

A new species of damselfish (*Chromis*: Pomacentridae) from the Raja Ampat Islands, Papua Barat Province, Indonesia

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Abstract

A new species of pomacentrid fish, *Chromis athena*, is described from five specimens, 49.8-54.3 mm SL collected in 62 m depth at the Raja Ampat Islands of western New Guinea (Papua Barat Province, Indonesia). Diagnostic features include XIII, 10 or 11 dorsal rays; II, 10 or 11 anal rays; 17-18 pectoral rays; 3 spiniform caudal rays; 13-14 tubed lateral-line scales; body depth 2.0-2.1 in SL, and a distinctive colouration consisting of a mainly blue-grey body with a bright yellow zone encompassing the nape and upper back above the lateral-line scales.

Zusammenfassung

Die neue Art *Chromis athena* wird auf der Grundlage von fünf Exemplaren mit 49,8 bis 54,3 mm SL beschrieben, die in 62 Metern Tiefe bei den Raja-Ampat-Inseln des westlichen Neuguinea (Provinz Papua Barat, Indonesien) gefangen wurden. Zu den Bestimmungsmerkmalen gehören: XIII, 10 oder 11 Rückenflossenstrahlen; II, 10 oder 11 Afterflossenstrahlen; 17-18 Brustflossenstrahlen; 3 stachelförmige Schwanzflossenstrahlen; 13-14 röhrenartige Schuppen auf der Seitenlinie; Körpertiefe 2,0 bis 2,1 mm SL; sowie eine unverkennbare Färbung mit einem hauptsächlich blaugrauen Rumpf und einer leuchtend gelben Zone vom Nacken über den oberen Rückenbereich oberhalb der Seitenlinienschuppen hinweg.

Résumé

Une nouvelle espèce de Pomacentridé, *Chromis athena*, est décrite sur base de cinq spécimens, de 49,8 à 54,3 mm de LS, collectés à 62 m de fond, près des îles Raja Ampat, à l'ouest de la Nouvelle-Guinée (province de Papua Barat, Indonésie). Les données diagnostiques comprennent XIII, 10 ou 11 rayons dorsaux; II, 10 ou 11 rayons à l'anale; 17-18 rayons pectoraux; 3 rayons spiniformes à la caudale; 13-14 écailles canaliculées sur la ligne latérale; hauteur du corps de 2,0 à 2,1 en LS, et une coloration distincte comprenant un corps principalement bleu-gris avec une zone jaune clair englobant la nuque et le haut du corps au-dessus des écailles de la ligne latérale.

Sommario

In questo articolo si descrive una nuova specie di pomacentride, *Chromis athena*, sulla base di cinque esemplari di 49.8-54.3 mm SL raccolti a 62 m di profondità presso le Isole di Raja Ampat, Nuova Guinea occidentale (Provincia di Papua Barat, Indonesia). Le caratteristiche diagnostiche includono XIII, 10-11 raggi dorsali; II, 10-11 raggi anali; 17-18 raggi pettorali; 3 raggi caudali spiniformi; linea laterale con 13-14 scaglie perforate; altezza del corpo 2.0-2.1 in SL e una particolare colorazione caratterizzata da un corpo fondamentalmente blu-grigio con un'area giallo brillante che circonda la nuca e la parte del dorso sopra le scaglie della linea laterale.

INTRODUCTION

The pomacentrid genus *Chromis* Cuvier, 1814 is common on coral and rocky reefs throughout tropical and warm temperate seas. The genus, which contains 89 species, is by far the largest in the family. Allen (1991) provided photos and a brief diagnosis for 75 of the 76 described species (*C. dispilus* Griffin, 1923 from New Zealand unintentionally omitted). An additional 14 species were described in recent years (Randall & McCosker 1992, Moura 1995, Randall 2001, Allen & Randall 2004, Senou & Kudo 2007, and Pyle et al. 2008). In addition, Allen (1993) showed that *C. megalopsis* Allen, 1976 from Western Australia is a junior synonym of *C. mirationis* Tanaka, 1917 of southern Japan.

The present paper describes a distinctive new species that was first discovered during a relatively deep scuba dive by the authors at the Raja Ampat Islands of western New Guinea (Papua Barat Province, Indonesia) during November 2007. A single specimen was speared by the second author in 62 m depth at the Fam Group of islands and four additional specimens were taken several months later at the same location.

