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A new fish species of the subfamily Serraninae (Perciformes, Serranidae) from the Philippines

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Abstract

A new species of serranine fish is described from the Philippine Islands. A single specimen of a new species, *Chelidoperca santosi*, captured by fishermen working in Palawan waters was discovered in the public fish market in Iloilo City, Panay, Philippines. Two additional specimens of the new species, also from the Philippines, were subsequently discovered in the collections of the Museum Victoria, Australia. The new species is currently known only from the Philippines and is characterized by its distinctive coloration with a row of four small dark spots on the snout (two in front of each eye) and two dark spots on the chin (one on each side of the symphysis of the dentaries), a white anal fin with six large yellow spots separated by broad white interspaces and a narrow yellow distal border, caudal fin with narrow yellow bars and a yellowish distal margin and no dark spots, and a combination of meristic and morphological characters.

Key words: *Chelidoperca santosi*, perchlet, Serranidae, Philippines, endemic

Introduction

The Philippines, a major component of the Indo-Malay-Philippine Archipelago (IMPA), has the richest diversity of coastal marine fishes in the world (Carpenter & Springer 2005, Sanciangco *et al.* 2013). Although the Philippines have long been the focus of ichthyological research, ongoing studies of its ichthyofauna continue to reveal new and previously unknown fish species. A recent project in the Philippines to obtain specimen-vouchered tissue samples of the fish species found in Philippine fish markets resulted in the collection of a single colorful specimen of an undescribed species of serranid fish of the genus *Chelidoperca*. Subsequent searches at international museums led to the discovery of two additional Philippine specimens of this new species.

The genus *Chelidoperca* has seven nominal species (an eighth nominal species from the Atlantic has been reassigned to the genus *Serranus*) (Eschmeyer 2014). All seven of the available species names are currently recognized as valid (Eschmeyer 2014, Froese & Pauly 2014): *C. hirundinacea* (Valenciennes in Cuvier & Valenciennes 1831), *C. investigatoris* (Alcock 1890), *C. lecromi* Fourmanoir 1982, *C. maculicauda* Bineesh & Akhilesh in Bineesh *et al.* 2013, *C. margaritifera* Weber 1913, *C. occipitalis* Kotthaus 1973, and *C. pleurospilus* (Günther 1880). These fishes are relatively small (usually less than 200 mm in length) and typically are taken using trawl nets at depths greater than 100 m. As a result there is little known about these perchlets. Only four species are currently known from the western Pacific (*C. hirundinacea*, *C. lecromi*, *C. margaritifera* and *C. pleurospilus*). *Chelidoperca lecromi* has only been reported from the Chesterfield Islands and American Samoa. *Chelidoperca hirundinacea* and *C. pleurospilus* are distributed from Indonesia to Japan, and *C. margaritifera* from New Guinea to Japan (Masuda *et al.* 1984).

The purpose of this paper is to describe the new species of *Chelidoperca*, which currently is known only from the Philippine Islands, bringing the total to eight valid species in the genus.

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Material and methods

Methods of counting and measuring follow Anderson and Heemstra (2012). The supraneural-dorsal ray-pterygiophore-neural spine interdigitation pattern is presented as a formula with "0"representing a supraneural, "/" a neural spine, and numerals indicating the number of spines/rays borne by each pterygiophore. Morphometric data for the new species are presented in the descriptions as proportional measurements of SL or HL, rounded to the nearest 0.1 mm. Values for the holotype are in parentheses for variable characters. The holotype of the new species is deposited in the Philippine National Museum (PNM). Paratypes are deposited in the Museum Victoria (NMV) and the National Museum of Natural History of the Smithsonian Institution (USNM). Abbreviations used: standard length (SL), head length (HL), lateral line (LL), dorsal fin (D) and anal fin (A).

