First Japanese Record of the Speckled Grouper
*Epinephelus magniscuttis* (Perciformes: Serranidae) from the Osumi Islands

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A single large specimen (613.0 mm standard length) of *Epinephelus magniscuttis* Postel, Fourmanoir, and Guézé, 1963, previously known from scattered localities of the Indo-West Pacific and the Philippines as the northernmost record, was collected at a depth of 50 m off Tanega-shima island in the Osumi Islands, southern Japan. The specimen represents the first record from Japan and the northernmost record of the species as well as the largest record as a museum specimen. The new standard Japanese name “Uguisu-gomadara-hata” is proposed for the species.

Key Words: Teleostei, Epinephelinae, distribution, northernmost record, Tanega-shima island.

Introduction

The genus *Epinephelus* Bloch, 1793, the most specious genus in the family Serranidae, contains about 90 species in the world (Heemstra and Randall 1993; Tucker et al. 2016), 43 species of which having currently been known in Japanese waters (Senou 2013; Fujiwara et al. 2015).

During ichthyofaunal surveys of the Osumi Islands, southern Japan, a single large specimen of *Epinephelus* was collected off Tanega-shima island at a depth of 50 m. The specimen was subsequently identified as the Speckled Grouper, *Epinephelus magniscuttis* Postel, Fourmanoir, and Guézé, 1963, a poorly known deep-water species recorded from scattered localities in the Indo-West Pacific in depths of 50–300 m (Randall and Heemstra 1991, 1999; Fennessy and Russell 2011). Since the northernmost record of the species has been known as the Philippines in the Pacific Ocean, the Tanega-shima specimen, described here in detail, represents the first record of *E. magniscuttis* from Japan.

Materials and Methods

Counts and measurements followed Randall and Heemstra (1991). Measurements were made to the nearest 0.1 mm with needle-point calipers. Standard, total, and head lengths are abbreviated as SL, TL, and HL, respectively. Curatorial procedures for the collected specimen followed Motomura and Ishikawa (2013). The specimen examined in this study is deposited at the Kagoshima University Museum, Kagoshima (KAUM). A tissue sample from the Japanese specimen of *E. magniscuttis* was sequenced for the DNA barcoding COI marker fragment, following the methods outlined in Ward et al. (2008). The sequence was lodged in GenBank (accession no. MH800836). Existing COI sequences of other species of *Epinephelus* used for comparative analysis were obtained from GenBank or Barcode of Life Database: *Epinephelus epistictus* (Temminck and Schlegel, 1843) (Taiwanese population: KU893048, KU943501, KU943517, KU943555, FJ237768); *E. epistictus* (Indian population: KM226254–226260, KU366471); *Epinephelus erythrurus* (Valenciennes, 1828) (JN208607–208609, JN208611–208612, KP998441); *Epinephelus heniochus* Fowler, 1904 (KY37146–208618, KR863512); *Epinephelus morhua* (Valenciennes, 1833) (DQ107896–107897, EU392188–392189, KM077930, KM226284–226285, KU943486, KY371488, WLIND133–134); *Epinephelus pociolotus* (Temminck and Schlegel, 1843) (DSLAF241, DSLAF245, DSLAF247–250, DSLAF579–580, DSLAG036, DSLAG619, DSLAG1398–1402, GU804952, GU805042, HQ945797, JF493454, KF89586, KF929856, KM226286–226287, TZSAL642–643, TZSAN153–154); *Epinephelus radiatus* (Day, 1868) (JQ681383, JQ681405, KM226295–226297, KT835687–835688, KU943526).

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**Epinephelus magniscuttis** Postel, Fourmanoir, and Guézé, 1963

[English name: Speckled Grouper; new standard Japanese name: Uguisu-gomadara-hata] (Fig. 1)

**Epinephelus pseudomorrhua** Postel, Fourmanoir, and Guézé, 1963: 366, fig. 10 (type locality: Réunion).

**Material examined.** KAUM–I. 73560, 613.0 mm SL, 739.0 mm TL, off Tanowaki, Genna, Nishinoomote, Tanegashima island, Osumi Islands, Kagoshima, Japan, 30°41′ N, 131°05′ E, 50 m depth, longline fishing, M. Takayama, 30 May 2015.

