



Description of a new species of *Priolepis* (Perciformes: Gobiidae) from the Red Sea, a new record of *Priolepis compita*, and a distributional range extension of *Trimma fishelsoni*

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Abstract

A new species of Reefgoby, *Priolepis melanops*, is described from Al Lith, central Saudi Arabian coast of the Red Sea, on the basis of a single adult specimen. It is a distinctive species, and can distinguish from its congeners by the following characters: dorsal-fin rays VI + I,9, no elongate spines in first dorsal fin; anal-fin rays I,8; pectoral-fin rays 14–15, all unbranched; longitudinal scale series 25; no scales on the head or predorsal midline, sides of the nape scaled; a developed transverse pattern of the sensory papillae below the eye; fifth pelvic-fin ray unbranched, its length 47% length of fourth ray; body and most of head brownish orange, densely covered with melanophores; snout, lips, chin and chest black; iris black; fins translucent with narrow black stripe along base of each dorsal fin. Placement of the new species in *Priolepis* is based on the presence of characteristics currently associated with *Priolepis* rather than with *Trimma*. An individual of *Priolepis compita* Winterbottom was photographed in very shallow water on a reef flat at Sharm el Sheikh, at the entrance of the Gulf of Aqaba, and represents a new record for the Red Sea. The endemic Red Sea species *Trimma filamentosus* Winterbottom and *T. fishelsoni* Goren, previously know as far south as Jeddah, were collected at Al Lith, central Saudi Arabia, and represents the southernmost record for both species. Variation of *P. compita* and *T. fishelsoni* is noted and the cephalic sensory system of the latter is described for the first time. In addition, we report that records of *Trimma tevegae* Cohen & Davis from the Red Sea are based on misidentification. A key to distinguish the species of *Priolepis* and *Trimma* known from the Red Sea is provided.

Key words: Gobioidae, systematics, coral reef fishes, Saudi Arabia

Introduction

Species of the gobiid *Priolepis* Valenciennes, 1837, known as Reefgobies, are widespread throughout the Indian Ocean including the Red Sea, and range to the central Pacific Ocean, four species are known from the Atlantic Ocean. The species are generally associated with coral or rocky reefs. Members of the genus are commonly found over a wide range of depths, usually from 0.5–30 m (although one Red Sea species was trawled from about 400 m). The genus currently contains 34 previously described species (Hoese & Larson, 2010). Species of the genus are characterized by: reduced or developed transverse cephalic sensory papillae pattern; no cephalic sensory canal pores; moderately broad gill opening, usually extending forward to below the posterior margin of the preopercle, sometimes to below the posterior margin of the eye; spicules (odontoids) present on the medial face of outer gill rakers of the first gill arch; 7–12 segmented dorsal- and anal-fin rays; usually no pelvic frenum; fifth branched pelvic-fin ray usually 75–90 % length of the fourth ray, and bars usually present on the head and often on the anterior part of the body.

Goren (1979) reported two species of *Priolepis* from the Red Sea: *P. cincta* (Regan, 1908) as *Quisquilius cinctus* and *P. semidoliata* (Valenciennes in Cuvier & Valenciennes, 1837) as *Zonogobius semidoliatus*. Goren (1985) treated both species in the genus *Priolepis* and provided a key to the Red Sea *Priolepis* and *Trimma* known to that date. Winterbottom & Burrige (1992) described *P. randalli* based on specimens from the Arabian Gulf, with notes that a single specimen collected from the Gulf of Aqaba, Ras Abu Galum, by J.E. Randall belongs to this species. Later Goren & Baranes (1995) described *P. goldshmidtae* from two specimens trawled at a depth of about 400 m. During a recent survey of Red Sea fishes, a distinctive brownish orange adult goby, with black snout and gular area, was collected from a small cave on a reef wall at depth of 27–29 m. Detailed examination revealed that the specimen belongs to an undescribed species of *Priolepis*, differing from its congeners in details of morphology and coloration. One individual of *Priolepis*, similar to *P. semidoliata*, was photographed on a reef flat in less 1 m at Sharm el Moya, close to Sharm el Sheikh at the entrance to the Gulf of Aqaba. This specimen in fact represents *P. compita* Winterbottom, 1985, a species known from South Africa (type locality Chagos Archipelago) to the Marquesas Islands, but previously unknown from the Red Sea. The species can be easily distinguished from other species by its unique colour pattern (identification confirmed by R. Winterbottom, pers. comm.).

Trimma Jordan & Seale (species known as Pygmygobies) is one of the largest genera of gobioid fishes, and is widespread throughout the Indian Ocean (including the Red Sea) and to the central Pacific Ocean. Species are generally associated with coral or rock reefs, and some form small, free-swimming groups close to caves and crevices. Members of the genus are commonly found over a wide range of depths, with some species found in as little as 0.5 m, while others are present at depths of greater than 110 m. It is thought that the genus contains well over 110 species, with 96 currently described valid species (Allen, 2015; Hoese *et al.*, 2015; Suzuki *et al.*, 2015; Winterbottom *et al.*, 2014a, 2015; Winterbottom & Hoese, 2015; Winterbottom, 2016). Characteristics of the species of the genus are as follows: a reduced or rarely developed transverse cephalic sensory papillae pattern; no cephalic sensory canal pores; very rarely a transverse row of interorbital papillae; a broad gill opening usually extending forward to below the posterior margin of eye, and sometimes to below the posterior margin of the preopercle or middle of the eye; no spicules (odontoids) on the outer gill rakers of the first gill arch; 7–11 segmented dorsal- and anal-fin rays; usually no pelvic frenum (= interspinal membrane); a fifth (often dichotomously branched) pelvic-fin ray usually 50–75% length of fourth pelvic-fin ray; and bars seldom present on the head and body.