Molecular techniques are those employed at the Smithsonian as described by Baldwin *et al.* (2011) for genetic analysis of the mitochondrial gene coding for cytochrome C oxidase subunit 1 (COI). A 655 base-pair fragment from the new species was sequenced and compared with all available sequences from congeners obtained from GenBank (none available for *C. hirundinacea*, *C. lecromi* and *C. margaritifera*), with a representative of the Serraninae and Epinephelinae used as outgroups (Table 1). All sequences are deposited in GenBank. Sequence divergence and tree construction in relation to other known species of *Chelidoperca* and outgroups were estimated using the Kimura 2-parameter model under maximum likelihood using the MEGA 5.05 software package (Tamura *et al.* 2011). An appropriate model of nucleotide substitution and maximum likelihood tree was also determined using jModelTest2 (Darriba et al. 2012) and Phyml (Guindon & Gascuel 2003) that yielded an identical topology. Topology confidence was estimated with 1000 bootstrap replicates.

TABLE 1. Specimens included in our molecular analysis.

Species	GenBank Accession numbers
Chelidoperca santosi n.sp.	KP150308
Chelidoperca investigatoris	JX185305, JX185307, JX185310, JX185312
Chelidoperca maculicauda	JX185308, JX185309, JX262929
Chelidoperca occipitalis	JX185304, JX185306, JX185311, JX185313
Chelidoperca pleurospilus	JQ681448, JQ681449, JQ681476
Hypoplectrus unicolor	JQ840882
Liopropoma pallidum	JQ431890

Chelidoperca santosi, new species

Common name: Pogi Perchlet
(Fig. 1)

Holotype. PNM 15190 (previously USNM 424586); 69 mm SL; Philippines: vicinity of Palawan, found in the mouth of a large grouper (species not recorded) in Iloilo City fish Market, exact locality unknown, vendor stated that he received the shipment containing this fresh fish from Palawan; field number PHI-2013-46; tissue voucher number PHI-422; 20 June 2013; J.T. Williams & K.E. Carpenter; depth of capture unknown.

Paratypes. NMV A16485: 84 mm SL; Philippines, Bohol Sea, off Mindanao; depth 146 m; latitude 9.5066667, longitude 123.8416667; collected by otter trawl; R/V Alpha Helix 79-1; 22 Nov 1979; Chung-Chen Lu. USNM 427531, 69 mm SL; out of NMV A16485.

Diagnosis. Dorsal rays X, 10; preopercle with 40–45 serrae; exposed portion of posttemporal with 5–7 spines at beginning of LL; lateral-line tubed scales 42–45; scales above lateral line to dorsal origin 2.5–3.0; body pinkish without dark markings; snout with row of four small dark spots (two in front of each eye); two dark spots on chin (one on each side of symphysis of dentaries); maxillaries pinkish anteriorly with posterior half white with dusky streak positioned centrally near dorsal edge; pelvic fin white with yellow streak on middle rays; white anal fin with six large yellow spots separated by broad white interspaces and a narrow yellow distal border; caudal fin with reddish pink base surrounding small pinkish white spot over bases of middle rays, remainder of fin white with four narrow yellow bands and yellowish distal margin;; caudal-fin shape weakly emarginate.

Description. Dorsal rays X, 10, third spine longest, tenth ray longest; anal rays III, 6, third spine longest, sixth ray longest; pectoral rays 16, dorsalmost 2 unbranched, others branched with middle rays longest and reaching to anus; pelvic fin I, 5, first two rays thickened and heavily branched, innermost ray with narrow skin flap medially, reaching anal fin when depressed; caudal fin weakly emarginate with 9 dorsal and 7 ventral procurrent rays, 1 or 2 (2) dorsal and 1 or 2 (2) ventral unbranched rays, 8 + 7 branched rays, 18 or 19 (19) total segmented rays; LL with 42–45 (42) tubed scales to caudal base (some scales missing); scales above LL to origin of dorsal fin 2.5 or 3 (2.5); scales above LL to base of middle dorsal spine 2.5; scales below LL to origin of anal fin 10 or 11 (10); diagonal rows of scales on cheek 6 or 7 (6); scales on top of head extending anteriorly to vertical from anterior margin of pupil (some scales missing, but distinct scale pockets present), about 7 or 8 scales between supratemporal sensory canal and dorsal-fin origin (some scales missing); circumpeduncular scales 19 or 20 (20); first gill arch with 5 rudiments and 2 developed gill rakers (upper), 1 developed gill raker at angle, 6-8 (8) developed rakers, 6 or 7 (7) rudiments (lower); total rudiments and gill rakers 20–22 (22); pseudobranchial filaments 20–26 (20); vertebrae 10 + 14 = 24; last rib borne on vertebral centrum 10; last epineural on vertebral centrum 11 or 12 (11); supraneurals 3; supraneural-dorsal ray-pterygiophore-neural spine interdigitation pattern 0/0/0+2/1+1/1/1/1/1/1/2/1/1+1/1/1/1+1/1/1.

