

# First Record of the Yellowfin Surgeonfish, *Acanthurus xanthopterus* (Perciformes: Acanthuridae) from Geomundo Island, Korea

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**ABSTRACT** The Yellowfin surgeonfish, *Acanthurus xanthopterus* was reported as the first confirmed record from Korea based on a single specimen (332.6 mm SL) collected from the coast from Geomundo Island. It is characterized by having a longitudinal yellowish band in front of eye, dorsal and anal fins with 4 bluish stripes, and broad yellowish bar distally on pectoral fin. The new Korean name, “No-rang-mu-nui-yang-jwi-dom”, is proposed for the species.

**Key words:** Acanthuridae, *Acanthurus xanthopterus*, first record, Geomundo Island, Korea

## INTRODUCTION

The family Acanthuridae consists of six genera and 85 species from all tropical and subtropical seas (Sorenson *et al.*, 2013; Carpenter *et al.*, 2017; Fricke *et al.*, 2023). Their common name ‘Surgeonfish’ is derived from the distinctive feature of the family with scalpel-sharp spines on the caudal peduncle (Nelson, 2016). In the surgeonfish, the genus *Acanthurus* Forsskål, 1775 is currently known to comprise at least 40 species from the Atlantic and Indo-Pacific oceans (Randall, 1986; Hanahara *et al.*, 2021). However, some species of the genus have been recently reported from Mediterranean as alien or range expanding species (Evans *et al.*, 2017). In Korean waters, two species of *Acanthurus* have been reported including *A. dussumieri* Valenciennes, 1835 and *A. nigricauda* Duncker and Mohr, 1929 (Kim *et al.*, 2007; Seo *et al.*, 2014), although the former was only recorded as underwater photograph from Jeju Island (Myoung *et al.*, 2002). The genus is characterized by having a compressed and elliptical body, caudal peduncle with a single sharp folding spine on each side, small mouth, close-set and incisiform teeth with denticulate edges, dorsal and anal fins continuous and unnotched,

small ctenoid scales, dorsal fin with six to nine (usually nine) spines and 22 to 33 rays, anal fin with three spines and 19 to 29 soft rays, pectoral fin with 15 to 17 rays, pelvic fin with one spine and five rays (Randall, 1956; Hanahara *et al.*, 2021).

Recently, a large specimens of *Acanthurus* was obtained at the Dongdo Port in Geomundo Island, southern Korea, after being caught by local fisherman. It was subsequently identified as *A. xanthopterus* based on its previously reported morphological descriptions (Randall, 1956, 2001; Kishimoto, 1984). Although the species has been widely recorded in the tropical Indo-Pacific and eastern Pacific oceans from east coast of Africa to the Japan and Galapagos (Motomura *et al.*, 2017), it has not been recorded in Korean waters to date. Therefore, we describe *A. xanthopterus* as the first record from Korea based on the specimen collected from the coast of Geomundo Island.

## MATERIALS AND METHODS

The methods of counts and measurements followed those of Randall (1956) and Hubbs *et al.* (2004). The numbers of vertical fin rays and vertebrae were counted from radiograph (Softex VIX-100, Japan). Standard length and head length were abbreviated as SL and HL, respectively.

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**Fig. 1.** Fresh A and preserved B specimen of *Acanthurus xanthopterus*, (HNIBR-P166, 332.6 mm SL) collected from Geomundo Island, Korea.

The Curatorial procedures for collected specimen followed Motomura and Ishikawa (2013). The specimen was deposited as voucher in the fish collection of Honam National Institute of Biological Resources, Korea (HNIBR-P).