Because there are minor differences between *Priolepis* and *Trimma*, some species recently included in *Trimma* were originally described in *Quisquilius* Jordan & Evermann, 1903 or *Zonogobius* Bleeker, 1874, both placed in synonymy with *Priolepis* (Hoese & Larson [2010] summarized the generic synonymy). The first two species from the Red Sea were described by Goren (1978) as *Quisquilius mendelsohni* (from the Gulf of Aqaba, Nuweiba and Eilat) and *Zonogobius avidori* (from the Gulf of Aqaba, Eilat). Later Goren (1982) described *Q. flavicaudatus* from Marsa Bareika, northern Red Sea. Goren (1985) described *Trimma fishelsoni* from the Gulf of Aqaba, and moved the three species previously described by him to *Trimma*. Randall (1994) reported *T. taylori* Lobel, 1979 from the Sudan as a new record for the Red Sea. Winterbottom (1995) reviewed the Red Sea *Trimma*, and recognized nine valid species, two of which he described as new and two as new records: *T. avidori*, *T. barralli* Winterbottom, 1995, *T. filamentosus* Winterbottom, 1995, *T. fishelsoni*, *T. flavicaudatum*, *T. mendelsohni*, *T. sheppardi* Winterbottom, 1984, *T. taylori*, and *T. tevegae* Cohen & Davis, 1969. Records of *T. flammeum* (Smith, 1959) from Yemen, southern Red Sea, by Randall (1994) are *T. barralli* (J.E. Randall, pers. comm.). More recently, a dwarf new species, *T. quadrimaculatum* Hoese, Bogorodsky & Mal, 2015, was described from Red Sea coast of northern Saudi Arabia. During a survey of Red Sea fishes in November of 2014, several specimens of *T. fishelsoni*, a species previously known only from the north, were collected at Al Lith, Saudi Arabia. They differ from their northern counterparts in having only unbranched rays in the pectoral fins. At the request of the first author, specimens recorded as *Trimma tevegae* from Jeddah (WAM 25787.008) were examined by Winterbottom, who concluded that the record was based on misidentification of *T. fishelsoni*. A single specimen of *T. filamentosus*, a species reported from the Gulf of Aqaba south to Jeddah, was collected at Al Lith, Saudi Arabia, and represents the southernmost extent of its distribution.

This paper describes a new species of *Priolepis* and reports the first record of *Priolepis compita*, bringing to six the number of valid species of the genus in the Red Sea. We extend the distribution of *T. filamentosus* and *T. fishelsoni* to the central Red Sea, and note on intraspecific variation in latter species. A key is provided for the Red Sea species of both genera.

Materials and methods

Specimens are deposited in the Senckenberg Museum, Frankfurt (SMF) and King Abdulaziz University Marine Museum, Jeddah, Saudi Arabia (KAUMM temporarily housed at SMF). Examination of some characters are adapted from Winterbottom (1996) and Suzuki & Senou (2007) as follows: the last double soft ray of the second dorsal and anal fins that is split to the base is counted as one ray; the term “elongate” is used for a dorsal-fin spine that is slightly longer than those posterior to it, and the term “filamentous” is used to describe a spine that is prolonged into a long filament, with about half of its length free of membrane. Methods of counting scales and gill rakers follow Winterbottom & Hoese (2015). Morphometric data are presented as ratios of standard length (SL) in the text and percentages of SL in Table 1; proportional measurements were made point to point with a micrometer to the nearest 0.1 mm. Head length is taken from the front of the upper lip to the most posterior edge of the opercle; snout length is measured from the same point to the bony edge of the orbit; upper-jaw length from the same anterior point to the posterior end of the maxilla; eye diameter is the greatest bony diameter between the margins of the eyeball; interorbital width is measured as both the least bony width and the width between the fleshy edges of eyeballs; caudal peduncle depth is the least depth and caudal peduncle length is the distance measured from the base of last anal-fin ray to the middle of the base of caudal fin (posterior edge of the hypural plate); distance from snout to origin of first and second dorsal, and anal fins were measured from median anterior point of the snout tip to the anterior edge of the first spine-base of the relevant fin; measurements of the length of the spines and rays in the dorsal and pelvic fins are made from the fleshy insertions of the spine/ray to its tip. Pectoral- and pelvic-fin ray branching, squamation, trench and trough around orbit, cephalic sensory papillae of head were described from preserved material stained with a cyanine blue solution (Akihito *et al.*, 1993, Saruwatari *et al.*, 1997). Information on dentition and gill rakers of *T. fishelsoni* were obtained from preserved material stained with alizarin red. The dentition of *P. melanops* n. sp. was observed on the holotype, stained with cyanine blue. Terminology of cephalic sensory papillae follows Winterbottom *et al.* (2015). The terms “developed transverse pattern of papillae” refers to the presence 3–8 papillae in vertical row below eye (see Fig. 2); a “reduced transverse pattern of papillae” refers to a single papillae at the position of rows in the definition above (see Fig. 5).

Comparative Material. *Trimma filamentosus*: BPBM 27444, 3: 15.0–21.0 mm, Towartit Reef, Sudan; SMF 35727, 23.0 mm, Al Lith, Saudi Arabia. *Trimma flavicaudatum*: SMF 35721, 9: 19.0–20.0 mm, Jeddah, Saudi Arabia; KAUMM 369, 9: 18.0–20.0 mm, Jeddah, Saudi Arabia. *Trimma mendelssohni*: AMS I.24407–001, 12: 13.0–21.0 mm, Sinai Peninsula. *Priolepis cincta*: SMF 75736, 20.0 mm, Duba, Saudi Arabia. *Priolepis semidoliata*: BPBM 41242, 21.0 mm, Dahab, Egypt.

