

A new record of *Variola albimarginata* (Teleostei, Serranidae) from the Dongsha Atoll

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Abstract

Variola albimarginata Baissac, 1953, is identified as a newly recorded grouper from the Dongsha Atoll based on four specimens collected by lure fishing. In this study, morphology of *V. albimarginata* is examined and the description based on the Dongsha specimens is reported. The new record of white-edged lyretail in the Dongsha Atoll fills the species' distribution gap between southern Taiwan and the Spratly Islands.

Keywords: *Variola albimarginata*, new record, grouper, Taiwan

東沙環礁新紀錄種白緣星鱸(真骨魚總目:鮨科)

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摘要

本文報導臺灣東沙環礁海域首次紀錄之白緣星鱸(*Variola albimarginata*)。此物種經常被誤判為同屬之星鱸(*Variola louti*)。文中提供以路亞釣法採集的四尾樣本之形值測量、形態描述與其地理分布資訊, 此紀錄填補了該物種在臺灣與太平島之間的分佈空缺。

關鍵詞: 白緣星鱸、新紀錄種、石斑、臺灣

Introduction

The family Serranidae, commonly known as groupers or white-edged lyretail, are a member of the most diversified order Perciformes with 538 species from 75 genera of three subfamilies broadly distributed in tropical and temperate seas (Nelson 2006). The Epinephelinae are one of the subfamilies of the Serranidae, a group of fishes with high values in commercial and sport fisheries. This subfamily is composed of 15 genera, including two important aquaculture genera, *Cephalopholis* and *Epinephelus* (Rhodes and Tupper 2007).

The epinepheline genus *Variola* comprises only two species, *V. albimarginata* Baissac, 1953 and *V. louti* (Forsskål, 1775), inhabiting coral reefs at depths of 4 to 200 m (Lieske and Myers 1994). According to Heemstra and Randall (1993), stomach contents of *V. albimarginata* show this species feeds primarily on fish. Though *V. albimarginata* and *V. louti* are highly similar, these two species can be distinguished by the color pattern of their caudal fin.

Variola albimarginata is widely distributed in the tropical Indo-Pacific region, from east coast of Africa and eastward to the Samoa, and the islands in the central Pacific (Randall 2005). *Variola albimarginata* has also been recorded in southern Taiwan, including Kaohsiung and Pingtung and even in the

Spratly Islands, but it has never been recorded in the Dongsha Atoll (Shao *et al.* 2008). This study is the first report of *V. albimarginata* in the Dongsha Atoll and includes an examination of its morphology

Material and Methods

Four specimens with standard lengths between 173-196 mm were caught by lure fishing in the Dongsha Atoll on 11 August 2016. The specimens were brought back to the laboratory, and a fin clip of each specimen was preserved in 95% alcohol. The remaining specimens were fixed with 10% formalin, then transferred into 70% ethanol solution for preservation. The morphometric measurements followed Smith (1971), and the measurements were implemented using digital caliper, with precision to 0.1 mm, and tape measure, and expressed as proportion in total length (TL) or head length (HL) in Table 1. The specimens were deposited in the Department of Oceanography, National Sun Yat-Sen University, Kaohsiung (catalog number: DOS 02991).

Material Examined

DOS 02991, four specimens, 236-268 mm TL, caught by lure fishing in the Dongsha Atoll by Hsiang-Chun Sun, 11 August 2016 (Fig. 1).



Fig. 1: *Variola albimarginata* from the Dongsha Atoll. DOS 02991(3), 190 mm SL. Photo by Wen-Chien Huang.

圖一：採集自東沙環礁之白緣星鱧。標本號 DOS 02991(3)，標準體長 190 mm。黃文謙攝。

Description of DOS 02991

Refer to Table 1 for morphometric measurements and Fig. 1 for general appearance. Body elongated and fusiform with depth 32.1-35.8% SL. Head relatively large; head length slightly longer than body depth. Eye diameter 14.4-16.8% HL, interorbital slightly convex. Mouth opening large, extending to vertical of posterior orbit with lower jaw slightly longer than upper jaw; upper jaw with a pair of large canine teeth on the front, teeth on both sides villiform with few conical teeth scattered outside; 2 large canine teeth on anterior lower jaw, 1-2 pairs canine teeth on sides of lower jaw with several villiform teeth. Preoperculum margin smooth, 3 flat spines on posterior of operculum. Dorsal fin base long, origin at

approximately $1/3$ of TL from snout, outline straight without notch. D.IX.14(2)-15(2). Pectoral fin rounded, slightly ahead to dorsal-fin origin. P.16(3)-17(1). Pelvic fin abdominal and opposite to dorsal-fin origin, longest ray prolonged. VI.5. Fourth and fifth anal soft rays prolonged reaching caudal fin base. A.III.8. Caudal fin lunate. Body covered by small ctenoid scales, lateral line scale 119-123; 16-20 scales between lateral line to dorsal fin origin, 51-62 scales between lateral line to anal fin origin, predorsal scales 38-45. Circumpeduncular scales 22-26, 9-11+0.5 above lateral line and 9-11+0.5 below lateral line (both not including lateral line row).