### TAXONOMIC ACCOUNTS

#### *Acanthurus xanthopterus* Valenciennes, 1835

(New Korean name: No-rang-mu-nui-yang-jwi-dom)

(Fig. 1; Table 1)

*Acanthurus xanthopterus* Valenciennes in Cuvier and Valenciennes, 1835: 215 (type locality: Seychelles); Randall, 1956: 215, pl. 3 (Durban, South Africa; Red sea;

Mauritius; East Indies; Philippine; Solomon Islands; Mariana Islands; Gilbert Islands; Phoenix Islands; Samoa Islands; Line Island; Jarvis Islands; Hawaiian Islands; Galapagos Islands; western Mexico; western Panama); Kishimoto, 1984: 232, pl. 230-D (southern of Japan); Randall, 1986: 816, pl. 129 (from Durban, South Africa to Eastern Pacific); Randall, 2001: 3675, pl. XVIII, 141 (western central Pacific); Shimada, 2002: 1330 (key to species, Japan); Devi and Rao, 2003: 10, fig. 3 (Andaman and Nicobar Islands, India); Motomura and Aizawa, 2011: 454, fig. 6G (Yaku Island, Japan); Shimada, 2013: 1631 (key to species, Japan); Koeda *et al.*, 2016: 102, fig. 476 (Yonaguni island, Japan); Matsunuma *et al.*, 2017: 65, fig. 80 (Haruno, Kochi Prefecture, Japan); Moto-

mura *et al.*, 2017: 206, unnumbered fig. (Philippine); Moazzam *et al.*, 2017: 649, fig. 4 (Pakistan); Nakae *et al.*, 2018: 332 (Amami-Oshima Island, Japan) Fricke *et al.*, 2019: 302 (New Ireland); Campos-León *et al.*, 2019: 377, fig. 2 (northern Peru); Soniyama *et al.*, 2020: 110 (list, Yamaguchi Prefecture, Japan) Adel *et al.*, 2022: 134, fig. 1 (Mediterranean Egyptian waters).

**Material examined.** HNIBR-P166, 332.6 mm SL, long line fishing gear, Geomundo Island, Dongdo Port, Geomundo-ri, Samsan-myeon, Yeosu-Si, Jeollanam-do, Korea, 26 October 2021, obtained by H.G. Cho.

**Diagnosis.** A species of *Acanthurus* with compressed and elliptical body, nine dorsal fin spines, single lancet-like spine on each side of caudal peduncle, yellow band across eye, yellowish color on outer one-thirds of pectoral fin, and dorsal and anal fins yellowish brown with 4 blue bands.

**Description.** Comparison of meristic counts are provided in Table 1. Measurements in % SL: body depth 47.2; body width 50.1; head length 26.7; snout length 20.5; eye diameter 4.1; interorbital width 9.6; length of upper jaw 6.5; length of groove in front of eye 7.3; length of predorsal fin 37.8; length of second dorsal fin spine 5.7; length of ninth dorsal spine 12.5; length of preanal fin 47.4; length of second anal fin spine 7.3; length of third anal fin spine 9.3;

depth of caudal peduncle 11.2; length of caudal spine 7.8; caudal fin concavity 18.6. Measurements in % HL: eye diameter 15.3; length of upper jaw 24.3; interorbital width 36.0; length of caudal spine 29.2.

Body strongly compressed, its width 1.7 in HL, and deep, depth 2.1 in SL. Dorsal profile of head steep. Eyes round and relatively small; interorbital region very convex; deep oblique groove in front of eyes extending to nearly anterior tip of snout. Mouth terminal and very small with thick lips; teeth on both jaws with a single row close-set, compressed denticulate edge; tongue broadly rounded. Nostrils situated just before eye; anterior and posterior nostrils close to each other; anterior semicircular flap which cover half of nostril aperture and posterior nostril with low membranous rim. Gill opening narrow; its membranes fused into isthmus; upper attachment of membrane below eyes extending anteriorly to lower edge of pectoral fin. Gill rakers on first arch short and conical; its tip blunt.