Key to the species of *Priolepis* and *Trimma* of the Red Sea

- 1a Gill opening moderately broad, extending forward to below posterior margin of preopercle or little forward, or to below posterior margin of eye (in *P. compita*); spicules (odontoids) present on the medial surface of outer gill rakers of the first gill arch 2 (*Priolepis*)
- 1b Gill opening broad, extending forward almost to below posterior margin or middle of eye; no spicules (odontoids) on the gill rakers of the first gill arch 7 (*Trimma*)
- 2a Predorsal scales 14–19; head and body with broad brown bars 3
- 2b Predorsal area naked; head and body with pale bars, those on body short below first dorsal fin, or head and body without bars 5
- 3a Pectoral-fin rays 20–21; second spine of first dorsal fin elongate and filamentous; body with a broad bar in front of first dorsal fin followed by 4–5 narrower, oblique pale bars, and with 3 oblique bars on nape *P. goldshmidtae*
- 3b Pectoral-fin rays 17–19; no elongate dorsal-fin spines; head and body with alternating pale and brown bars 4
- 4a Dorsal-fin rays VI+I, 10–12 (usually 11); anal-fin rays I, 9–10 (usually 9); longitudinal scale series 34–37; three brown bars below second dorsal fin. *P. cincta*
- 4b Dorsal-fin rays VI+I, 9; anal-fin rays I, 8; longitudinal scale series 25–28; two brown bars below second dorsal fin *P. randalli*
- 5a Pectoral-fin rays 14–15, all unbranched; developed transverse pattern of papillae below eye; head and body uniform brownish orange densely covered with melanophores, snout and chin black. *P. melanops* n. sp.
- 5b Pectoral-fin rays 16–19, some branched; reduced transverse pattern of papillae below eye; head with pale bars, body below first dorsal fin with short pale bars 6
- 6a Dorsal-fin rays VI + I, 8–9 (usually 8); three white bars across preopercle, opercle, and pectoral-fin base, joined with slightly oblique stripes at eye level *P. compita*
- 6b Dorsal-fin rays VI + I, 9–10 (usually 9); head with two white bars across nape joined to a vertical bar across preopercle and

	another bar bifurcating on side of predorsal area into two bars continuing across opercle and pectoral-fin base, bars not joined with stripes at eye level.	<i>P. semidoliata</i>	8
7a	Nape with a pair of modified elongate papillae; head with two dark bars below eye.		8
7b	No modified elongate papillae on nape; no bars below eye, if bars present, they are yellow (<i>T. sheppardi</i>).		9
8a	Dorsal-fin rays VI + I,8–9 (usually 9); anal-fin rays usually I,8; pectoral-fin rays 17–20; 1–3 scales usually present dorsally on opercle; second dorsal-fin spine prolonged in both sexes; body with six white bars dorsally	<i>T. mendelssohni</i>	
8b	Dorsal-fin rays VI + I,8; anal-fin rays I,7; pectoral-fin rays 15–17; no scales on opercle; spines of first dorsal fin not prolonged; body with diffuse brown bars	<i>T. quadrimaculatum</i>	
9a	Predorsal scales present in midline		10
9b	No predorsal scales in midline		13
10a	Spines in first dorsal fin not elongate; dark bluish grey, usually shading gradually to yellow on caudal peduncle and fin; head with scattered red spots (some pupil-size), snout red, dorsal half of orbit outlined with pale blue; dorsal fins transparent	<i>T. flavicaudatum</i>	
10b	First dorsal fin with two or three elongate, often filamentous, spines; colour of head and body not as above; dorsal fins with yellow spots or stripes		11
11a	Second and third dorsal-fin spines elongate, second spine filamentous; orange-brown overall, body with three longitudinal rows of orange-yellow spots; iris reddish brown, flecked peripherally with light blue; solitary on coral reefs	<i>T. barralli</i>	
11b	Second, but not third, dorsal-fin spine elongate and filamentous; colour not as above; forms small free-swimming groups close to caves		12
12a	Dorsal-fin rays VI + I,10–11 (usually 10); anal-fin rays I,9–10 (usually 10); no scales on head; body semi-translucent with broad midlateral reddish orange stripe tapering posteriorly and longitudinal row of small, ovoid, golden spots below first dorsal fin; dorsal and anal fins with series of small yellow spots	<i>T. taylori</i>	
12b	Dorsal-fin rays VI + I,7–8; anal-fin rays I,7–8; cheek and opercle scaled; body pale greenish yellow densely dotted with melanophores along back and on lower half of body, with a faint broad purple stripe above midside of body; each dorsal and anal fins with yellow stripe.	<i>T. fishelsoni</i>	
13a	Dorsal-fin rays VI + I,8–9 (usually 9); body translucent pale yellow with a series of eight internal dark spots along vertebral column and an oval one or double blackish spot at upper insertion of gill opening; two yellow bars below eye	<i>T. sheppardi</i>	
13b	Dorsal-fin rays VI + I,9–11 (usually 10 or 11); body with longitudinal series of red or reddish orange spots; no bars below eye		14
14a	Dorsal-fin rays VI + I,10–11 (usually 11); anal-fin rays I,9–10 (usually 10); second dorsal-fin spine elongate and filamentous; blue line below eye; iris brown-red with bluish internal ring	<i>T. filamentosus</i>	
14b	Dorsal-fin rays VI + I,9–10 (usually 10); anal-fin rays I,9–10 (usually 9); no elongate spines in first dorsal fin; no line below eye; iris mainly red with five or six small pale blue spots surrounding pupil	<i>T. avidori</i>	

Taxonomy

Priolepis melanops n. sp.

Black-faced Reefgoby

Figures 1 & 2, Table 1

Holotype. SMF 35728, 24.0 mm SL, female, Red Sea, Saudi Arabia, Al Lith, reef wall to depth of about 35–40 m, 27–29 m, St 41, 20°11'N, 40°03'E, 17 November 2014, coll. S.V. Bogorodsky & T.J. Alpermann.

