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First record of albinism in the rockfish *Sebastes pachycephalus* complex (Scorpaeniformes: Scorpaenidae)

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29 Short running head: Albinism in *Sebastes pachycephalus* complex

30 News and Comments

31 Text 7 pp, Figure 1 page.

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Albinism, a condition resulting from a group of genetically determined disorders of the melanin pigmentary system (Kinnear et al. 1985), occurs in two forms: (1) complete albinism, which is phenotypically expressed as a lack of integumentary and retinal melanin, indicating defects in the integumentary and retinal melanophores, and (2) partial albinism or leucism. The latter describes an individual with reduced or absent integumentary pigment, but with pigmented retinas, resulting in diminished or no body coloration and darkly pigmented eyes. Primarily used in herpetological literature, the term leucism has recently been suggested as appropriate for ichthyology (Clark 2002). Complete albinism and leucism have been reported in numerous teleost species (e.g., Follett and Dempster 1966; Huzita and Nishino 1966; Dawson 1967; Shinohara and Amaoka 1993; Delgado et al. 2009; Mansur 2011; Pillai and Somvanshi 2011), as well as among chondrichthyans (e.g., Talent 1973; Ishihara et al. 2001; Bottaro et al. 2005; Sandoval-Castillo et al. 2006; Reum et al. 2008; Veena et al. 2011). However in rockfishes of the genus *Sebastes* Cuvier 1829, only one record of albinism has been documented to date [Follet and Dempster 1966, as *Sebastes melanostomus* (Eigenmann and Eigenmann 1890)], an unusual example of leucism, termed “melanalbinism” by the authors. On 28 February 2012, a single leucistic individual of *Sebastes pachycephalus* complex was captured alive in a basket trap in Kamaishi Bay, Iwate Prefecture, Japan (Fig. 1). A brief description of the specimen is given below.

Morphological characters were examined following Muto et al. (2011) except for the lower jaw length, which was taken as the distance between the symphysis and the posteriormost point of the dentary, after fixation in 10 % formalin and preservation in 70 % ethanol. Terminology of the head spines follows Randall and Eschmeyer (2001). Counts and measurements were taken from the right side of the body, the left side having been damaged. The specimen was deposited in the Kyoto University Fish Collection (FAKU).

Description (based on FAKU 134960, 245.3 mm in standard length). The following

59 measurements are expressed as percentage of standard length: head length 41.3; snout length
60 10.5; orbital length 8.6; postorbital length 22.6; upper jaw length 18.3; lower jaw length 16.6;
61 body width 25.6; caudal peduncle depth 12.1; preanal length 68.2; predorsal length 32.7;
62 prepelvic length 46.9; longest dorsal-fin spine (both fourth and fifth) length 15.3; longest
63 dorsal-fin soft ray (fourth) length 16.4; first anal-fin spine length 8.1; second anal-fin spine
64 length 14.3; third anal-fin spine length 13.7; longest anal-fin soft ray (second) length 19.2;
65 pectoral-fin length 29.0; pelvic-fin length 22.1; pelvic-fin spine length 13.7.

66 Dorsal-fin rays XIII, 12; anal-fin rays III, 6; pectoral-fin rays 17; pored lateral line scales 31;
67 gill rakers on upper limb 7, lower limb 16, short and blunt. Body relatively deep and
68 moderately compressed anteriorly, progressively more compressed posteriorly. Head covered
69 with ctenoid scales, except for tip of snout, maxilla, lacrimal, lower jaw, interopercle, isthmus
70 and branchiostegal rays. Posterior part of maxilla naked. Base of spinous dorsal fin naked
71 from below first spine to 12th spine; small scales present posteriorly from below 12th spine to
72 last dorsal-fin ray. Mouth large, slightly oblique; posterior margin of maxilla reaching level of
73 middle of eye. Lower jaw not protruding beyond upper jaw, without distinct symphysial knob.
74 Nasal spine simple, sharp, directed dorsally. Head armed with preocular, supraocular,
75 postocular and parietal spines; all spines robust and well developed. Supracleithral spine
76 simple, directed posteriorly. Interorbital space concave without ridge. Upper posttemporal
77 spine flattened, its base embedded; lower posttemporal spine absent. Sphenotic, tympanic,
78 pterotic and nuchal spines absent. Anterior lacrimal rounded, without distinct spine; posterior
79 lacrimal spine flattened, sharp, directed ventroposteriorly.

