *Cirrhitus pinnulatus*, Perciformes, Cirrhitidae, coral reefs

INTRODUCTION

The Indo-Malay Archipelago has long been considered the area of highest marine biodiversity (Bellwood & Wainwright, 2002; Mora *et al.*, 2003). With the other waters regions, the north Sulawesi waters were situated in the Western Central Pacific. It characterized with various ecosystems such as mudflats, coral reefs, estuaries, mangrove swamps, coastal areas, and continental shelves. Marine fishes is one of the main marine food resources in this area and is also constitute an important export product especially tuna. The fishing activity is dominated by tuna and other small pelagic fisheries by using pool and line or long line boats. Small pelagic and coral reef fishes were dominant at the local market and the most widely used gear is traditional net, such as light fishing, bamboo trap, seine net, and gill net.

Studies on fish in Indonesia are still insufficient. Scientific fish collections in Indonesia began with the visits of European explorers in the early 19th century, following by Dutch researchers. Historically, the Indonesian fish specimen mostly were deposit at the United States National Museum of Natural History in Washington, D. C. and the Bishop Museum in Honolulu. Other museums are the Academy of Natural Sciences, Philadelphia; Museum National d'Histoire Naturelle, Paris; Nationaal Natuurhistorisch Museum, Leiden; The Natural History Museum, London; Universiteit van Amsterdam, Amsterdam; Western Australian Museum, Perth and Museum Zoologicum Bogoriense, Bogor, Indonesia (Allen & Adrim, 2003). The fish specimen collection at Research Center for Oceanography (formerly labeled by NCIP), Jakarta is now transferred to Museum Zoologicum Bogoriense, Bogor, Indonesia.

Amongst the coral reef fish, family Cirrhitidae is one of the important fish under order Perciformes. This fish family belongs to the sub order Percoidei. Hawkfish are small to medium-sized marine fishes and are strictly tropical, associated with the coral reefs. Randall (1963) has revised the family Cirrhitidae. Nelson (1984) divided this family into 9 genera with about 32 species. Randall, 2001 in Carpenter & Niem, 2001 mentioned the hawkfish consists of 10 genera and 38 species, 33 of which occur in the Indo-Pacific region; 19 species are found in the Western Central Pacific.

In the West Central Pacific region family Cirrhitidae represent by 9 genera (*Amblycirrhitus*, *Cirrhitichthys*, *Cirrhitops*, *Cirrhitus*, *Cyprinocirrhitus*, *Isocirrhitus*, *Neocirrhitus*, *Oxycirrhitus* and *Paracirrhitus*) and 45 species (Randall, 2001 in Carpenter & Niem, 2001). Genera *Cirrhitus* in the area was represented by *Cirrhitus albopunctatus* Schultz, 1950 and *Cirrhitus pinnulatus* (Foster in Bloch & Schneider, 1801) (Randall, 2001 in Carpenter & Niem, 2001).

The purpose of the present study is to inventory a new finding on fish species from the Indonesian waters. Thus, it is hope that this new finding will be used as a new baseline of the fisheries sciences which can stimulate future research in North Sulawesi and eastern Indonesian in general.

MATERIALS AND METHODS

The specimen of *Cirrhitus pinnulatus* (Bloch & Schneider, 1801), LBRCF-332, 136.30 mm SL was collected by spear gun at a depth of 3 to 5 m at the reef flat of Kema, Bitung, North Sulawesi on March 1th 2008. After collection, the specimens were

Corresponding author:

Jl. Tandurusa, Kelurahan Tandurusa, Kotamadya Bitung 95227, Indonesia. E-mail: ikan_teguh@yahoo.com

immediately photographed, labeled with LBRCF (Reference Collection of Indonesian Institute of Sciences Bitung-Fish) and preserved in formalin solution 10% and deposit at Technical Implementation Unit for Marine Biota Conservation, Indonesian Institute of Sciences, Bitung for further study. Valid record of the fish specimen was used data from Fishbase (Froese & Pauly (ed.), 2006 and Eschmeyer (ed.), 1998).