FIGURE 1. *Chelidoperca santosi*, holotype, PNM 15190, 84 mm SL, freshly collected at a fish market at Iloilo, Panay, Philippines, photographed by J.T. Williams.

Relatively small serranid species 69–84 (69;72 when fresh) mm SL; body depth 3.4–4.1 (4.1) in SL; head length 25–32 (25) mm, 2.5–2.8 (2.8) in SL; snout length 3.7–5.6 (4.2) in HL; orbit diameter 3.1–3.4 (3.1) in HL; bony interorbital width 7.1–9.3 (8.3) in HL, upper jaw length 2.1–2.2 (2.1) in HL; caudal peduncle length 2.3–2.7 (2.3) in HL; caudal peduncle least depth 3.1–3.7 (3.1) in HL; snout to D origin length 2.7–2.8 (2.8) in SL; snout to A origin length 1.6–1.8 (1.7) in SL; snout to pelvic origin length 2.9–3.1 (3.1) in HL; length of longest (5^{th}) D spine 1.9–2.5 (1.9) in HL; length of longest A spine 3.6–4.0 (3.6) in HL; pectoral-fin length 1.6 in HL; pelvic-spine length 2.3–2.7 (2.3) in HL; longest pelvic-ray length 1.3–1.5 (1.3) in HL; caudal-fin length 4.2–4.7 (4.3) in SL.

Holotype with mouth large, slightly oblique, posterior margin of maxilla reaching to a vertical at posterior edge of pupil; maxilla expanded posteriorly, with long, low, lateral ridge running parallel to dorsal margin; mouth superior (lower jaw protrudes slightly beyond upper); upper lip with row of tiny papillae on ventral margin, lower lip with fringe of papillae on medial half, lip thickening posteriorly on each side of jaw; upper jaw with row of enlarged canines slightly curved and directed anteriorly on each side of symphysis, narrow untoothed gap at symphysis, enlarged canines flanked mesially by a patch of small pointed teeth with inner row consisting of two large posteriorly directed fangs almost reaching vomer, narrower band of fine pointed teeth extends posteriorly along length of jaw to gape; lower jaw with row of about 8 enlarged curved fangs directed anterodorsally, flanked mesially by band of small conical teeth extending posteriorly to gape; vomer with roughly V-shaped band of 3–5 rows of sharp-tipped conical teeth, largest teeth posteriorly in innermost row; palatines with 2–4 rows of small, sharp-tipped conical teeth; tongue small, narrow, pointed. Paratypes similar to holotype except lower jaw protrudes anteriorly only slightly beyond upper jaw.

Opercle with 3 flat spines, 2 of which are prominent, dorsalmost spine slightly longer; preopercle with 40–45

(45) small spines along posterior and ventral margins; distal margin of interopercle with 10–14 (10) spines; distal margin of subopercle with 16–21 (19) spines. Posttemporal with 5–7 spines (6 spines on left side, 7 on right) at beginning of LL. Anterior nostrils positioned at middle of snout, each nostril with small rounded flap rising from posterior rim; posterior nostril an elliptical opening at anterior border of orbit.

Body with ctenoid scales; lateral line slightly arched over pectoral fin then gradually descending, ending at middle of caudal-fin base. Small cycloid scales on basal quarter of caudal and pectoral fins; no scales on dorsal, anal or pelvic fins. Head with cycloid scales above eyes, several tiny cycloid scales posteriorly on dentaries and on opercular membrane, subopercle and interopercle; no scales on maxilla or snout. Preopercle with mixture of cycloid and ctenoid scales.

Dorsal fin with middle spines longest, spines 8 and 9 shorter than 10th, segmented rays increasing in length posteriorly with rays 8 and 9 longest; anal fin with successive rays increasingly longer than preceding rays with ray 6 longest; caudal fin slightly emarginate; pectoral fin lanceolate with middle rays longest and reaching vertical from anus; pelvic fins with first segmented ray elongate, reaching anus.