Diagnosis. *Priolepis melanops* n. sp. differs from other species of the genus in the following combination of characters: dorsal-fin rays VI + I,9, second spine of first dorsal fin longest but not elongate; anal-fin rays I,8; pectoral-fin rays 14–15, all rays unbranched; longitudinal scale series 25; no scales on head or predorsal midline, side of nape scaled; interorbital shallowly concave, bony width 46% of pupil diameter; developed transverse pattern of sensory papillae rows on cheek; interorbital space with anterior and posterior transverse rows of papillae; pelvic fins mostly separated with height of basal membrane between innermost pelvic-fin rays 10.7% of length of fifth ray; fifth pelvic-fin ray unbranched, its length 47% length of fourth ray; body and most head brownish orange densely covered with melanophores; snout, lips, chin, and chest black; iris black; and fins translucent with narrow black stripe along base of first and second dorsal fins.

Description (Fig. 1). Body somewhat compressed, not slender, tapering posteriorly, body depth at pelvic-fin origin 3.9 in SL. Head more or less rounded in cross section, head length 3.2 in SL. Cheeks not prominent. Snout short, with moderately sloping profile, rounded in dorsal view, its length 5.3 in head length. Mouth oblique, lower jaw protruding slightly beyond, with jaws forming an angle of 50° to body axis; maxilla reaching to below anterior fourth of eye, upper jaw length 2.8 in head length. Eyes large, elevated above head profile, eye diameter 2.6 in head length. Interorbital shallowly concave, without postorbital trough or trench; bony interorbital width 46.0% pupil diameter. Suborbital region between eye and upper lip moderately narrow, about one-fourth of eye diameter.

Anterior nares with short tube about one nostril diameter above upper lip; posterior nares a pore-like opening with low raised rim, about one nostril diameter from anterior nares, nasal sac slightly raised. Gill opening moderately broad, extending forward to below between posterior margin of eye and posterior margin of preopercle. Medial face of gill rakers on first gill arch with spicules, GR 5 + 15.

Dentition. Teeth in upper jaw conical, slightly curved, front of jaw with outer row of close-set, enlarged teeth followed by 3 or 4 irregular inner rows of small teeth; sides of jaw with two rows of teeth, progressively narrowing to one row to end of jaw, teeth of outer row larger than those in inner rows and widely-spaced. Front of lower jaw with four large canines on each side of symphysis (outer tooth of each pair twice length of inner tooth), and outer row of seven, enlarged conical teeth medially, followed by two or three, irregular, inner rows of small conical teeth; teeth on sides of jaw small, biserial, those in inner row a little larger than in outer.

Fins. Dorsal fin VI + I,9; first dorsal fin separated from second by a short distance; anal-fin rays I,8; pectoral-fin rays 15/14, all rays unbranched; segmented caudal-fin rays 9 + 8; branched caudal-fin rays 6 + 5. Dorsal- and anal-fin rays branched, except first ray in each fin. Dorsal-fin origin half pupil diameter behind vertical through pelvic-fin insertion; first dorsal fin low, subequal in height to second, without filamentous spines, second spine longest, but not elongate, its length 1.6 in head length, reaching to base of spine of second dorsal fin when adpressed; fourth and fifth dorsal-fin spines not extending beyond others when fin adpressed. Pectoral fins reaching to below base of second ray of second dorsal fin. Pelvic fins mostly separated, connected by a thin membrane, the height of basal membrane between innermost pelvic-fin rays 10.7% of length of fifth ray (Fig. 1C), no frenum; first four rays each with two terminal tips; fifth ray unbranched, 47% of fourth ray in length; fourth ray longest, reaching posteriorly to base of first segmented ray of anal fin when adpressed. Caudal fin truncate.



FIGURE 1. *Priolepis melanops*, n. sp., SMF 35728, holotype, female, 24.0 mm SL, Al Lith, Saudi Arabia, Red Sea **A:** freshly collected; **B:** preserved; **C:** ventral view of region between pelvic and anal fins; red line indicates basal membrane, yellow lines show fourth and fifth pelvic-fin rays. Photos by S.V. Bogorodsky (A) and T. Suzuki (B, C).