MATERIALS AND METHODS

Lengths of specimens are given as standard length (SL) measured from the anterior end of the upper lip to the base of the caudal fin (posterior edge of hypural plate); head length (HL) is measured from the same anterior point to the posterior edge of the opercle flap; body depth is the maximum depth taken vertically between the belly and base of the dorsal spines; body width is the maximum width just posterior to the gill opening; snout length is measured from the anterior end of the upper lip to the anterior edge of the eye; orbit diameter is the horizontal fleshy diameter, and interorbital width the least fleshy width; upper jaw length is taken from the front of the upper lip to the posterior end of the maxilla; caudal peduncle depth is the least depth, and caudal peduncle length is the horizontal distance between verticals at the rear base of the anal fin and the caudal fin base; lengths of fin spines and rays are measured to their extreme bases (i.e., not from the point where the ray or spine emerges from the basal scaly sheath); caudal fin length is the horizontal length from the posterior edge of the hypural plate to a vertical at the tip of the longest ray; caudal concavity is the horizontal distance between verticals at the tips of the shortest and longest rays; pectoral fin length is the length of the longest ray; pelvic fin length is measured from the base of the pelvic spine to the filamentous tip of the longest soft ray; pectoral ray counts include the small splint-like, uppermost rudimentary ray; only the tube-bearing anterior lateral-line scales are counted; a separate count is given for the deeply pitted scales occurring in a continuous series midlaterally on the caudal peduncle; a back slash (/) in the count of lateral line scales for the holotype indicates different counts on the left and right side respectively; the decimal figure “.5” appearing in the scale row count above the lateral line refers to a small truncated scale at the base of the dorsal fin; gill raker counts include all rudiments and are presented as separate counts for the upper and lower limbs as well as a combined count; the last fin ray element of the dorsal and anal fins is usually branched near the base and is counted as a single ray.

Counts and proportions appearing in parentheses apply to the range for the paratypes if different from the holotype. Proportional measurements expressed as percentage of the standard length are provided in Table I. The holotype is deposited at Pusat Penelitian dan Pengembangan Oseanologi, Jakarta, Indonesia (NCIP).

Chromis athena n. sp.

(Figs 1-2, Table I)

Holotype. NCIP 6337, 49.8 mm SL, Keruo Channel, 00°35.291'S 130°17.542'E, Fam Group, Raja Ampat Islands, Papua Barat Province, Indonesia, 62 m depth, clove oil, M. Erdmann, 16 November 2007.

Paratypes (same locality and depth as holotype). NCIP 6346, 52.8 mm SL, spear, M. Erdmann, 10 April 2007; WAM P.33012-001, 2 specimens, 50.1-54.3 mm SL, clove oil, M. Erdmann, 20 March 2008; USNM 391635, 53.1 mm SL, collected with WAM paratypes.

Diagnosis: Dorsal rays XIII,10 or 11; anal rays II,10 or 11; pectoral rays 17 or 18; spiniform caudal rays 3; tubed lateral-line scales 13 or 14; gill rakers 9 + 20 or 21 = 29 or 30; body depth 2.0-2.1 in SL; colour overall dusky bluish grey, except dark grey on anterior half of head and bright yellow on nape and upper back above lateral-line; fins mainly translucent whitish except caudal fin lobes and basal portion of soft dorsal fin dark grey; colour in alcohol mainly mottled brown with translucent whitish fins.

Description: Dorsal rays XIII,11 (one paratype with XIII,10); anal rays II,11 (one paratype with II,10); all dorsal and anal soft rays branched, the last to base; pectoral rays 17 (one paratype with 18), the upper 2 and lowermost unbranched; pelvic rays I,5; principal caudal rays 15, the upper and lowermost unbranched; spiniform caudal rays 3, followed by 2 accessory segmented rays; scales in longitudinal series 27; tubed lateral-line scales 13/14 (13-14); posterior midlateral scales with a pore or deep pit (in continuous series) 8 (6-10); scales above lateral line to origin of dorsal fin 2.5; scales above lateral line to base of middle dorsal spine 1.5; scales below lateral line to origin of anal fin 8; gill rakers 9 + 21 = 30 (one paratype with 9 + 20 = 29); branchiostegal rays 6; supraneural (predorsal) bones 3; vertebrae 11 + 15.

Body moderately deep, depth 2.0 (2.0-2.1) in SL, and compressed, the width 2.5 (2.6-2.9) in body depth; HL 3.0 (2.9-3.2) in SL; dorsal profile of head with a slight convexity above eye; snout shorter than orbit diameter, its length 3.9 (3.7-4.2) in HL; orbit diameter 2.5 (2.4-2.5) in HL; interorbital space convex, its width 2.9 (2.8-3.0) in HL; caudal-peduncle depth 2.2 (2.2-2.6) in HL; caudal-peduncle length 2.4 (2.2-2.7) in HL.



