

## First record of a unicornfish, *Naso tergus* (Perciformes: Acanthuridae), from the Philippines

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**Key words:** Distribution, Iloilo, Panay Island

### Abstract

A single specimen of *Naso tergus* Ho, Shen and Chang, 2011 (Acanthuridae), having previously been known only from Taiwan and the Ryukyu Islands, southern Japan, was collected off Iloilo Province (Panay Island), the Philippines. The present specimen represents the first record of *N. tergus* from the Philippines and the southernmost record for the species. It suggests that *N. tergus* is widely distributed in the northwestern Pacific Ocean. The present specimen is described in detail and morphological variations of the species are mentioned.

The acanthurid genus, *Naso*, comprises 20 species from Indo-Pacific region<sup>1-2)</sup>. One of these, *Naso tergus*, was originally described in 2011 by Ho et al.<sup>2)</sup> on the basis of 13 specimens from Taiwan. Matsunuma and Motomura<sup>3)</sup> subsequently reported the species from Nakano-shima island in the Tokara Islands, southern Japan, on the basis of a single specimen. No other record of the species has been reported.

A single specimen of *N. tergus* was obtained at the Iloilo Central Market in Iloilo City, Panay Island, the Philippines, during a marine ichthyofaunal survey of the Iloilo Province in August 2013, led by the University of the Philippines Visaya, the Research Institute for Humanity and Nature, and the Kagoshima University Museum. The present specimen is described herein as the first record of the species from the Philippines.

### Material and Methods

Counts and measurements followed Randall and Bell<sup>4)</sup> and Ho et al.<sup>2)</sup>, and were made on the left side. Standard length is abbreviated as SL. Curatorial procedures for the newly collected specimen followed Motomura and Ishikawa<sup>3)</sup>. The

Institutional code used in this study is as follows: KAUM — The Kagoshima University Museum, Kagoshima, Japan.

### Results and Discussion

#### *Naso tergus* Ho, Shen and Chang, 2011

(Figs. 1–2; Table 1)

*Naso tergus* Ho, Shen and Chang, 2011: 205, figs. 1–4 (type locality: off Nanfangao, Ilan, northeastern Taiwan); Matsunuma and Motomura, 2013: 103, figs. 1–2, 4 (Nakano-shima island, Tokara Islands, Japan; description).

**Specimen examined.** KAUM–I. 56004, 211.9 mm SL, off Iloilo (Panay Island), the Philippines (purchased at Iloilo Central Market in Iloilo City), 20 August 2013, H. Motomura, M. Matsunuma, S. Tashiro, N. Muto, and Y. Ogata.

**Description.** Meristics and morphometrics expressed as percentage of SL are shown in Table 1. Body moderately elongated and compressed, lateral profile spindle-like, deepest at midpoint of body; head relatively large, dorsal profile

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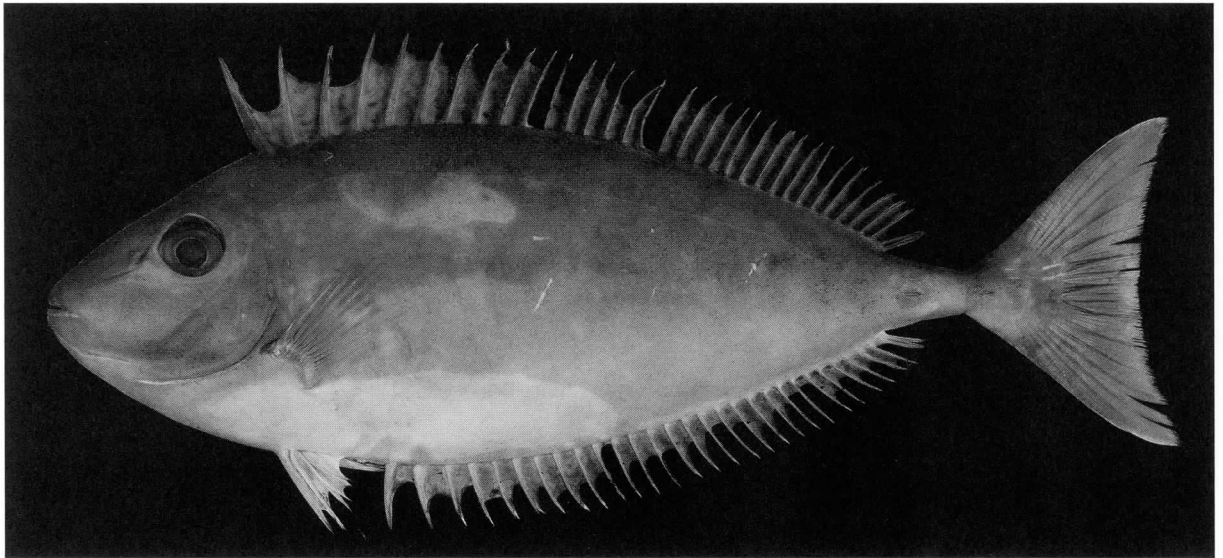