Cyanin blue was used to examine and count scales. Counts and measurements of meristic and morphological character were made on the left side of specimen by using dial point caliper to the nearest of 0.05 mm. Length is recorded to 0.05 mm only for sizes under 150 mm, length bigger than 150 mm is recorded to tenths of mm. Total length is measured from the tip of snout to the tip of caudal fin. Standard length is taken from the front of the upper lip to the base of the caudal fin (end of hypural plate). Head length is measured from the front of the upper lip in the median plane to the end of the opercular membrane. Snout length is taken from the same anterior point to the fleshy edge of the orbit. Body depth is the greatest depth from the base of the dorsal fin, adjusting for any obvious malformations of preservation. Body width is the maximum width just behind the gill opening (anterior to the base of the pectoral fins). Orbit diameter is the greatest diameter to the fleshy edges of the orbit. Interorbital width is measured between eyes on top of head area. The length of the upper jaw is measured from the front of the upper lip to the posterior fleshy edge of the jaw. The depth of the caudal peduncle is the least depth, and the length of the caudal peduncle is taken horizontally from the rear base of the anal fin to the base of the caudal fin. Lengths of the dorsal and anal spines and rays are measured from the point they depart from the contour of the body. Dorsal fin base is taken from the anterior base of first dorsal rays to the end of the dorsal fin rays. Pectoral and pelvic fin lengths are the lengths of the longest ray. Anal fin base is taken from the base of anterior anal fin rays to the base of the end of anal fin rays.

RESULTS AND DISCUSSION

Family Cirrhitidae (Randall, 2001 in Carpenter & Niem, 2001)

Oblong fishes (size to about 30 cm), body depth 2 to 4.6 times in standard length. A fringe of cirri on posterior edge of anterior nostril. Two indistinct spines on opercle. A row of canine teeth in jaws, the longest usually anteriorly in upper jaw and half way back on

lower jaw; a band of villiform teeth inside the canines, broader anteriorly (in lower jaw only anteriorly). One or more cirri projecting from tips of interspinous membranes of dorsal fin. Dorsal fin continuous, with X spines and 11 to 17 soft rays, cirri on interspinous membrane, notched between spinous and soft portions; anal fin with III spines and 5 to 7 (usually 6) soft rays; pectoral fins with 14 rays, the lower 5 to 7 rays unbranched and usually enlarged, with the membranes deeply incised; pelvic fins with I spine and 5 soft rays. Principal caudal fin rays 15. Branchiostegal rays 6. Scales cycloid or ctenoid. Swimbladder absent. Vertebrae 26 to 28. Colour variable with species.

Genus *Cirrhitus* Lacepède, 1803

Elongate, rather compressed. Snout obtuse, the mouth far below level of eye. Body covered with moderate scales. Head scaly, excepting snout. Scales on cheeks and on inter and subopercle small, those of opercle large, but the anterior ones small. Strong canines in the upper and lower jaw, besides villiform teeth. Teeth on vomer and generally also on palatines. Dorsal with X spines and 11 (12) soft rays. Anal with III spines and 6 (7) rays. Pectoral with 7 simple rays. Caudal truncate or slightly rounded.

Cirrhitichthys pinnulatus (Bloch & Schneider, 1801) (Figure 1)

In the natural conditions, Coral Hawkfish (*Cirrhitichthys falco*), ring eye hawkfish (*Paracirrhitichthys arcatus*) and freckled hawkfish (*P. forsteri*) are the most popular amongs the hawkfish. Out of these three species, the Marbled hawkfish is one of the un commonly seen.

Observations and measurements based on a single specimen, LBRCF-332, 136.30 mm SL, March 1st 2008, Market Collection, catch by spear gun, Kema, Bitung, North Sulawesi.

Diagnostic Characters

Counts and measurements of specimen were presented at Table 1. Dorsal fin continuous with X spines and 11 soft rays, deeply notched between spinous and soft portions; each dorsal fin spine with a cirri from membrane near tip; anal fin with III spines and 6 soft rays; caudal fin truncate; pectoral fins not reaching a vertical at tips of pelvic fins; pectoral fin rays 14, the lower 7 un branched and thickened. Lateral line scales 39; scales on cheek much smaller than scales on body.

Body depth 2.68 times in standard length. Rounded head with big lips. Snout short and blunt. Mouth large and oblique, the maxilla nearly reaching a vertical at posterior edge of eye; upper margin of preopercle finely serrate. Supraorbital ridge low. Nostrils rounded, the anterior one with a posterior flap. Teeth in the jaws pointed forming a row, the anterior teeth in the lower jaw more strong canines; in the upper jaw only the anterior teeth are canines. A few rows of small teeth on the vomer and a single row of similar teeth on the

palatines. Dorsal spines strong; their membranes deeply incised. Forth and fifth spines almost equal, longer than the others. Last spine about half length of first dorsal ray, which is equal to snout and eye together. First and third anal spine almost equal; first anal ray less than head length. Lower unbranched pectoral rays longer than the upper. Pelvic fin rounded. Caudal truncate, slightly rounded when expanded.