Dorsal fin continuous and unnotched; its origin above posterior edge of opercle vertically; first spine very short and covered with skin; 15th soft ray longest. Origin of anal fin below 7th dorsal spine base; first spine very short and covered with skin. Upper end of pectoral fin base slightly anterior to vertical through origin of dorsal fin; third ray longest; upper two and lowermost rays unbranched. Origin of pelvic fin below 4th dorsal fin spine base; first soft ray

**Table 1.** Comparison of diagnostic characters of *Acanthurus xanthopterus* between the present study and previous works

|                                 | <i>Acanthurus xanthopterus</i> |                    |                  |
|---------------------------------|--------------------------------|--------------------|------------------|
|                                 | Present study                  | Randall (1956)     | Kishimoto (1984) |
| Standard length (mm)            | 332.6                          | 127~423 (n = 114)  | –                |
| Dorsal fin rays                 | IX, 27                         | VIII~IX, 25~27     | IX, 25~27        |
| Anal fin rays                   | III, 25                        | III, 23~25         | III, 23~25       |
| Pectoral fin rays               | 17                             | 16~17 (usually 17) | 16~17            |
| Pelvic fin rays                 | I, 5                           | I, 5               | I, 5             |
| Anterior gill rakers            | 17                             | 16~22              | –                |
| Posterior gill rakers           | 18                             | 17~22              | –                |
| Upper teeth                     | 16                             | 12~18              | –                |
| Lower teeth                     | 18                             | 14~20              | –                |
| Vertebrae                       | 22 (9 + 13)                    | –                  | –                |
| In SL                           |                                |                    |                  |
| Body depth                      | 2.1                            | 1.95~2.25          | –                |
| Snout length                    | 4.8                            | 4.8~5.3            | –                |
| Longest dorsal ray              | 5.6                            | 4.4~5.7            | –                |
| Caudal concavity                | 5.3                            | 4.6~7              | –                |
| In HL                           |                                |                    |                  |
| Eye diameter                    | 5.5                            | 3.9~5.6            | 3.9~5.6          |
| Length of caudal peduncle spine | 4.4                            | 4.4~5.5            | –                |

longest; its tip reaching first anal soft ray, when depressed. Caudal fin lunate; its upper and lower edges elongate. Each side of caudal peduncle with one sharp fording spine. Body densely covered with minute ctenoid scales.

**Coloration.** When fresh, ground color of body and head uniformly purplish brown, paler ventrally. Lips and eyes yellowish brown. Iris dark navy. Yellow longitudinal band as wide as eye diameter extending from hind rim of orbit to snout region in front of eyes. Dorsal, anal, pectoral, and pelvic fins yellowish brown; dorsal and anal fins with 4 bluish gray and marginal yellow bands; yellow on outer thirds of pectoral fin and outermost membrane translucent. Caudal fin same coloration as body. Sheath of spine on caudal fin peduncle dark (Fig. 1A).

After Preservation, ground color of head and body uniformly dark brown. Distinctive white blotch behind and in front of eyes. All fins dark brown; margin of dorsal, anal and pelvic fins nearly grayish brown; outer third of pectoral fin whitish gray with translucent tip (Fig. 1B).

**Distribution.** Widely known in the Indo-Pacific: north to southern Japan and Korea (Geomundo Island), south to Great Barrier Reef and New Caledonia and Eastern Pacific from lower Gulf of California and Clipperton Island to Panama and the Galapagos Islands (Froese and Pauly, 2023; this study).

**Remarks.** The Korean specimen collected from Geomundo Island, Korea was identified as *Acanthurus xanthopterus* based on the following morphological characteristics: IX, 27 dorsal fin rays; III, 25 anal fin rays; 17 pectoral fin rays; I, 5 pelvic fin rays; snout length 4.8 in SL; caudal fin lunate; one folding spine on caudal peduncle; sheath of caudal peduncle spine dark; a distinctive yellow band behind and in front of eye; dorsal and anal fins with yellow and blue stripes; outer third of pectoral fin yellow.

These characteristics agreed closely with the diagnosis of *A. xanthopterus* presented by Randall (1956, 1986, 2001) and Kishimoto (1984). Although the presence of whitish band on base of caudal fin was regarded as one of the diagnostic features of *A. xanthopterus* (e.g., Randall, 2001), that of Korean specimen is the lack. We consider such a difference as intraspecific or ontogenetic variations, because color variations on base of caudal fin were found in *A. xanthopterus* and *A. mata*, a closely related congener (Bernal and Rocha, 2011; Robertson *et al.*, 2021).