Fig. 1. *Chromis athena*, holotype, 49.8 mm SL, Raja Ampat Islands, Indonesia. Photo by G. R. Allen.



Fig. 2. *Chromis athena*, underwater photograph of anesthetized freshly collected holotype, 49.8 mm SL, Raja Ampat Islands, Indonesia. Photo by G. R. Allen.

Table I. Proportional measurements of type specimens of *Chromis athena* as percentage of the standard length.

	Holotype NCIP 6337	Paratype WAM P:33012	Paratype NCIP 6346	Paratype USNM 391635	Paratype WAM P:33012
Standard length (mm)	49.8	50.1	52.8	53.1	54.3
Body depth	51.2	49.9	49.1	50.7	47.7
Body width	20.7	18.6	18.4	17.7	18.2
Head length	32.9	32.7	31.3	34.3	32.4
Snout length	8.4	8.4	8.5	8.1	8.3
Orbit diameter	13.3	13.4	12.9	13.7	13.1
Interorbital width	11.2	11.4	11.0	11.3	11.2
Depth of caudal peduncle	14.3	14.2	14.0	13.2	13.6
Length of caudal peduncle	13.7	14.0	13.8	12.6	14.9
Upper jaw length	11.4	11.6	11.4	11.3	11.0
Predorsal distance	43.4	42.5	42.0	44.1	41.4
Preanal distance	71.3	70.9	74.4	70.2	69.1
Prepelvic distance	40.4	41.9	43.4	42.6	40.0
Length of dorsal fin base	61.2	55.9	58.3	59.9	57.6
Length of anal fin base	21.1	20.8	20.6	22.2	19.9
Pectoral fin length	36.9	34.7	33.3	33.9	32.0
Pelvic fin length	33.7	29.9	31.3	30.9	29.7
Pelvic fin spine length	18.5	17.0	17.4	16.8	17.1
1st dorsal spine	8.4	8.8	8.3	9.0	8.8
2 nd dorsal spine	13.3	12.6	12.7	13.4	13.1
6th dorsal spine	17.1	15.2	16.3	16.0	15.7
Last dorsal spine	11.2	11.2	12.7	10.5	11.0
Longest soft dorsal ray	19.9	17.6	20.1	18.5	20.3
1st anal spine	7.2	6.6	6.8	5.3	7.0
2nd anal spine	20.7	19.2	20.5	21.1	19.3
Longest soft anal ray	21.1	17.4	20.5	18.8	19.0
Caudal fin length	30.9	34.1	33.3	32.8	33.7
Caudal concavity	12.7	16.0	15.5	17.3	16.8

Mouth terminal, small, and oblique, forming an angle of about 40° to horizontal axis of head and body; posterior edge of maxilla reaching a vertical slightly behind anterior edge of pupil, the upper-jaw length 2.9–3.0 (2.8–3.0) in HL; teeth multiserial, an outer row of conical teeth in each jaw, largest anteriorly; 25 (24–26) upper and 24 (23–25) lower teeth on each side of jaw; a narrow band of villiform teeth lingual to outer row, in 2–3 irregular rows anteriorly, narrowing to a single row on side of jaws; tongue triangular with rounded tip; gill rakers long and slender, the longest on lower limb near angle about three-fourths length of longest gill filaments; nostril with a fleshy rim, more elevated on posterior edge and located at level of middle of pupil, slightly less than one-half distance from front of orbit to edge of upper lip.

Opercle ending posteriorly in a flat spine, the tip relatively obtuse and obscured by a large scale; margin of preopercle smooth, the posterior margin

extending dorsally to level of upper edge of pupil, the anterior margin extending to level of middle of pupil; suborbital with free lower margin extending nearly to a vertical at posterior edge of pupil.

Scales finely ctenoid; anterior lateral line ending beneath rear portion of spinous dorsal fin; head scaled except lips, tip of snout, and a narrow zone from orbit to edge of snout containing nostrils; a scaly sheath at base of dorsal and anal fins, about one-half pupil diameter at base of middle of spinous portion of dorsal fin, progressively narrower on soft portion; a column of scales on each membrane of dorsal and anal fins, narrowing distally, those on spinous portion of dorsal progressively longer, reaching about two-thirds distance to spine tips on posterior membranes, then progressively shorter on soft portion; small scales on caudal fin extending slightly more than two-thirds distance to posterior margin; small scales on basal one-fifth of pectoral fins; a median scaly process extending posteriorly

from between base of pelvic fins, its length slightly more than half that of pelvic spine; axillary scale above base of pelvic spine about one-third length of spine.