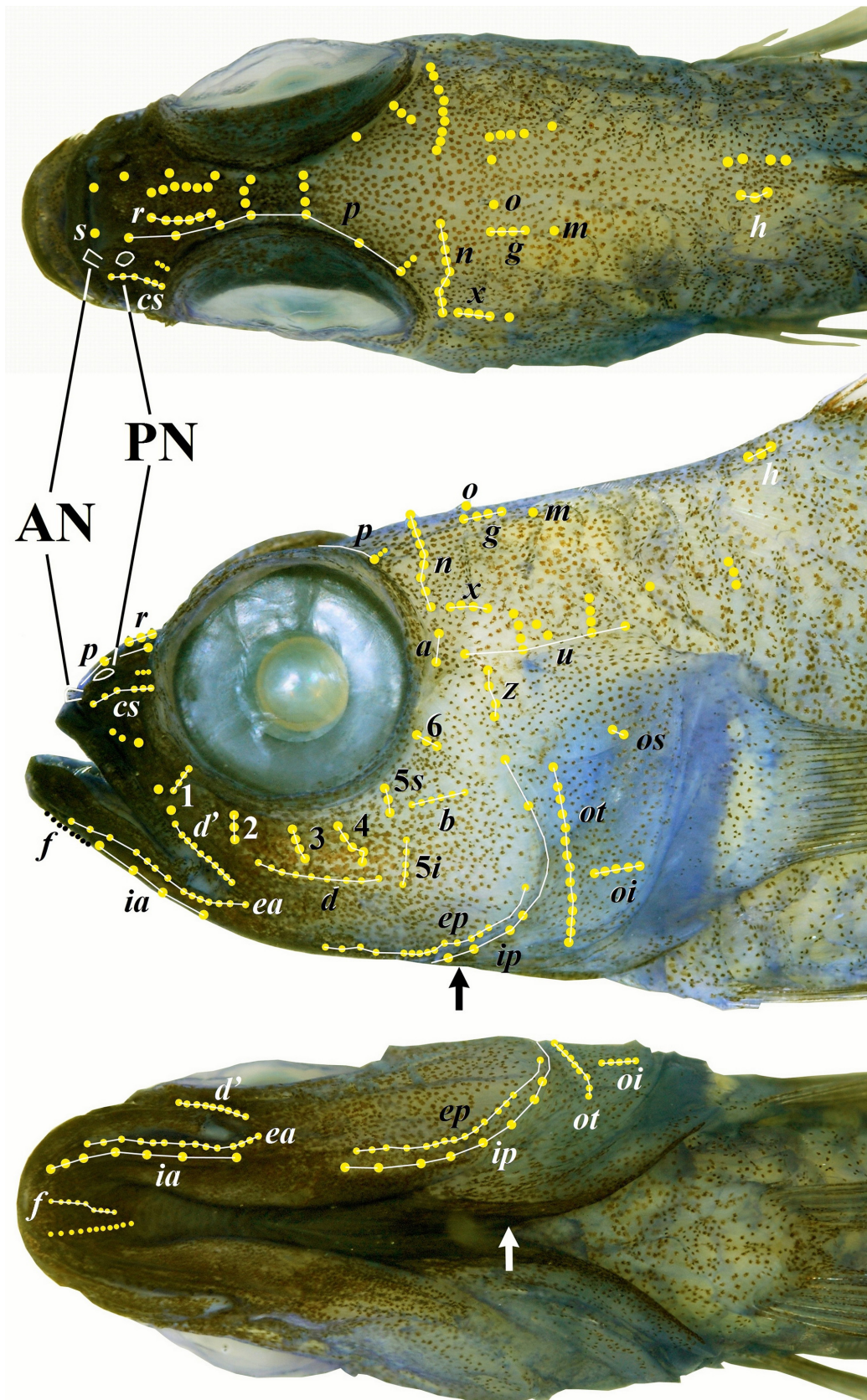


FIGURE 2. *Priolepis melanops* n. sp., SMF 35728, holotype, cephalic sensory papillae of head. Dorsal (top), lateral (middle) and ventral (bottom) views of head. Dots represent the sensory papillae; AN= anterior nares, PN= posterior nares; arrow shows position of lower end of gill opening. Photo and drawing by T. Suzuki.

Squamation. Body scales ctenoid, except for small cycloid scales on belly, prepectoral, and prepelvic areas. Longitudinal scale series 25; transverse scales counted back 7. No scales on head or midline of predorsal area; side of nape with ctenoid scales, extending forward to above posterior margin of preopercle; prepectoral area with cycloid scales embedded in skin (only one scale visible through skin); prepelvic area fully covered with small cycloid scales but most scales missing and scale pockets abraded.

Head papillae pattern. Pattern of sensory papillae shown in Fig. 2. Papillae on cheek immediately below eye in six transverse rows, each row with 3–5 papillae, except fifth row interrupted into upper segment with three papillae and lower segment with five papillae, the lower segment below row *b*. Longitudinal papillae row *d* ends before fifth transverse row. Interorbital area with anterior and posterior transverse rows at level of pupil, each with four papillae. Vertical rows incorporating elements of rows *a* (in part), *c*, and *cp*, the numbers (in parentheses) in each of remaining rows as follows: *a* (2), *b* (6), *cs* (6), *d* (9), *d'* (10), *ea* (14), *ep* (15), *f* (9), *g* (4), *ia* (7), *ip* (10), *m* (1), *n* (9), *o* (1), *ot* (14), *oi* (5), *os* (2), *p* (7), *r* (6), *s* (1), *u* (4), *x* (4), and *z* (4).

Coloration of freshly collected material (based on photo of holotype - Fig. 1A). Body and head, except snout and gular region, brownish orange, densely covered with melanophores, more so on cheek and caudal-fin base; abdomen yellowish orange, with fewer melanophores; caudal-fin base dark brownish orange; snout, lips, cheek anteriorly, chin, free margin of branchiostegal membrane and chest black; iris black; dorsal and anal fins with translucent membranes, spines and soft rays reddish brown; black stripe along each base of dorsal and anal fins, those in dorsal fins very obvious; pectoral fins with translucent membranes; pelvic fins with few melanophores in membranes; caudal fin translucent with grayish rays in basal half and reddish rays in posterior half.

Coloration of preserved material (Fig. 1B). Body and most head pale brown densely covered with melanophores, less pigmented on abdomen; anterior half of head (face) black. Fins translucent except for pigmented rays on basal half of caudal fin; dark brown stripe along each base of dorsal and anal fins. Iris deep blue.

Distribution and habitat. *Priolepis melanops* **n. sp.** is currently known only from the central Red Sea, Saudi Arabia, close to Al Lith. The specimen was found in a small cave in the wall of seaward reef at a depth of 27–29 m, the wall extending to a depth of 35 m. An individual of presumably the same species was observed by the first author inside wreck “Umbria”, at Port Sudan, at depth of 28 m.

Etymology. From the Latin *melanops* referring to the black face — black snout, lips, and chin.