In Indo-Pacific ocean, *A. xanthopterus* is the most similar to *A. dussumieri* and *A. mata* in having the overall body form and coloration such as meristic counts, morphometric proportions, and yellow color around eye. However, the former can be distinguished from two latter species by a distinct color pattern of dorsal and anal fins (four blue bands

vs. non-band in two latter species) (Randall, 1956, 2001; this study).

In Korean waters, *A. xanthopterus* is easily differentiated from *A. nigricauda* in no having a longitudinal black band above pectoral fin (present for *A. nigricauda*).

A new Korean name, “No-rang-mu-nui-yang-jwi-dom” is proposed for *A. xanthopterus*, “No-rang-mu-nui” being Korean for yellow marking and referring to coloration pattern on eyes and pectoral fin of the species.

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## REFERENCES

- Adel, M., O.M. Nour, S.A.A. Al Mabruk, B. Zava, A. Deidun and M. Corsini-Foka. 2022. The yellowfin surgeonfish *Acanthurus xanthopterus* Valenciennes, 1835 (Actinopterygii: Perciformes: Acanthuridae) from Mediterranean Egyptian waters. *Mediterr. Mar. Sci.*, 23: 134-139. <https://doi.org/10.12681/mms.28131>.
- Bernal, M.A. and L.A. Rocha. 2011. *Acanthurus tractus* Poey, 1860, a valid western Atlantic species of surgeonfish (Teleostei, Acanthuridae), distinct from *Acanthurus bahianus* Castelnau, 1855. *Zootaxa*, 2905: 63-68. <https://doi.org/10.11646/zootaxa.2905.1.5>.
- Campos-León, S., A. Moreno-Méndez, P. Béarez and A. Solano-Sare. 2019. First report of the yellowfin surgeonfish *Acanthurus xanthopterus* (Teleostei: Acanthuridae) in northern Peru. *Cybio*, 43: 377-379. <https://doi.org/10.26028/cybio/2019-434-008>.
- Carpenter, K.E., J.T. Williams and M.D. Santos. 2017. *Acanthurus albimento*, a new species of surgeonfish (Acanthuriformes: Acanthuridae) from northeastern Luzon, Philippines, with comments on zoogeography. *Ocean Sci. J.*, 25: 33-46. <https://doi.org/10.5281/zenodo.291792>.
- Cuvier, G. and A. Valenciennes. 1835. Histoire naturelle des poissons. Tome dixième. Suite du livre neuvième. Scombroïdes. Livre dixième. De la famille des Teuthyes. Livre onzième. De la famille des Taenioïdes. Livre douzième. Des Athérines. 10: 1-482, pls. 280-306.
- Devi, K. and D.V. Rao. 2003. A field guide to the fishes of Acanthuridae (Surgeon fishes) and Siganidae (Rabbit fishes) of Andaman and Nicobar Islands. Zoological Survey of India, Kolkata. 42pp.
- Duncker, G. and E. Mohr. 1929. Die fische der Sudsee-expedition der