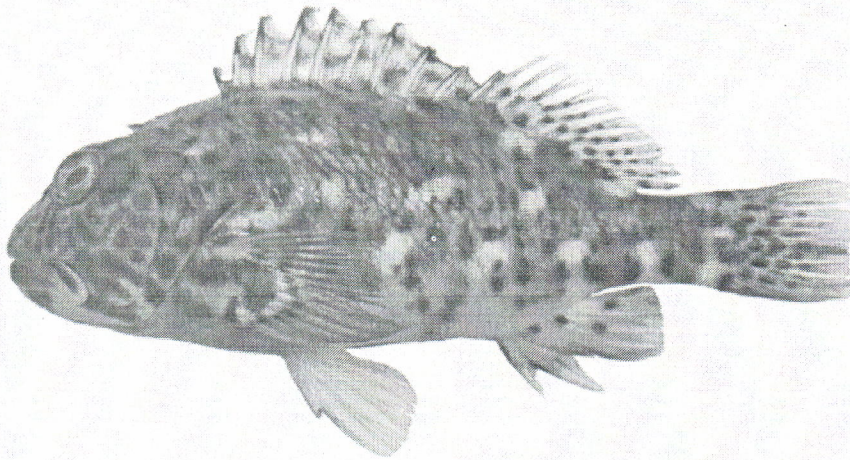


Figure 1. Marbled hawkfish, *Cirrhitidae pinnulatus* (Bloch & Schneider, 1801); LBRCF-332, 136.30 mm SL.

Color

Color of fresh specimen: Fresh specimen reddish brown mottling on body, ground colour white but overlaid with dark reddish brown blotches and numerous dark orangish to reddish brown spots; ventral thorax and abdomen white; head with reddish brown spots, sometimes conjoined to form irregular bands; median fins with reddish brown spots. Pelvic fins whitish. Pectoral fins reddish. Size Maximum total length 30 cm, commonly about 20 cm.

Colour of preserved specimen: Preserved specimen reddish or violet grey. Head and body with numerous reddish-brown spots, forming more or less distinct longitudinal stripes on sides of head. Large white blotches on side. Belly whitish. Chin with a dark brown blotches forming a wide band, fins with exception of the pelvic, spotted with brown.

Habitat and Biology

Found on rocky shallow areas standing up by their pectoral fins. Family Cirrhitidae don not have a

swimbladder and are therefore are not a good swimmers. Field observation showed that fish always "take a rest" on the bottom by using their free pectoral spines or to cling among ramifications of corals. Fishes belonging to the *Oxycirrhites* kinds and *Cyprinocirrhites* live at deeper water. Several species live on reefs or each individual choose a good point that permits him to observed the vicinities. Feeds mainly on crabs and generally caught from coral reef area, usually by hook and line or spear.

Distribution

Occurs through out the Indo-Pacific region from the Red Sea south to Port Alfred (South Africa) and east to French Polynesia and the Pitcairn Group; in the western Pacific from southern Japan to the Great Barrier Reef (Figure 2).

Some valid record of this species were found and recorded from Christmas Island, Indian Ocean (Allen & Steene, 1988), the Cocos (Keeling) Islands (Allen & Smith-Vaniz, 1994), Lutao Island, Taiwan (Chang *et al.*, 1983), Lord Howe, Norfolk, & Kermadec Islands,

Southwest Pacific Ocean (Francis, 1993), Papua New Guinea (Kailola, 1987), Caribbean and the Red Sea (Lieske & Myers, 1994), Japan (Masuda *et al.*, 1984), Hawaiian Archipelago (Mundy, 2005), Micronesian (Myers, 1991), Vietnam (Phung *et al.*, 1995), Maldives Islands (Randall & Anderson, 1993), the South China

Sea (Randall & Lim, 2000), Oman (Randall, 1995), the Great Barrier Reef and Coral Sea (Randall *et al.*, 1990), the Ogasawara Islands (Randall *et al.*, 1997), the Chagos Archipelago (Winterbottom & Anderson, 1997) as Figure 3 (Froese & Pauly (ed.), 2006).