Color in life (based on photo of the fresh holotype). Head pinkish with numerous yellow spots on nape, yellow streak from beneath middle of eye across cheek; underside of head, chest and abdomen white; snout pink with two side-by-side black spots above upper lip on each side; maxillaries pinkish anteriorly with posterior half white with dusky streak positioned centrally near dorsal edge; tip of lower jaw pinkish with small black spot on either side of symphysis, remainder of jaw white; yellowish orange area between eyes and on top of head, scales on top of head and on body above LL to about middle of soft dorsal fin pinkish yellow with narrow posterior black borders; scales on body below LL without black borders; four broad, irregular pink and yellow bars alternating with broader pinkish white interspaces on dorsal three-fourths of body, first bar beneath middle of spinous dorsal fin, last bar darkest in color on caudal peduncle at base of caudal fin; pectoral-fin base white, small pinkish red blotch on bases of middle pectoral rays, remainder of fin translucent; pelvic fins white with yellow stripe along middle rays; spinous dorsal fin whitish with small pink spots on bases of spines followed by yellow spots and blotches on middle of fin, distal margin dusky; soft dorsal fin translucent with yellow spots and blotches; anal fin white with six large yellow spots (three along base of fin, final three along lengths of rays 5 and 6) alternating with white interspaces of similar width, narrow yellow margin distally; caudal fin white with small pinkish white spot outlined with pink on bases of middle rays, followed by four narrow yellow bars alternating with broad white interspaces, faint yellow distally; eye with yellowish pink iris.

Color in alcohol of all three specimens uniformly cream or white with the only remaining markings being the black spots on the snout and lower jaw and black outlines on nape and scales above LL; no indication persists of pink and yellow fresh coloration.

Etymology. The species is named *santosi* in honor of Mudjekeewis Santos of the NFRDI-BFAR, Manila, our Philippine colleague and collaborator, without whose assistance the discovery of this colorful perchlet would not have been possible, and in recognition of his many contributions to the advancement of science in the Philippines. The common name is based on the Tagalog word *pogi* meaning handsome in reference to its striking fresh coloration.

Remarks. *Chelidoperca santosi* is distinguished from all congeners by the presence of a row of four small dark spots on the snout (two in front of each eye) and two dark spots on the chin (one on each side of the symphysis of the dentaries). It is further distinguished from *C. hirundinacea* by having 2.5–3.0 (versus 4) scales between the lateral line and the dorsal-fin origin, and an emarginate caudal fin with narrow yellow bands (versus asymmetrically crescent shaped with elongate yellow dorsal lobe and short red ventral lobe). *Chelidoperca santosi* lacks prominent dark blotches, stripes or spots on the body (one or more present in *C. occipitalis, C. investigatoris, C. pleurospilus* and *C. hirundinacea*) and has about four irregular reddish pink bars on the body (*C. margaritifera* with yellow stripe and small white spots below stripe; *C. lecromi* with yellow body with a row of about five short yellowish brown bars ventrally on body). *Chelidoperca santosi* is similar in appearance and probably most closely related to *C. maculicauda*, but is distinguished by having no scales anteriorly between the eyes (versus scales present anteriorly between the eyes), a white anal fin with six broad yellow spots with broad white interspaces and a narrow yellow distal border (versus 10 yellow bars/spots with narrow white interspaces and red distal border on anal fin), narrow yellow bars on the caudal fin and no dark spots (versus white spots on the ventral lobe and a small dark spot on the dorsal lobe of the caudal fin), and no dark margins on scales below lateral line (versus some scales below lateral line with dark distal margins).

Available molecular data support the morphological results. *Chelidoperca santosi* is resolved as a distinct genetic lineage (Fig 2) from all other *Chelidoperca* species for which CO1 sequences are available. We could not attempt to infer a comprehensive phylogeny of all species of *Chelidoperca* because sequences were not available for *C. hirundinacea*, *C. lecromi* and C. *margaritifera*. However, the morphological differences discussed above indicate that these three species are distinctly different from *C. santosi* and not likely to apply.