- Hamburgischen Wissenschaftlichen Stiftung 1908-1909. 3. Teil. Acanthopteri sens. ampl., Physoclisti malacopterygii, Physostomi, Plagiostomi. Mitt. Zool. Staatsinst. Zool. Mus. Hamb., 44: 57-84.
- Evans, J., R. Tonna and P.J. Schembri. 2017. A bevy of surgeons: first record of *Acanthurus chirurgus* (Bloch, 1787) from the central Mediterranean, with notes on other Acanthuridae recorded in the region. *BioInvasions Rec.*, 6: 105-109. <https://doi.org/10.3391/bir.2017.6.2.03>.
- Forsskål, P. 1775. Descriptiones animalium avium, amphibiorum, piscium, insectorum, vermium; quae in itinere orientali observavit. Post mortem auctoris edidit Carsten Niebuhr, Hauniae, 164pp.
- Fricke, R., G.R. Allen, D. Amon, S. Andréfouët, W.J. Chen, J. Kinch, R. Mana, B.C. Russell, D. Tully and W.T. White. 2019. Checklist of the marine and estuarine fishes of New Ireland Province, Papua New Guinea, western Pacific Ocean, with 810 new records. *Zootaxa*, 4588: 1-360. <http://doi.org/10.11646/zootaxa.4588.1.1>.
- Fricke, R., W.N. Eschmeyer and R. Van der Laan. 2023. Eschmeyer's Catalog of fishes: genera, species, references. Available at <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (24 April 2023).
- Froese, R. and D. Pauly. 2023. Fishbase. World wide web electronic publication. <http://www.fishbase.org/> (02/2023).
- Hanahara, N., K. Miyamoto and S.I. Oka. 2021. Northernmost record of the surgeonfish *Acanthurus nigros* (Teleostei: Acanthuridae) from Minamidaitojima Island, southern Japan. *Spec. Div.*, 26: 43-47. <https://doi.org/10.12782/specdiv.26.43>.
- Hubbs, C.L., K.F. Lagler and F.R. Smith. 2004. Fishes of the great lakes region. University of Michigan Press, Ann Arbor, U.S.A., xvii + 213pp.
- Kim, J.K., J.H. Park and K.S. Hwang. 2007. One unrecorded species of *Acanthurus nigricauda* (Acanthuridae, Perciformes) from Korea. *Korean J. Ichtyol.*, 19: 164-167.
- Kishimoto, H. 1984. Family Acanthuridae. In: Masuda, H., K. Amaoka, C. Araga, T. Uyeno and T. Yoshino (eds.), *The fishes of the Japanese archipelago*. Tokai Univ. Press, Tokyo, Japan, pp. 228-232.
- Koeda, K., Y. Hibino, T. Yoshida, Y. Kimura, R. Miki, T. Kunishima, D. Sasaki, T. Furukawa, M. Sakurai, K. Eguchi, H. Suzuki, T. Inaba, T. Uejo, S. Tanaka, M. Fujisawa, H. Wada and T. Uchiyama. 2016. Annotated checklist of fishes of Yonaguni-jima island, the westernmost island in Japan. *Kagoshima Univ. Mus.*, Kagoshima, Japan, 119pp.
- Matsunuma, M., T. Natio, M. Sato and K. Mizumachi. 2017. Checklist of fishes collected from Haruno Fishing Port, Koichi Prefecture, Japan. *Nature of Kagoshima*, 44: 47-71.
- Moazzam, M., H.B. Osmany and K. Zohra. 2017. An annotated checklist of the family Acanthuridae (Pisces) from Pakistan: Northern Arabian Sea. *Int. J. Biol. Biotech.*, 14: 645-660.
- Motomura, H. and M. Aizawa. 2011. Illustrated list of additions to the ichthyofauna of Yakushima Island, Kagoshima Prefecture, southern Japan: 50 new records from the island. *A World Heritage Island in the Osumi Group, Kagoshima Prefecture, Southern Japan. Natl. Mus. Sci. Nat.*, Tokyo, Japan, pp. 65-247.
- Motomura, H. and S. Ishikawa. 2013. Fish collection building and procedures manual. English edition. *Kagoshima Univ. Mus.*, Kagoshima and Res. Ins. for Hum. and Nat., Kyoto, Japan, 70pp.
- Motomura, H., U.B. Alama, N. Muto, R.P. Babaran and S. Ishikawa. 2017. Commercial and bycatch market fishes of Panay Island, Republic of the Philippines. *Kagoshima Univ. Mus.*, Kagoshima, Univ. Philipp. Visayas, Iloilo, and Res. Ins. for Hum. and Nat., Kyoto, Japan, Kyoto, Japan, 246pp.
- Myoung, J.G. 2002. The sea fishes of Korea. *Darakwon*, Seoul, Korea, 287pp. (in Korean)
- Nakae, M., H. Motomura, K. Hagiwara, H. Senou, K. Koeda, T. Yoshida, S. Tashiro, B. Jeong, H. Hata, Y. Fukui, K. Fujiwara, T. Yamakawa, M. Aizawa, G. Shinohara and K. Matsuura. 2018. An annotated checklist of fishes of Amami-oshima Island, the Ryukyu Island, Japan. *Mem. Nstl. Mus. Nat. Sci.*, Tokyo, 52: 205-361.
- Nelson, J.S., T.C. Grande and M.V.H. Wilson. 2016. Fishes of the World. 5th edition. John Wiley and Sons, Hoboken, N. J. v-xli + 707pp.
- Randall, J.E. 1956. A revision of the surgeonfish genus *Acanthurus*. *Pac. Sci.*, 10 : 159-235, pls. 1-3.
- Randall, J.E. 1986. Family No. 243: Acanthuridae. In: Smith, M.M. and P.C. Heemstra (eds.), *Smiths' sea fishes*. Macmillan South Africa, Johannesburg, pp. 811-823.
- Randall, J.E. 2001. Acanthuridae. Surgeonfishes (tangas, unicornfishes). In: Carpenter, K.E. and V.H. Niem (eds.), *FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volume 6. Bony fishes part 4 (Labridae to Latimeriidae), estuarine crocodiles, sea turtles, sea snakes and marine mammals*. FAO, Rome, pp. 3653-3683.
- Robertson, D.R., A.L. Morgan-Estapé and C.J. Estapé. 2021. *Acanthurus mata* (Cuvier, 1829), Elongate surgeonfish (Acanthuridae), newly recorded in the tropical eastern Pacific. *Check List*, 17: 1609-1614. <https://doi.org/10.15560/17.6.1609>.
- Seo, H.R., J.M. Hur, J.H. Kim, J.W. Lim, S.M. Kweon, J.M. Park, M.J. Jeon, G.G. Kim, B.G. Kim, J.E. Han, K.H. Moon, M.S. Kang and J.H. Kim. 2014. National list of species of Korea (List of additional species in 2014). National Institute of Biological Resources, Incheon, Korea, 250pp.
- Shimada, K. 2002. Acanthuridae. In: Nakabo, T. (ed.), *Fishes of Japan with Pictorial Keys to the Species*, English ed. Tokai Univ. Press, Tokyo, Japan, pp. 1319-1330.
- Shimada, K. 2013. Acanthuridae. In: Nakabo, T. (ed.), *Fishes of Japan with pictorial keys to the species*, 3<sup>rd</sup> ed. Tokai Univ. Press, Kanagawa, Japan, pp. 1619-1631. (in Japanese)
- Soniyama, T., K. Ogimoto, S. Hori, Y. Uchida and M. Kawano. 2020. An annotated checklist of marine fishes of the Sea of Japan