Table 1. Counts and measurements of *Cirrhitus pinnulatus* (Bloch & Schneider, 1801)

Counts and measurements (mm)		LBRCF-332
Counts	Dorsal fin rays	X, 11
	Anal fin rays	III, 6
	Pectoral fin rays	Uppers rays 6, lower rays 7 tickened and unbranched
	Ventral fin rays	I, 5
	Caudal fin rays	11
	Lateral line scales	39
Measurements	Body and head	Length (mm)
	Total length	167.00
	Standard Length	136.30
	Body depth	50.85
	Body width	30.75
	Head length	54.20
	Snout length	18.05
	Orbit diameter	11.05
	Interorbital width	10.65
	Upper jaw length	23.95
	Predorsal length	51.70
	Preanal length	95.80
	Prepelvic length	56.60
	Caudal peduncle depth	11.75
	Caudal peduncle length	29.90
	Dorsal fin	
	Dorsal fin base	79.10
	First dorsal spine	6.50
	Second dorsal spine	12.25
	Thirth dorsal spine	16.05
	Fourth dorsal spine	18.50
	Fifth dorsal spine	17.90
	Longest dorsal ray	22.95
	Anal fin	
	Anal fin base	18.50
	First anal spine	15.70
	Second dorsal spine	23.60
	Thirth dorsal spine	16.90
	Longest anal ray	28.05
	Caudal fin	
	Caudal-fin length	24.95
	Pectoral fin	
	Pectoral fin length	27.70
	Pelvic fin	
	Pelvic spine length	20.00
	Pelvic fin length	25.05

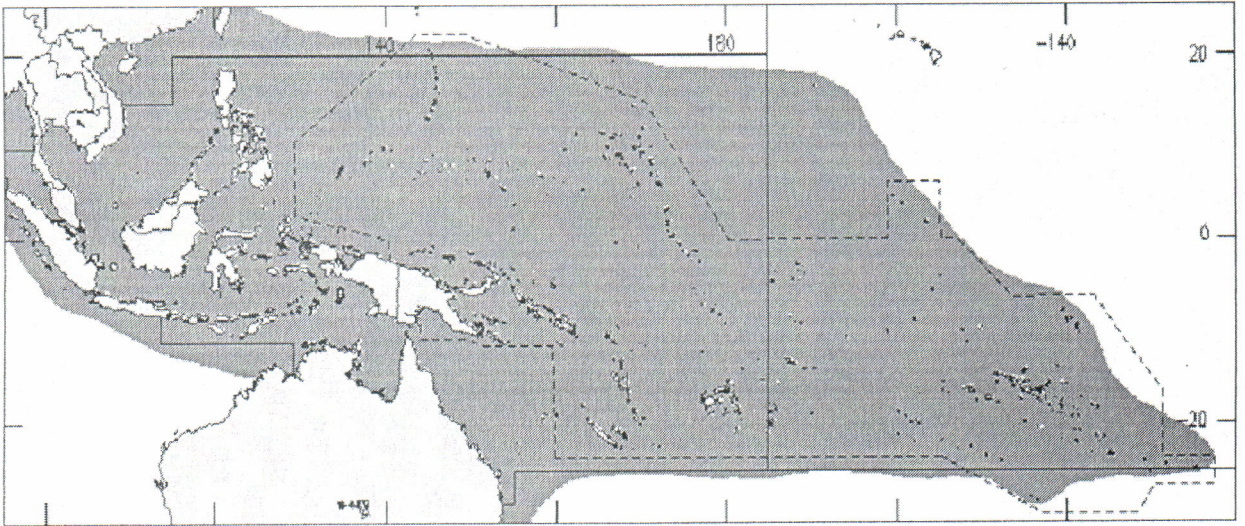


Figure 2. Geographic distribution of *Cirrhitus pinnulatus* (Bloch & Schneider, 1801) at western Central Pacific (Randall, 2001 in Carpenter & Niem, 2001).