**Description.** Dorsal-fin rays XI, 14; anal-fin rays III, 8; pectoral-fin rays 18; pelvic-fin rays I, 5; lateral-line scales 61; scale rows in longitudinal series 104; gill rakers (upper+lower=total) 9+16=25. The following morphometrics are expressed as percentage of SL: head length 41.2; snout length 11.1; body depth 34.3; body width 16.7; orbit diameter 6.4; interorbital width 7.2; suborbital depth 4.0; upper-jaw length 19.0; caudal-peduncle depth 11.3; caudal-peduncle length 21.0; pre-dorsal-fin length 38.9; pre-anal-fin length 67.9; pre-pelvic-fin length 39.6; dorsal-fin base length 53.2; first dorsal-fin spine length 5.9; second dorsal-fin spine length 10.6; third dorsal-fin spine length 12.6; fourth dorsal-fin spine length 12.6; fifth dorsal-fin spine length 12.3; sixth dorsal-fin spine length 11.8; seventh dorsal-fin spine length 10.9; eighth dorsal-fin spine length 10.6; ninth dorsal-fin spine length 9.7; tenth dorsal-fin spine length 8.9; eleventh dorsal-fin spine length 8.8; longest dorsal-fin soft ray length (eighth ray) 13.9; anal-fin base length 16.3; first anal-fin spine length 4.0; second anal-fin spine length 7.6; third anal-fin spine length 8.3; longest anal-fin soft ray length (third ray) 15.5; pectoral-fin length 23.7; pelvic-fin length 16.3; pelvic-fin spine length 9.0.

Body oblong, somewhat compressed; dorsal profile of head and body elevated from snout to dorsal-fin origin, and parallel to body axis from first to sixth dorsal-fin base, then decreasing to caudal peduncle. Ventral profile of body decreasing from lower-jaw tip to between pelvic-fin insertion and anus, and then elevated to caudal-fin base. Eye and pupil rounded. Anterior and posterior nostrils oval, close together, anterior nostril (its greatest diameter 2.3 in greatest diameter of posterior nostril) 17.4%; dermal flap on posterior edge of anterior nostril. Mouth terminal, large; posterior tip of maxilla vertical through posterior margin of pupil. Anterior tip of lower jaw significantly anterior to upper jaw. Single outer row of conical teeth and inner band of villiform teeth on upper jaw; paired canine-like teeth on anterior part of jaws; two rows of conical teeth on lower jaw. Villiform teeth on vomer and palatines. Gill rakers on upper and lower limbs short, rounded and long, slender respectively. Posterior margin of preopercle finely serrated; rounded corner of preopercle with numerous fine serrations, lacking enlarged serrae; lower margin of preopercle smooth. Posterior mar-
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gin of opercle smooth, lower margin with blunt serrations; three opercular spines. Body scales ctenoid, except for abdomen with cycloid scales; no scales on jaws, around eyes, gill membranes, or axillary region of pectoral fin. Lateral line complete, originated from upper end of opercle to middle of caudal-fin base.

Dorsal-fin origin anterior to vertical through posterior tip of opercle. End of dorsal-fin base posterior to vertical through end of anal-fin base. First to third dorsal-fin spines gradually lengthening, third to eleventh spines gradually becoming shorter. Upper end of pectoral-fin base anterior to vertical through posterior tip of opercle. Lower end of pectoral-fin base slightly posterior to vertical through pelvic-fin spine base. Posterior margin of pectoral fin rounded, reaching to vertical through eighth dorsal-fin spine base, not reaching to anus. Pelvic-fin origin slightly anterior to vertical through dorsal-fin origin. Basal half of last pelvic-fin soft ray connected to abdomen with membrane. Posterior tip of depressed pelvic fin not reaching to anus or vertical through posterior margin of pectoral fin. Anal-fin origin vertical through eleventh dorsal-fin spine base. Caudal fin rounded.

**Color when fresh** (Fig. 1). Head and body greenish brown dorsally, pale brown ventrally. Numerous dark brown spots, their size smaller than posterior nostril diameter, scattered dorsolaterally. No close-set spots forming lines behind orbit; few spots on spinous portion of dorsal fin, and upper two-third of caudal fin; no close-set spots forming lines behind orbit; few spots on spinous portion of dorsal fin. No spots on lower half of head (including snout, jaws, and lips), abdomen, and pectoral, pelvic, and anal fins. Black band on cheek along above upper edge of maxilla. Dorsal fin greenish brown; distal half of soft-rayed portion grayish. Pectoral fin greenish brown with grayish margin. Pelvic and anal fins pale brown. Caudal fin greenish brown with grayish distally. No white margins to fins.

**Distribution.** *Epinephelus magniscuttis* is distributed at scattered localities in the Indo-West Pacific where it was recorded from South Africa (Natal), Mozambique, Réunion, Mauritius, Philippines (Mindianoa), New Guinea, New Ireland, Australia (Western Australia and Great Barrier Reef, Queensland), New Caledonia, Fiji, and Tonga in depths of 50–300 m (Heemstra and Randall 1986, 1993, 1999; Randall and Heemstra 1991; Kramer et al. 1994; Hutchins 2001; Randall et al. 2003; Fricke et al. 2009, 2011; Fennessy and Russell 2011). The species is newly recorded at a depth of 50 m off Tanega-shima island, Osumi Islands, southern Japan (this study).

