

## A new record of the genus *Lophotus* (Lampridiformes: Lophotidae) in Taiwan

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### Abstract

Two specimens (304.0–441.4 mm standard length) of the species of genus *Lophotus* were recently collected from the southwestern Taiwan at the Dong-gang Fish Market. Although all of the valid species of genus *Lophotus* were estimated to be distributed circumglobal, substantiated records were unknown from Taiwan. Therefore, morphology and fresh coloration of the collected specimens are herein described as the first Taiwanese record of *L. guntheri*.

**Key words:** Teleostei, taxonomy, distribution, *Lophotus capellei*, *Lophotus guntheri*, *Lophotus lacepede*, Taiwan

### Introduction

The family Lophotidae, belonging to the order Lampridiformes, are a group of large sized fishes uniquely characterized by ribbon-like body that is strongly elongated and compressed (Olney, 1999). The genus *Lophotus* is characterized by having a large fleshy crest or horn that extends from top of forehead. Species of this genus have a unique habit that can extrude a dark ink from a specialized

gland near the anus (Fitch & Lavenberg, 1968). The taxonomy of *Lophotus* is contentious for a longtime by the absence of type specimens, lack of comparative material, and oversight of previous taxonomic treatments. However, Craig et al. (2004) showed difference of dorsal-fin rays and vertebrae counts between the specimens collected from the South, and Northern/Eastern Pacific, and concluded that there are two species of genus

*Lophotus* in the Pacific Ocean. They also indicated that *Lophotus guntheri* Johnson, 1882 is the oldest available name for the species distributed in the South Pacific. Roberts (2012) followed their opinion, and recognized three valid species, *Lophotus capellei* Temminck & Schlegel, 1845, *L. guntheri*, and *Lophotus lacepede* Giorna, 1809.

Two specimens of *Lophotus* were recently collected off south-western Taiwan, and landed at Dong-gang fishing port. Although the genus is reported of worldwide distribution without evidential data (Eschmeyer et al., 2017), no confirmed record is known from Taiwan to date. The morphological characters of two specimens from southern Taiwan closely resembled to the South Pacific specimens (*L. guntheri*) shown by Craig et al. (2004). Therefore, the specimens are herein provisionally identified as *L. guntheri* in the present study.

## Materials and Methods

Two specimens were collected from Dong-gang fishing port. Counts and measurements followed Craig et al. (2004) and Hubbs & Lagler (1947), respectively. Fin rays and vertebrae were counted from the radiographs. Measurements were made to the nearest 0.1 mm with needle-point calipers. Standard and head lengths are abbreviated as SL and HL, respectively. The morphological description is based on the specimens collected from

Taiwan. The specimens examined in this study are deposited at National Museum of Marine Biology & Aquarium (NMMB-P).

## Results

### Family Lophotidae

#### *Lophotus* Giorna, 1809

#### *Lophotus guntheri* Johnson, 1882

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Figure. 1, Table 1

*Lophotus guntheri* Johnson, 1882:177 (type locality: Near Emu Bay, northwestern coast of Tasmania, Australia). Craig et al. 2004:63.

**Specimens examined.** NMMB-P21031, 362.0 mm SL, 12 March 2014 and NMMB-P25983, 417.0 mm SL, 14 March 2017; both trawled off Dong-gang (ca. 22°39'N, 133°40'E), southwestern Taiwan, ca. 30–60 m, mid-water trawl, coll. H.-C. Ho.

#### **Description of Taiwanese specimens.**

Counts and measurements of the present specimen are given in Table 1.