80 Body, head and all fins uniformly white; a small number of melanophores on side of trunk
81 above and below lateral line, and on soft rays of dorsal, anal, pectoral and caudal fins. Eye
82 black. Peritoneum white.

83 *Remarks.* *Sebastes pachycephalus* Temminck and Schlegel 1843 is commonly found in

84 coastal shallow-water rocky areas from southern Hokkaido southward to Kyushu, Japan and off
85 the Korean Peninsula (Nakabo 2002). However, the species has been subject to much
86 taxonomic confusion due to variations in body color and other morphological characters.
87 Whereas Matsubara (1943) and Nakabo (2002) recognized four subspecies of *S. pachycephalus*,
88 *Sebastes pachycephalus pachycephalus* Temminck and Schlegel 1843, *Sebastes pachycephalus*
89 *nigricans* (Schmidt 1931), *Sebastes pachycephalus nudus* Matsubara 1943 and *Sebastes*
90 *pachycephalus chalcogrammus* Matsubara 1943, Amaoka (1984) and Amaoka et al. (2011) did
91 not consider the variations as being taxonomically significant, recognizing simply *S.*
92 *pachycephalus*. Except for body coloration, the present specimen most closely resembled *S. p.*
93 *nudus* or *S. p. chalcogrammus* sensu Matsubara (1943) and Nakabo (2002) in having robust
94 head spines, concave interorbital space, short lower jaw lacking scales, thickened rays in ventral
95 half of pectoral fin, dorsal fin with 13 spines and 12 rays, anal fin with three spines and six rays,
96 17 pectoral-fin rays, 31 lateral line pores, and scales absent on base of spinous dorsal fin below
97 first to 12th spines. Recently, Kai et al. (2011) recognized two distinct species within the *S.*
98 *pachycephalus* complex, referring to them as “Species P-Ni” and “Species Nu-C”, on the basis
99 of genetic and morphological differences. According to Kai et al. (2011), “Species P-Ni” is
100 characterized by lacking distinct markings on the dorsum, (usually) small scales occurring along
101 the entire base of the spinous dorsal fin and having 17–19 (mode 18) pectoral-fin rays, thereby
102 being referable to *S. p. pachycephalus* and *S. p. nigricans* of Matsubara (1943). “Species Nu-C”,
103 on the other hand, is characterized by having yellow or brownish-red markings on the dorsum,
104 (usually) small scales on the spinous dorsal fin base restricted to below the fifth or more
105 posterior spines and 16–18 (mode 17) pectoral-fin rays, thereby being referable to *S. p. nudus*
106 and *S. p. chalcogrammus* of Matsubara (1943). The present specimen was therefore
107 considered to be conspecific with “Species Nu-C” of Kai et al. (2011).
108 The normal body coloration of “Species Nu-C” is brownish with yellowish or brownish-red

markings on the dorsum (Kai et al. 2011). The present specimen instead displayed a leucistic phenotype, lacking normal pigmentation over the entire body surface, except for the eyes, a small number of melanophores being coarsely scattered on the sides of the body, operculum and soft rays of the dorsal, anal, pectoral and caudal fins. Although skin color abnormalities are not uncommon in *Sebastes* (Love et al. 2002), most of these so far recorded for the genus represent melanism due to abnormal growth of color-containing cells, resulting in skin tumors (Phillips 1957, 1964). The present (second) example of albinism in *Sebastes* may contribute to our understanding of skin color abnormalities in the genus.

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196 **Figure legend**

197 **Fig. 1** Aquarium photograph of a leucistic specimen of *Sebastes pachycephalus* complex from
198 Kamaishi Bay, Iwate Prefecture, Japan (FAKU 134960, 245.3mm in standard length)

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