Generic placement. Winterbottom & Burrige (1989) separated *Priolepis* and *Trimma* on three primary features: gill opening extending usually to below posterior preopercular margin in *Priolepis* (from below the posterior preopercular margin to below the eye in *Trimma*); the presence of spicules on the medial surface of the gill rakers of the first arch (no spicules in *Trimma*), and the presence of vertical bars at least on the head in *Priolepis* (typically absent in *Trimma*). Hoese *et al.* (2015) noted that *Priolepis* possess enlarged canine teeth in front of the upper jaw. Spicules on the medial face of the gill rakers of the first gill arch in *P. melanops* **n. sp.** confirm its generic placement. The new species could be assigned to *Trimma* based on: absence of bars on head and body, moderately broad gill opening, extending forward to below posterior margin of preopercle, no canines in upper jaw, and short fifth pelvic-fin ray (about half length of fourth ray). However, the single specimen *P. melanops* **n. sp.** shares with some *Priolepis* spp. the possession of anterior and posterior transverse interorbital papillae rows, each with four papillae, and a fifth transverse papillae row on cheek that is separated into two segments, the lower segment lying below longitudinal row *b* (see Winterbottom & Burrige, 1992). No *Trimma* species are known with transverse interorbital papillae rows except *T. nauagium* Allen, 2015, *T. xanthochrum* Winterbottom, 2011, and *T. yoshinoi* Suzuki, Yano & Senou, 2015, which may have 2 or 3 papillae in transverse rows. There are only a few species of *Trimma* with developed transverse papillae pattern on cheek. However, even when developed, the fifth vertical row of papillae on the cheek always forms a single line, and is not interrupted into two separate lines by longitudinal row *b*. The new species is accordingly assigned to the genus *Priolepis* on the basis of specific features of cephalic papillae pattern and the possession of spicules on the gill rakers of the first gill arch.

Remarks. The genus *Priolepis* is divided into three groups (Winterbottom & Burrige, 1992, 1993a, 1993b): species possessing a developed transverse pattern of cheek papillae and with predorsal scales, species possessing a reduced transverse pattern of cheek papillae but without predorsal scales, and species possessing a reduced transverse pattern of cheek papillae and with predorsal scales. Based on its papillae pattern *Priolepis melanops* **n. sp.**, could be assigned to the former group, containing nine species: *P. aithiops* Winterbottom & Burrige, 1992, *P. akihitoi* Hoese & Larson, 2010, *P. anthioides* (Smith, 1959), *P. fallacineta* Winterbottom & Burrige, 1992, *P. goldshmidtae* Goren & Baranes, 1995, *P. profunda* (Weber, 1909), *P. randalli* Winterbottom & Burrige 1992, *P.*

sticta Winterbottom & Burridge, 1992, and *P. winterbottomi* Nogawa & Endo, 2007. *Priolepis melanops* n. sp., however, rather forms a fourth group characterized by a developed transverse papillae pattern and no predorsal scales in the midline. It differs from Indo-Pacific members of the genus, descriptions of which were provided in several publications (e.g. Winterbottom & Burridge, 1992, 1993a, 1993b, 1993c; Goren & Baranes, 1995; Nogawa & Endo, 2007; Hoese & Larson, 2010), in its distinctive colour pattern, with the body and most head brownish orange and densely covered with melanophores, except for a black snout and gular region, and translucent fins with a black stripe along the base of the first and second dorsal fins.

Almost all species of *Priolepis* are characterized by bars at least on the head; only *P. aithiops* is uniform in colouration. In addition to its unique colouration, *P. melanops* n. sp. differs from *P. aithiops* in having 14–15 pectoral-fin rays, and no scales on the head or the predorsal midline, versus 16–18 pectoral-fin rays, and opercle and predorsal midline scaled in *P. aithiops*. Two other *Priolepis* species may have indistinct bars in life: *P. agrena* Winterbottom & Burridge, 1993 and *P. psygmophilia* Winterbottom & Burridge, 1993. *Priolepis melanops* n. sp. is easily differentiated from *P. agrena* in possessing developed transverse head papillae pattern and no predorsal scales, versus reduced pattern of cheek papillae and 12–15 predorsal scales, and from *P. psygmophilia* in having fewer soft rays in dorsal and pectoral fins (9 and 14–15 respectively versus 10–12 and 19–21 rays respectively), and in having a developed transverse papillae pattern on the cheek versus a reduced papillae pattern in *P. psygmophilia*. At present five species of the genus are known from the Red Sea: *P. cincta*, *P. compita* Winterbottom, 1985, *P. goldshmidtae*, *P. randalli* and *P. semidoliata*. *Priolepis melanops* n. sp. can easily be differentiated from the Red Sea congeners by its distinctive colour pattern and by a combination of the developed transverse papillae pattern on cheek, the count of rays in fins, and in lacking scales on the head and the predorsal midline area.

Priolepis melanops n. sp. resembles *Trimma flavatrum* Hagiwara & Winterbottom, 2007, known from the Western Pacific, which has 12–15 pectoral-fin rays, 22–26 longitudinal scale series, 7–9 anterior and 6–9 posterior transverse scale rows, a shallow concave interorbital region, no postorbital trench or trough, no elongate spines in first dorsal fin, unbranched pectoral-fin rays, an unbranched fifth ray of the pelvic fin, length of fifth pelvic-fin ray 40–65% length of fourth ray, scales on side of the nape, head and body largely uniform, and narrow black band along base of first and second dorsal fins. *Priolepis melanops* n. sp. differs from *T. flavatrum* in having no predorsal scales in the midline (versus 7–8 such scales in *T. flavatrum*), developed transverse pattern of sensory papillae rows below eye (versus reduced papillae pattern), 9 second dorsal-fin rays (versus 7–8), no scales on the cheek and opercle (versus present), gill opening moderately broad, extending forward to below the posterior margin of the eye and the posterior margin of the preopercle (versus gill opening broad, extending to below mid-eye), height of the basal membrane between the innermost pelvic-fin rays 10.7% of the length of the fifth ray (versus absent), no canine teeth in the upper jaw (versus canine teeth present), uniform brownish orange body becoming darker at the caudal-fin base only and head brownish orange with black “face” (versus the head and anterior part of the body uniform yellow becoming progressively darker from posterior half of body below the second dorsal fin or from the anterior caudal peduncle), and first and second dorsal fins translucent with a narrow black stripe along the base (versus black stripe followed by a broader yellow band, and distal half either bluish or translucent (see Hoese & Winterbottom, 2015).