Chelidoperca santosi is known only from the Palawan and Visayan regions of the Philippines. It has been collected by trawl from a depth of 146 m.

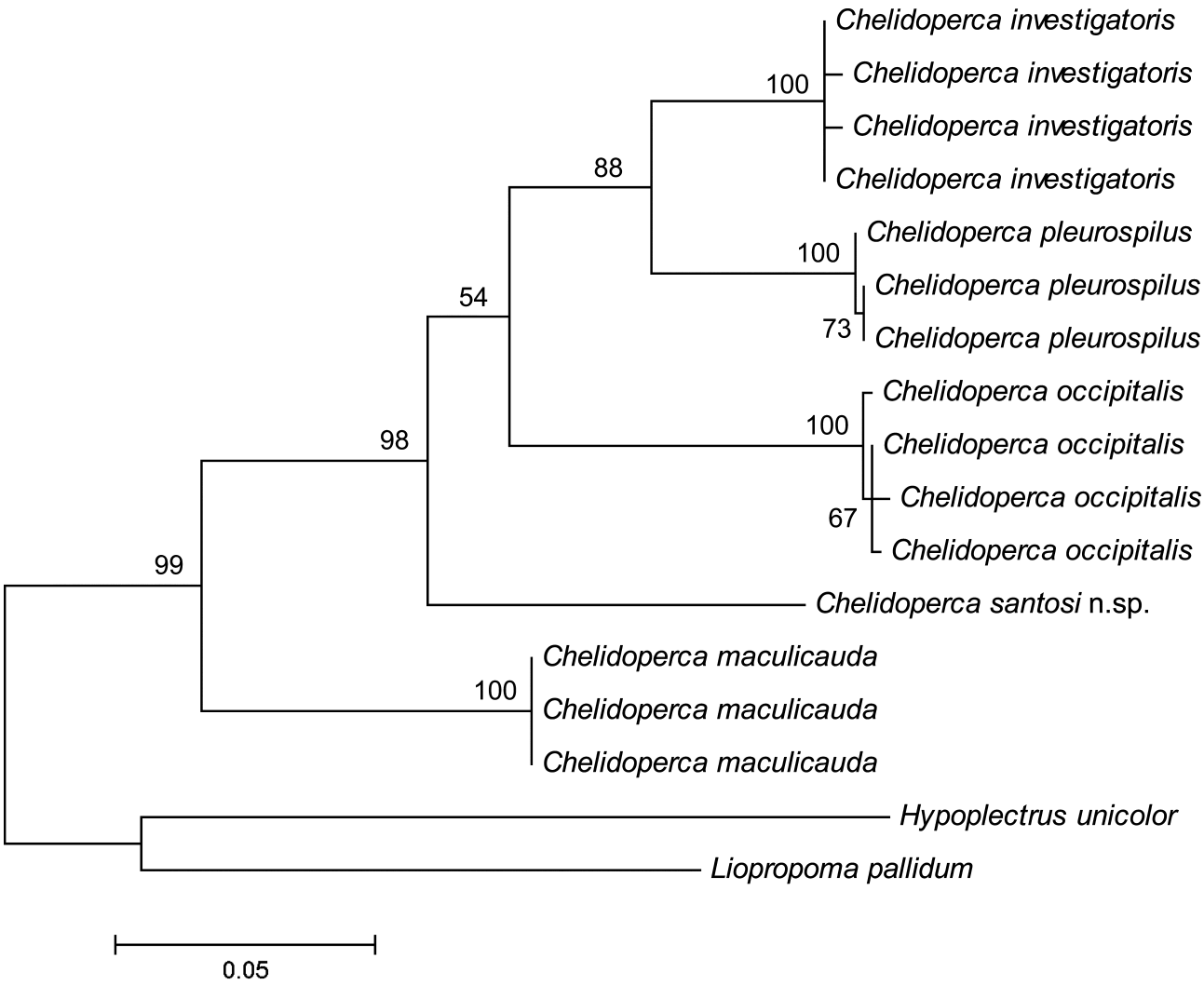

FIGURE 2. Maximum-likelihood tree based on K2P model of available CO1 sequences for members of the genus *Chelidoperca*. Scale bar refers to substitutions/site and bootstrap values are shown on nodes.

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