Body dark red with yellowish marbled pigmentation, dorsum darker, ventral gradually lighter, scattered by spots bluish dorsally and

gradually turning light purple ventrally. Chin yellowish. Pelvic and pectoral fins yellowish; dorsal, anal and caudal fins red with dots; posterior margins of dorsal and anal fins whitish; posterior of caudal fin with a definite and thin white margin.

Table 1. Morphometric measurements of *Variola albimarginata* (DOS 02991). Meas stands for measurements; pct for percentage; SD for standard deviation. Percentages are in standard length (SL) or head length (HL).

表一、白緣星鱸(DOS 02991)之形態測量形值。Meas 表測量值；pct 表百分比；SD 表標準差。百分比係指測量值佔標準體長或頭長之比例。

Characteristic	DOS02991(1-4)			DOS02991(1)		DOS02991(2)		DOS02991(3)		DOS02991(4)	
	meas.	pct.	SD	meas.	pct.	meas.	pct.	meas.	pct.	meas.	pct.
Total length (mm)	236-268			268		267		253		236	
In SL											
Standard length (mm)	173-196			196		187		190		173	
Body depth	62-66	32.1-35.8	1.65	63	32.1	66	35.3	66	34.7	62	35.8
Body width	27.4-34.7	14.7-17.7	1.43	34.7	17.7	27.4	14.7	30.4	16	30.4	17.6
Caudal peduncle length	23-30	13.3-15.5	1.02	30	15.3	29	15.5	27	14.2	23	13.3
Caudal peduncle depth	26-28	13.9-15.0	0.47	28	14.3	26	13.9	27	14.2	26	15
Snout to first dorsal fin	62-68	33.2-35.8	1.3	65	33.2	67	35.8	68	35.8	62	35.8
Pectoral fin length	43-46	22.6-24.9	1.06	46	23.5	46	24.6	43	22.6	43	24.9
Pelvic fin length	35-38	17.9-20.8	1.27	35	17.9	38	20.3	37	19.5	36	20.8
dorsal fin base	90-103	49.0-54.2	2.36	96	49	98	52.4	103	54.2	93	53.8
Anal fin base	31-39	15.8-20.9	2.33	31	15.8	39	20.9	39	20.5	32	18.5
In HL											
Head length (mm)	67-76.6			73.6		76.6		75.1		67	
Head width	34.4-41.1	45.8-54.7	4.11	34.5	46.9	35.1	45.8	41.1	54.7	34.4	51.3
Snout length	16.7-21.9	23.9-29.2	2.45	17.9	24.3	18.3	23.9	21.9	29.2	16.7	24.9
Interorbital width	12.0-14.1	16.9-19.2	0.96	14.1	19.2	13.5	17.6	12.7	16.9	12	17.9
Eye diameter	10.6-12.6	14.4-16.8	1.13	10.6	14.4	12.6	16.4	12.6	16.8	11.2	16.7

Distribution

The species is known from the Indo-Pacific region, from east coast of Africa and eastward to the Samoa, north to the Ryukyu Islands, south to Queensland and Mozambique (Randall 2005). It is also found in East Andaman Sea (Allen *et al.* 2005). In Taiwan, this species is reported in southern Taiwan, including Kaohsiung, Pingtung, the Spratly Islands, and now in the Dongsha Atoll.

Remark

Although *V. albimarginata* was described in 1953, it was frequently overlooked and had been misidentified as *V. louti* in previous studies (Postel *et al.* 1963; Morgans 1982; Randall and Ben-Tuvia 1983; Heemstra and Randall 1984). Nevertheless, it can be distinguished from *V. louti* by a narrower white posterior margin on the caudal fin (Myers 1999). Our morphometric measurements and meristic counts of specimens match the results of Heemstra and Randall (1993), except for more soft rays of anal fins (9-12 vs. 8) and less soft rays of pectoral fins (16-17 vs. 17-19). The differences might be attributed to individual variations.

The geographical distributions of *V. albimarginata* and *V. louti* approximately overlap, and the latter seems to be a much more common species (Randall 2005; Heemstra and Randall 1993). In the South China Sea, both species have been recorded in Taiwan, Hong Kong, Malaysia and the Philippines (Mohsin and

Ambak 1996; Lou and Li 2000; Broad 2003), and *V. louti* has been recorded from Dongsha. *Variola albimarginata* is known from southern Taiwan and the Taiping Island, but has never been reported in the Dongsha Atoll. The new record in the Dongsha Atoll fills the distribution gap. Because the specimens were caught by lure fishing using mimicking bait on the water surface to attract predatory fish, the habitat uses of both *V. albimarginata* and *V. louti* in Dongsha remain uncertain and may need further studies.

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