New record from the Red Sea

Priolepis compita Winterbottom, 1985

Crossroads Reefgoby

Figure 3A

Priolepis compita Winterbottom, 1985: 748, Figs. 1, 2, 4 (Salomon Atoll, Chagos Archipelago, Indian Ocean).

Diagnosis. Dorsal-fin rays VI + I, 8–9 (usually 8); first four spines of first dorsal fin slightly elongate, membranes between spines incised; anal-fin rays I, 7–8 (usually 7); pectoral-fin rays 17–19, rays branched; longitudinal scale series 23–26; scales on body ctenoid, becoming cycloid anterior to middle of first dorsal fin; no scales on head, nape, pectoral-fin base or chest; cheek papillae pattern reduced; gill opening extending forward to below posterior

margin of eye; pelvic fins broadly joined by membrane, usually reaching anal-fin origin, fifth ray with two dichotomous branches; no pelvic frenum. Body semi-translucent yellowish brown, densely dotted with dark brown, with three short white bars below first dorsal fin, first oblique; head reddish, dotted with dark brown, with three black-edged white bars extending ventrally from eye; interorbital with transverse bands; three black-edged white bars across nape continue across preopercle, opercle, and pectoral-fin base, joined by horizontal to slightly oblique bands at eye level; iris dark red, with radiating black-edged white bands; fins dark yellow.

Distribution and habitat. Winterbottom (1985) and Winterbottom & Burrige (1993a) reported *P. compita* from South Africa (KwaZulu-Natal), Comoro Islands, Seychelles, Chagos Archipelago (type locality: Salomon Atoll), Indonesia, Australia (Great Barrier Reef), Fiji, Tahiti, Society Islands, Tuamotu Archipelago and Marquesas Islands. It is recorded from a variety of habitats, from lagoons, reef flats, and drop-offs at depth of 1–36 m. The record from the Red Sea is based on a single individual photographed on a reef flat in less than one meter depth at Sharm el Moya, near the entrance of the Gulf of Aqaba.

Remarks. The individual photographed on the reef flat in the northern Red Sea (Fig. 3A) matches the descriptions of *Priolepis compita* provided by Winterbottom (1985) and Winterbottom & Burrige (1993a). The species is easily recognized by the three black-edged bars behind the eye, joined by cross-bands at eye level.



FIGURE 3. A: *Priolepis compita*, live individual, Sharm el Moya, at entrance of the Gulf of Aqaba, Red Sea; **B:** *Priolepis semidoliata*, fresh specimen, BPBM 41242, 21.0 mm SL, Dahab, Gulf of Aqaba, Red Sea. Photos by S.V. Bogorodsky.

TABLE 1. Measurements expressed as percentage of standard length and counts for *Priolepis melanops* n. sp. and *Trimma fishselsoni*.

Specimen	<i>T. melanops</i> n. sp.	<i>Trimma fishselsoni</i>		
Catalog number	SMF 35728, holotype	SMF 35735	SMF 35737	KAUMM 368
Standard length, mm	24.0	20.0	21.6	15.4
sex	female	female	male	unknown
Morphometrics				
Body depth (at pelvic-fin origin)	25.7	23.3	22.5	24.1
Head length	30.8	29.0	29.5	33.3
Snout length	5.9	4.3	4.4	5.6
Orbit diameter	11.5	11.2	11.7	13.0
Pupil diameter	5.5	5.7	5.7	6.8
Upper-jaw length	10.7	11.0	10.6	10.8
Caudal-peduncle depth	10.7	10.5	9.7	11.1
Caudal-peduncle length	27.7	31.9	30.8	29.0
Snout to first dorsal-fin origin	37.9	38.1	37.0	40.1
Snout to second dorsal-fin origin	56.9	56.7	55.5	58.0
Snout to anal-fin origin	58.1	55.7	55.9	58.0
Longest dorsal-fin spine (second)	18.6	33.3	33.5	29.6
Length of fourth pelvic-fin ray	23.7	25.7	25.1	24.7
Length of fifth pelvic-fin ray	11.1	11.9	13.0	13.9
Bony interorbital width % in pupil diameter	46.4	58.3	61.5	45.5
Fleshy interorbital width % in pupil diameter	71.4	95.8	100.0	81.8
Pelvic connecting membrane length % in 5th pelvic-fin ray length	10.7	absent	absent	absent
Meristics				
Dorsal-fin rays	9	8	8	8
Anal-fin rays	8	8	8	8
Pectoral-fin rays (left/right side)	15/14	16/16	15/15	15/broken
Predorsal scales	absent	12	9	9
Longitudinal scale series	25	27	27	25
Scales in TRF	8	10	8	8
Scales in TRB	7	9	8	7