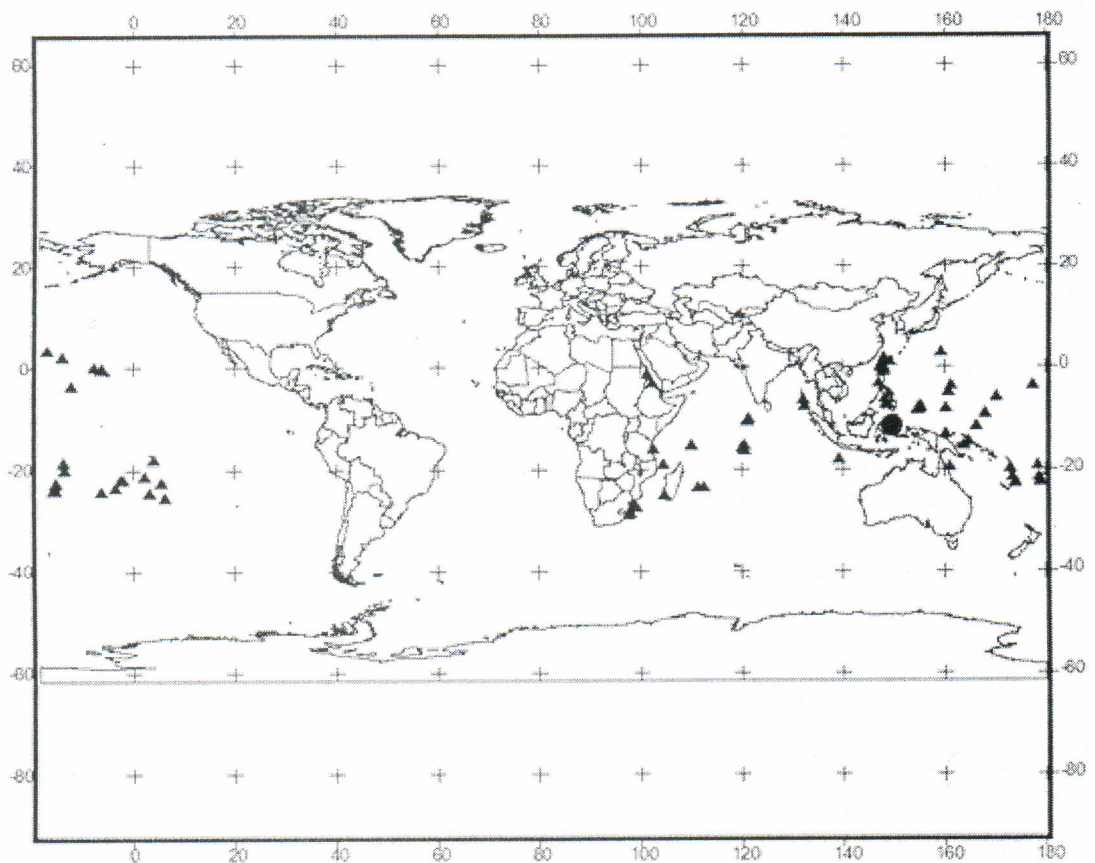


Figure 3. Geographic distribution of *Cirrhitus pinnulatus* (Bloch & Schneider, 1801) at western Central Pacific were represented by triangle (position were downloaded from Froese & Pauly (eds.), 2006) and specimen collected from Indonesia was represented by circle.

From Indonesian waters, De Beaufort (1940) recorded this species from Pariaman, Bali, and Talaud. But mostly Indonesian record were found by sensus visual study such from Rajaampat Islands, Bali Island, Komodo, and Manado (Allen & Adrim, 2003; Kuitert & Tono-zuka, 2001). Allen & Adrim (2003) noted that Indonesian specimen were deposit at Western Australian Museum but without any detail location.

Most hawkfish are solitary but some will form pairs and share a head of coral or coral rubble. They are diurnal and remain within the shallows of the reef, inhabits reef fronts and rocky shorelines exposed to depths of about 3 m. Typically motionless and laid down on the high position of the reef to observe surroundings. Feeds primarily on crabs, crustaceans, small fishes, sea urchins or brittle stars. In natural condition, the hawk fish seek the high position of the reef where they can survey their surroundings. Most hawk fish are solitary but some will form pairs and share a head of coral. They are diurnal and live at the depths of less than 30 metres.

ACKNOWLEDGEMENT

I am very grateful to the reviewers for all suggestions and corrections. I also express my sincere gratitude to Dr. S. Kimura, Fisheries Research Laboratory of Mie University, Mie, Japan for the visit of first author in his laboratory and checked the specimen. And also to JSPS by Dr. K. Matsuura, Collection Director at National Museum of Nature and Science, Tokyo-Japan to support first author visiting Japan.

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