Origin of dorsal fin over third lateral-line scale, the predorsal distance 2.3 (2.3-2.4) in SL; base of soft portion of dorsal fin contained 3.1 times in base of spinous portion; first dorsal spine 3.9 (3.7-3.8) in HL; second dorsal spine 2.5 (2.5-2.6) in HL; fifth to eighth dorsal spines subequal, the longest 1.9 (1.9-2.2) in HL; last dorsal spine 2.9 (2.5-3.3); membranes of spinous portion of dorsal fin moderately incised; third-fifth dorsal soft ray longest, 1.7 (1.6-1.9) in SL; first anal spine 4.6 (4.6-6.5) in HL; second anal spine 1.6 (1.5-1.7) in HL; first three anal soft rays subequal, the longest 1.6 (1.5-1.9) in HL; caudal fin forked, its length 3.2 (2.9-3.1) in SL, the caudal concavity 2.6 (1.9-2.1) in HL; fourth pectoral ray longest, 2.7 (2.9-3.1) in SL; pelvic spine 1.8 (1.8-2.0) in HL; first soft ray of pelvic fin filamentous, 3.0 (3.2-3.4) in SL.

Colour of holotype in alcohol (Fig. 1): mottled brown with many of the scale in the middle portion of the body with pale tan centres; median fins brownish except outer half of soft dorsal fin and posterior margin of caudal fin translu-

cent; pelvic fins whitish with dusky brown suffusion; pectoral fins translucent white.

Colour of holotype when fresh (Fig. 2): overall dusky bluish grey, except dark grey on anterior half of head and bright yellow on nape and upper back above lateral-line scales; spinous dorsal and basal portion of soft dorsal fin dark grey, remaining portion of soft dorsal translucent white; anal fin translucent whitish; caudal fin mainly dark grey with translucent white posterior margin; pectoral and pelvic fins translucent white.

Remarks: Only six other species of *Chromis* share the combination of XIII dorsal spines and relatively low number (14-16) of tubed lateral-line scales: *C. alpha*, *C. caudalis*, and *C. delta*, described from the western Pacific by Randall (1988), *C. monochroma* Allen & Randall, 2004 from Flores, Indonesia, and *C. brevirostris* and *C. earina* described from deep reefs (75-120 m) of the western Pacific by Pyle et al. (2008). All of these except *C. monochroma* and *C. brevirostris* are known to be sympatric with *C. athena*, frequenting outer reef slopes, often at considerable depths (e.g. 50-95 m). *Chromis caudalis* and *C. delta* are easily separated by having two instead of three spiniform caudal rays and their overall dark brown colour with an



Fig. 3. *Chromis monochroma*, holotype, 41.0 mm SL, Flores Indonesia. Photo by J. E. Randall.

abruptly white caudal peduncle and fin. *Chromis brevirostris* differs in having 13-14 soft dorsal rays and 16 (rarely 15) soft anal rays (versus 10-11 rays in both dorsal and anal fins of *C. athena*). *Chromis earina* usually has 12 anal rays and is deeper-bodied (maximum depth 1.65-1.9 in SL versus 2.0-2.1 for *C. athena*). *Chromis alpha* usually possesses 12 instead of 10 or 11 dorsal and anal soft rays, and usually 15 rather than 13 or 14 lateral-line scales. It also differs in colour, having a black spot at the upper base of the pectoral fin, and blackish posterior margins on the preopercle and opercle. All of the above mentioned species lack the yellow colouration on the nape and back that is typical for *C. athena*. The new species appears to be most similar to *C. monochroma* (Fig. 3), a plain brownish fish that also differs in having broadly dusky yellow lobes on the caudal fin with blackish tips. It also differs from *C. athena* in having taller dorsal spines (longest spines 17.35-20.8 % of SL versus 15.7-17.1%) and 7 or 8 upper limb gill rakers instead of the usual complement of nine for *C. athena*.

The type locality and only known collection site consists of a steep drop-off adjacent to a small islet that is part of the Fam Group in the Raja Ampat Islands of far western New Guinea (Papua Barat Province, Indonesia). A group of about 10 individuals was observed hovering near a ledge in 62 m depth.

Etymology: This species is named *athena* with reference to the sailing yacht Athena, which served as our base of operations during the cruise upon which the new species was first discovered.

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