- off Yamaguchi Prefecture, Japan, with 74 new records. Bull. Kagoshima Univ. Mus. No. 11: 1-152. (in Japanese)
- Sorenson, L., F. Santini, G. Carnevale and M.E. Alfaro. 2013. A multi-locus timetree of surgeonfishes (Acanthuridae, Percomorpha), with revised family taxonomy. Mol. Phylogenetics Evo., 68: 150-160. <https://doi.org/10.1016/j.ympev.2013.03.014>.

# 우리나라 거문도 연안에서 채집된 양쥐돔과 한국첫기록종, *Acanthurus xanthopterus*

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**요 약** : 우리나라 거문도 연안에서 채집된 양쥐돔과 어류 1개체 (332.6 mm in SL)의 표본을 근거로 *Acanthurus xanthopterus*를 국내 첫기록으로 보고한다. 본 종은 눈 앞에 노란색 가로줄 무늬가 있는 점, 등지느러미와 뒷지느러미에 4개의 푸른색 줄무늬가 있는 점, 가슴지느러미 가장자리에 노란색 띠가 있는 것이 특징이다. 본 종의 신한국명으로 '노랑무늬양쥐돔'으로 제안한다.

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**찾아보기 낱말** : 양쥐돔과, *Acanthurus xanthopterus*, 첫기록, 거문도, 한국