Body elongated ribbon-like, strongly compressed laterally; body depth deepest at pectoral-fin base, and slowly tapering posteriorly to a narrow caudal peduncle. Head remarkably rectangular, anterior margin moderately projecting (stronger in NMMB-P21031), forming a large crest. Eye large, rounded; anterior and posterior nostrils in front of eye; interorbital space extremely convex and narrow. Mouth

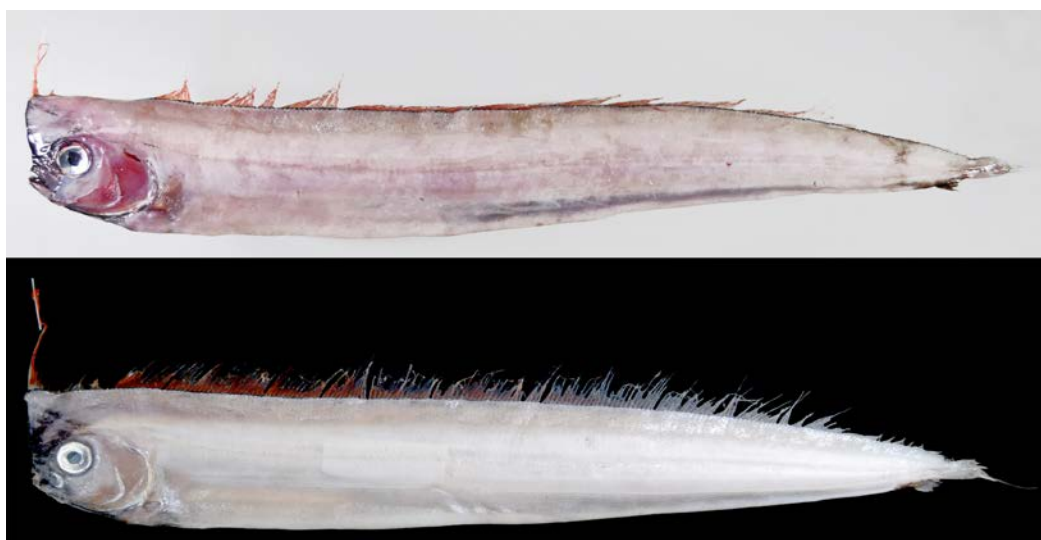
small, strongly oblique, maxilla extending to a vertical anterior half of eye, but not reaching to center of pupil; bands of small and sharp teeth on upper and lower jaws. Lateral line originating from tip of head crest, running descent to just above gill opening, and a straight line along the body axil to the caudal-fin base. Body covered with tiny deciduous cycloid scales.

Dorsal-fin base extremely long, originating at tip of head crest and extending to near caudal-fin base; first dorsal-fin ray tiny, and second ray predominantly longer and thicker than other rays. Anal-fin small with a short base, located in a short distance before caudal-fin base. Pectoral-fin situated below gill opening, its tip not reaching the

lateral line and its size larger than that of anal fin. Pelvic fin rudimentary, located at ventral margin behind pectoral fin. Caudal fin small, but larger than anal fin. Anus right in front of anal-fin origin.

Coloration. When fresh, body and head faint pink; interorbital area to snout blackened; dorsal-fin membranes red anteriorly, and translucent posteriorly; anal and caudal fins pale; pectoral fin pink; dorsal-fin base of anterior half of body blackened; anus to anal-fin broadly blackish (Fig. 1).

When preserved, body and head pale, dusky on dorsal 1/4 of body; interorbital area to snout blackish; dorsal-fin base dusky; anus to anal-fin broadly strongly blackish (Fig. 2).



**Fig. 1.** Fresh specimens of *Lophotus guntheri* from southwestern Taiwan. Upper: NMMB-P21031, 362 mm SL; lower: NMMB-P25983, 417 mm SL.

**Distribution.** *Lophotus guntheri* has been recorded from New South Wales, Tasmania in Australia, Johnston Island (Craig et al., 2004), and now Taiwan (present study).