Fig. 1. Fresh specimen of *Naso tergus*, KAUM-I. 56004, 211.9 mm standard length, from off Iloilo (Panay Island), the Philippines (obtained at Iloilo Central Market).

gradually sloping. Mouth relatively small, upper jaw slightly projecting; gape almost horizontal; lips narrow; teeth uniserial, slender, and lanceolate; approximately 80 (partly broken) teeth on both jaws; tongue broadly rounded. A deep oblique groove on snout from in front of middle of eye to nearly two-thirds distance to front of mouth; nostrils very small, anterior nostril with a low membranous rim and a small triangular posterior flap.

Scales very small, close-set, each with an elevated dense patch of posteriorly directed spinules; body and head completely scaled except for lips, opercular membrane, and around anterior nostril. Lateral line on upper side of body, running along contour of back.

Dorsal-fin origin just above upper end of gill opening; first dorsal-fin spine slightly longer than sixth dorsal-fin spine. Anal-fin origin below fifth dorsal-fin spine base; length of first spine subequal to that of second spine; height of soft-rayed portion almost similar to that of dorsal fin. Upper end of pectoral-fin base slightly anterior to a vertical through dorsal-fin origin; upper 2 and lowermost rays unbranched, fourth ray longest. Pelvic-fin origin below first dorsal-fin spine base; first soft-ray longest, its tip reaching first anal-fin spine base when depressed. Caudal fin slightly emarginate.

Two elliptical bony plates on each side of caudal peduncle; both plates approximately equal size; a keel-like spine projecting laterally; shape of spine trapezoid or low ridge without pointed tip.

**Coloration when fresh.** Head and body uniformly light brown, paler ventrally (Fig. 1). Lips pale gray. Eye dark yellowish-brown; iris black. Tongue and gill rakers creamy white. Dorsal-fin rays same coloration as body; ground color of fin membrane pale gray, dark brownish marginally, mottled with light brown. Anal fin similar to dorsal fin but slightly paler. Pectoral fin semi-translucent. Pelvic-fin spine same color as ventral portion of body; membrane grayish-white, brownish distally. Caudal fin uniformly light yellowish-brown, pale marginally. Peduncular plates pale reddish-brown.

**Remarks.** The present specimen from the Philippines is identified here as *Naso tergus* on the basis of following combination of characters: six dorsal-fin spines; two bony plates on the caudal peduncle; eye diameter 7.3% of SL; body depth 35.2% SL (2.8 in SL); and the body uniformly brownish. These characters of the present specimen agreed with the diagnostic characters of *N. tergus* given by Ho et al.<sup>2)</sup>, except for a slightly larger eye (its diameter 7.3% of SL in the present specimen vs. 6.3–7.2% of SL in Ho et al.<sup>2)</sup>).

Some morphometric differences are found between the present specimen of *N. tergus* and specimens from Taiwan and Japan given by Ho et al.<sup>2)</sup> and Matsunuma et al.<sup>3)</sup> respectively, e.g., slightly longer upper-jaw length of 5.9% of SL (vs. 4.9–5.7%), suborbital width 10.1% of SL (vs. 8.6–10.0%), and second dorsal-fin spine length 11.2% of SL (vs. 8.6–10.8%) (Table 1). These minor differences are regarded here as intraspecific variation, most likely related to

Table 1. Meristics and morphometrics, as percentages of standard length, of *Naso tergus*.

	Present specimen	Ho et al. <sup>2)</sup>	Matsunuma and Motomura <sup>3)</sup>
Locality	Philippines	Taiwan	Japan
Number of specimens	1	13	1
Meristics			
Dorsal-fin rays	VI, 28	VI, 26–30	VI, 27
Anal-fin rays	II, 28	II, 26–28	II, 27
Pectoral-fin rays <sup>1</sup>	ii + 13 + i = 16	16	ii + 13 + i = 16
Gill rakers <sup>2</sup>	4 + 11 = 15	4 + 11–13 = 15–17	4 + 11 = 15
Standard length (SL, mm)	211.9	275–335	363.0
Morphometrics (% SL)			
Head length	25.7	24.6–26.6	23.7
Body depth	35.2	34.4–36.8	31.2
Body width	13.8	13.3–15.2	12.5
Pre-dorsal-fin length	26.8	25.2–28.7	25.5
Pre-pectoral-fin length	24.7	23.5–27.6	23.2
Pre-pelvic-fin length	27.9	29.3–32.2	27.6
Pre-anal-fin length	38.9	38.6–41.3	36.6
Snout length	13.7	13.2–14.1	13.4
Eye diameter	7.3	6.3–7.2	6.0
Interorbital width	9.2	8.9–10.0	9.3
Upper-jaw length	5.9	4.9–5.7	5.5
Suborbital width	10.1	8.6–10.0	8.1
1st dorsal-fin spine length	—	5.5–12.7	9.4
2nd dorsal-fin spine length	11.2	8.6–10.8	9.2
3rd dorsal-fin spine length	—	8.2–10.7	8.9
4th dorsal-fin spine length	11.0	8.1–10.3	9.0
5th dorsal-fin spine length	10.1	8.8–11.7	—
6th dorsal-fin spine length	9.3	8.4–9.7	8.6
Pectoral-fin length	16.4	14.0–15.7	15.8
Pelvic-fin spine length	11.1	8.0–10.5	9.8
1st anal-fin spine length	7.8	3.6–7.9	6.1
2nd anal-fin spine length	—	5.6–8.6	6.6
Caudal-peduncle length	9.0	7.8–9.9	8.2
Caudal-peduncle depth	4.2	4.3–5.3	4.0
Caudal-peduncle width	5.2	5.4–6.7	5.9
Caudal-fork length	18.4	16.2–18.0	15.5
Caudal-fin length	28.4	23.0–28.1	25.7