**Remarks.** The specimen collected from Tanega-shima island agrees well with the genus *Epinephelus* defined by Randall and Heemstra (1991) and Heemstra and Randall (1993, 1999) in having 11 dorsal-fin spines, eight anal-fin soft rays, body depth 2.9 in SL, body depth at the dorsal-fin origin deeper than depth at anus, and a rounded caudal fin. The following features of the specimen closely match with the diagnostic features of *E. magniscuttis* given by Postel et al. (1963), Randall and Heemstra (1991), Heemstra and Randall (1993, 1999), and Fennessy and Russell (2011): dorsal-fin rays XI, 14, with the third spine longest; anal-fin rays III, 8; pectoral-fin rays 18, lateral-line scales 61; scale rows in the longitudinal series 104; gill rakers 9 + 16; pectoral-fin length 57.5% of HL; distinct black spots scattered on the dorsolateral portions of the head and body, the posterior portion of the dorsal fin, and the upper portion of the caudal fin (Fig. 1).

Although most morphometric values for the Tanega-shima specimen agree with the ranges for the Indo-West Pacific specimens of *E. magniscuttis* given by Randall and Heemstra (1991), Heemstra and Randall (1993, 1999), and Fennessy and Russell (2011), the Tanega-shima specimen has relatively shorter fin spines and rays than the latter (e.g., longest dorsal-fin spine length 30.6% of HL, shorter than the longest dorsal-fin soft ray, vs. 33.3–40.8% of HL, longer than longest soft rays; longest pelvic-fin soft ray length 39.9% of HL vs. 42.6–47.6% of HL). Specimens reported in the previous papers were smaller than the Tanega-shima specimen (<580 mm SL versus 613 mm SL), hence differences in relative lengths of fin spines and rays are most likely due to growth-related changes. Although Postel et al. (1963) state that *E. magniscuttis* attains 1500 mm TL and 50 kg, their specimen was only 260 mm TL and the reported 1500 mm specimen was not retained. The largest specimen-based record of the species was a specimen collected from Mozambique (580 mm SL), reported by Heemstra and Randall (1986), and the specimen was lost (Randall and Heemstra 1991). The Tanega-shima specimen (613.0 mm SL, 739.0 mm TL) is the largest voucher specimen of the species registered in a museum collection.

Although a distinct single row of close-set spots running posteriorly from the eye has been regarded as a diagnostic character for *E. magniscuttis* (Randall and Heemstra 1991; Fennessy and Russell 2011), the Tanega-shima specimen lacks such a single row, suggesting that close-set spots become more sparse, not forming a single row, with growth.

*Epinephelus magniscuttis* is most similar to *E. epistictus*, co-occurring with the former in the Indo-West Pacific, and sharing almost the same meristics and morphometrics, both species having dark spots (Randall and Heemstra 1991). However, *E. magniscuttis* differs from *E. epistictus* in having much more numerous and larger dark spots on the head, body, and fins, and lacking white margins on the soft-rayed portion of the dorsal and anal fins, and corners and adjacent edges of the caudal fin (Randall and Heemstra 1991; Heemstra and Randall 1993; this study).

The northernmost distributional record of the species has been regarded as off Rio Grande, Mindanao, the Philippines (Randall and Heemstra 1991). Therefore, the Tanega-shima specimen represents the first record of *E. magniscuttis* from Japan and the northernmost record for the species, an approximately 2,700 km northwestward range extension.

A new standard Japanese name “Uguisu-gomadara-hata” is proposed for *E. magniscuttis* based on the Tanega-shima specimen (KAUM–I. 75360). “Uguisu-gomadara” means sesame-like spots on an olive green body; “hata” is the common Japanese name for groupers.

**Molecular results.** No genetic samples from other specimens of *E. magniscuttis* were available to assess intraspecific sequence divergence. However, the Japanese specimen was
compared to samples from species regarded by Randall and Heemstra (1991) as the closest congeners to *E. magniscut-tis*. In accordance with the latter, the Japanese *E. magniscut-tis* sequence was found to be most similar to populations of *E. epistictus*, followed by *E. radiatus*, with increasingly larger divergences between all other sampled congeners. Average sequence divergences were recorded as follows: *E. epistictus* (Taiwanese population), 2.09%; *E. epistictus* (Indian population), 3.65%; *E. radiatus*, 4.56%; *E. poecilonotus*, 5.02%; *E. morrhaua*, 6.14%; *E. heniochus*, 6.64%; and *E. erythrurus*, 12.38%.

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