**Remarks.** Taxonomy of the genus *Lophotus* have been confounded due to the absence of type specimens, lacks of comparative materials, and oversight of previous taxonomic treatments. Goode & Bean (1895) recognized three species for genus *Lophotus* on the basis of coloration and two morphometric characters, degree of connection of the dorsal and caudal fins and shape of the cranial crest. However, Craig et al. (2004) studied the genetic data and morphology of museum specimens from the South Pacific and Northern/Eastern Pacific, and argued that these two morphometric characters are not useful for diagnosing the species. On the other hand, they suggested that there are differences in counts of dorsal-fin ray (214–229 in North/Eastern Pacific vs. 239–259 in South Pacific) and vertebra (123–144 vs. 141–152) between the regions in the Pacific Ocean. The counts of dorsal-fin rays and vertebrae of the Taiwanese specimens correspond well with the diagnostic characters of the South Pacific specimens: 243 and 263 dorsal-fin rays and 148 and 152 vertebrae. Craig et al. (2004) also indicated that these two forms maybe not entirely allopatric, whereas *L. capellei* and *L. guntheri* are the oldest available name for

North/Eastern Pacific and South Pacific population, respectively. Roberts (2012) followed their opinion and recognized three valid species for the genus. Although a fourth species, *Lophotus machadoi* Miranda Ribeiro, 1927 (type locality: Brazil), has been considered as valid (Figueiredo et al. in Menezes et al., 2003), its status needs further investigation. Therefore, we follow the data provided by Craig et al. (2004) and recognize the two Taiwanese specimens as *L. guntheri*.

As stated above, *Lophotus guntheri* has not been previously recorded from Taiwanese waters, as well as northern Hemisphere. In addition, the similar congener, *Lophotus capellei*, has been recorded from the scattered localities in North/Eastern Pacific Ocean and Hawaii Islands (Craig et al., 2004). In the Western Pacific Ocean, Hayashi (2013) followed the opinion of Craig et al. (2004) and adapted *L. capellei* to the Japanese *Lophotus* without comparing the morphology. They indicated *L. capellei* have been reported occasionally in Japan, from Rishiri Island in northern Hokkaido to Miyako Islands, by various authors. (Honma and Kitami, 1980; Honma and Mizusawa, 1981; Amaoka, 1997; Uozu Aqualium, 1997; Sakaguchi, 2004; Shiogaki et al., 2004; Yamada et al., 2004; Kawano et al., 2011; Shinohara, 2011; Senou et al., 2007). Although their systematics, taxonomy, and distributions

are still not completely understood, our specimens collected from southwestern Taiwan represent the first reliable records of genus *Lophotus* from Taiwan.

### Acknowledgments

We are especially grateful to Mr. C.-C. Chang and Miss Z.-L. Fang for collecting the specimens. We appreciate Miss R.-R. Chen (NMMB-P) for curatorial assistance. Dr. N.-L. Chao kindly improved the English in the manuscript. The present study was supported in part by a JSPS Overseas Research Fellowships (29-304) to the first author.

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**Table 1.** Counts and measurements of *Lophotus guntheri* from southwestern Taiwan.

	NMMB-P21031	NMMB-P25983
Standard length (mm; SL)	362.0	417.0
Counts		
Dorsal-fin rays	263	243
Anal-fin rays	20	20
Pectoral-fin rays	18	17
Pelvic-fin rays	5	5
Caudal-fin rays	17	19
Vertebrae	152	148
Measurements		
% of SL		
Body depth	13.8	14.4
Body depth at anus	4.8	4.2
Pre-dorsal-fin length	7.0	8.3
Pre-anal-fin length	91.1	92.2
Pre-pectoral-fin length	12.9	12.5
Pre-pelvic-fin length	15.3	14.7
Head length (HL)	13.7	13.3
% of HL		
Body depth	100.6	107.9
Body depth at anus	35.4	31.7
Snout length	22.0	22.5
Eye diameter	27.9	30.9
Upper jaw length	30.9	32.2
Interorbital length	20.0	19.4
Pectoral-fin length	41.8	51.6
Pelvic-fin length	6.1	7.6