<sup>1</sup>Upper unbranched rays + branched rays + lower unbranched rays = total rays on left side of body; <sup>2</sup>Rakers on upper limb + rakers on lower limb = total rakers

fish growth, because the Philippine specimen is smaller (211.9 mm SL) than the previously recorded specimens (275–363.0 mm SL).

*Naso tergus* has previously been recorded only from Taiwan and Japan<sup>2-3</sup>). Accordingly, the present specimen from Iloilo, Panay Island, represents the first record of *N. tergus* from the Philippines and the southernmost record for the species (Fig. 2). This study suggests that *N. tergus* is more widely distributed in the northwestern Pacific Ocean than was first thought. Regarding the dispersal of this species, we propose that *N. tergus* populated Taiwan and Japan from the Philippines via the Kuroshio Current. The specimens collected from Taiwanese waters represent various life stages, suggesting that the Taiwanese population reproduces locally. However, only a single specimen, large in size, has been collected from Japan, and this might indicate that the species does not reproduce in Japanese waters. Further specimens from the Philippines and other Southeast Asian countries are required to further assess the distribution and biological aspects of the species.

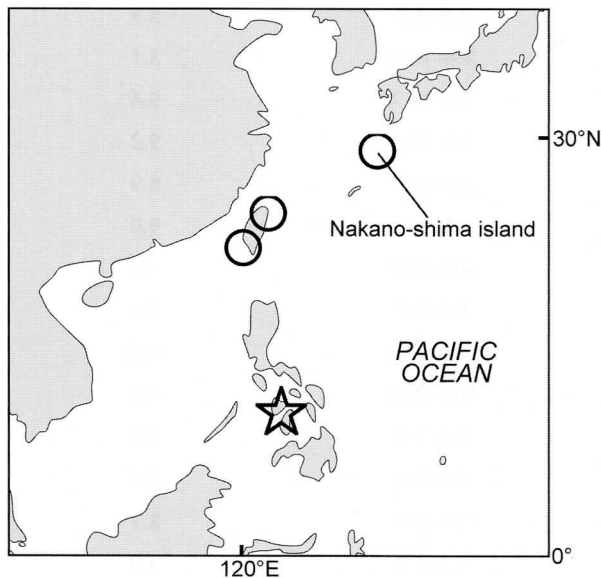


Fig. 2. Localities of previous records (circles) and present specimen (star) of *Naso tergus*.

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### References

- 1) Randall, J. E. (2002). Surgeofishes of Hawai'i and the world. Mutual Publishing, Honolulu. pp. x + 123 + ii.
- 2) Ho, H.-C., Shen, K.-N. and Chang, C.-W. (2011). A new species of the unicornfish genus *Naso* (Teleostei: Acanthuridae) from Taiwan, with comments on its phylogenetic relationship. *Raffles Bull. Zool.*, **59** (2): 205–211.
- 3) Matsunuma, M. and Motomura, H. (2013). First Japanese record of *Naso tergus* (Perciformes: Acanthuridae) from the Tokara Islands, southern Japan. *Japan. J. Ichthyol.*, **60** (2): 103–110. (in Japanese with English abstract).
- 4) Randall, J. E. and Bell, L. J. (1992). *Naso caesius*, a new acanthurid fish from the central Pacific. *Pac. Sci.*, **46** (3): 344–352, pl. 1.
- 5) Motomura, H. and Ishikawa, S. (eds.). (2013). Fish collection building and procedures manual. English edition. The Kagoshima University Museum, Kagoshima and the Research Institute for Humanity and Nature, Kyoto. pp. 70. (Available at [http://www.museum.kagoshima-u.ac.jp/staff/motomura/dl\\_en.html](http://www.museum.kagoshima-u.ac.jp/staff/motomura/dl_en.html))