Among the six Red Sea species of the genus, *P. compita* and *P. semidoliata*, are assigned to a species group characterized by reduced transverse cheek papillae pattern and no predorsal scales. *Priolepis compita* may be confused with *P. semidoliata* (Fig. 3B) but differs in fewer dorsal-fin rays VI + I, 8–9 (usually 8) versus dorsal-fin rays VI + I, 9–10 (usually 9) and in the pattern of bars posterior to the eye. The three white bars behind the eye are joined by a stripe at the level of the eye in *P. compita* versus two bars across the anterior nape joined into a bar continuing across the preopercle, and the bar across the posterior part of the predorsal area dividing into two bars that cross the opercle and the pectoral-fin base; these bars not joined by a stripe at the level of the eye in *P. semidoliata*. Winterbottom & Burrige (1993a) noted that the two bars on the anterior nape immediately posterior to the orbit may be joined by a cross-band along the midline, as seen in photographs of fish from different areas (Winterbottom & Emery 1986, Fig. 86, from Chagos Archipelago; Randall, 2005, from Bali; Allen & Erdmann, 2012, from West Papua; color image by R. Winterbottom (ROM 74982) from Palau). The two bars anteriorly on the nape midline are not joined by a cross-band in the Red Sea individual, although more specimens are needed to

determine whether this condition is an intraspecific character. *Priolepis compita* can easily distinguish from other Red Sea congeners, *Priolepis cincta*, *P. goldshmidtae*, *P. melanops* n. sp. and *P. randalli*, by a reduced cheek papillae pattern, absence of predorsal scales, and coloration.

New range extension

Trimma fishelsoni Goren, 1985

Fishelson's Pygmygoby

Figures 4, 5, 6A, Table 1

Trimma fishelsoni Goren, 1985: 64, Figs. 1–3 ("University Reef", Sinai, Egypt, Gulf of Aqaba, Red Sea) - Goren & Dor, 1994: 66 (Red Sea, checklist); Winterbottom, 1995: 96 (Gulf of Aqaba to southern Egypt at Ras Banas); Golani & Bogorodsky, 2010: 49 (Red Sea, checklist); Hoese *et al.*, 2015: 538 (Red Sea).

Material examined. SMF 35735 (KAU 14-857), 20.0 mm SL, female, stained with alizarin red, Saudi Arabia, Al Lith, reef wall to depth of about 35–40 m, 27–29 m, St. 41, 20°11'632"N, 40°03'137"E, 17 November 2014, coll. S.V. Bogorodsky & T.J. Alpermann; SMF 35737, 21.6 mm SL, male, and KAUMM 368 (KAU14-858), 15.4 mm SL, sex unknown, collection data the same as for specimen SMF 35735.

Diagnosis. *Trimma fishelsoni* differs from the other species of the genus in the following combination of characters: dorsal-fin rays VI + I, 7–8, second spine elongate and filamentous; anal-fin rays I, 7–8; pectoral-fin rays 14–17 (usually 15–16); longitudinal scale series 25–28; median predorsal scales 9–14, scales reaching to interorbital area. Head scaled, with 1–2 rows of scales on cheek and 3–4 rows on opercle. Bony interorbital width broad, about half pupil diameter. Pelvic fins separated, without basal membrane or frenum, fifth ray unbranched, its length 46–56% length of fourth ray. Pale greenish yellow densely dotted with melanophores on postorbital head, along back, and on lower half of body, with faint broad purple stripe above midside of body. Dorsal and anal fins broadly striped with pale yellow and blue, caudal fin yellow with blue margins and with two large bright yellow blotches in vertical alignment at base.

Head papilla pattern. This species has a reduced transverse pattern of sensory papilla rows, shown in Fig. 5, with number in each row (in parentheses) as follows: *a* (6), *b* (4), *c* (6), *cp* (1), *cs* (2), *d* (7), *d'* (9), *ea* (13), *ep* (14), *f* (3), *g* (1), *ia* (8), *ip* (7), *m* (1), *n* (4), *ot* (12), *os* (6), *oi* (4), *p* (7), *r* (3), *s* (1), *u* (5), *x* (9), and *z* (6).

Coloration of freshly collected specimen shown in Fig. 4A.

Distribution and habitat. *Trimma fishelsoni* was originally described based on 20 specimens from the Gulf of Aqaba by Goren (1985). Winterbottom (1995) extended the range of distribution south to Ras Banas, southern Egypt. The range is here extended to the central Red Sea, at Al Lith, about 250 km south from Jeddah. The species is typically seen hovering a few centimeters above the substratum, often upside down, forming small groups with each goby about 10–30 cm from other. Reported from coral reefs at depths of 15–47 m; the specimens from Al Lith were collected from a cave at a depth of 27–29 m, together with *Priolepis melanops* n. sp. and *Trimma taylori*.

Remarks. The three specimens from Al Lith generally matches the description and diagnosis provided by Goren (1985) and Winterbottom (1995). They differ, however, in having all pectoral-fin rays unbranched (versus upper and lower 5–7 rays unbranched). More specimens from southern part of the distribution are needed to determine whether unbranched rays represent intraspecific variation or are related to separate northern and southern populations.

The colour of live fish (Fig. 6A) is slightly different from that of freshly collected specimens (Fig. 4A): a broad stripe above midside of body dark purple; iris mainly dusky yellow with an oblique blue line across upper edge of pupil; each dorsal and anal fins with yellow stripe, rest of fin blue; and caudal fin with blue margins. Goren (1985) described presence of four faint saddle-like dusky blotches, one under each dorsal fin and two on the caudal peduncle which were apparent in preserved specimen; such blotches not visible in live gobies or in fresh specimens. Body along back in preserved specimens from Al Lith (Fig. 4B) densely covered with melanophores but not form patches or saddle-like blotches.

Trimma fishelsoni may be distinguished from other Red Sea congeners by a combination of scaled predorsal area, cheek and opercle, a very long second dorsal-fin spine, a moderately broad interorbital area, no spots on the head and body, body with an indistinct, dark purple stripe above midside, and each dorsal and anal fin with a

yellow band. *Trimma fishelsoni* is assigned to the *T. tevegae* species group and is most similar to *T. giganteum* Winterbottom & Zur, 2007, described from Palau, western Pacific. It differs in having fewer predorsal scales (11–14 versus 14–18), in the presence of two yellow blotches at the caudal-fin base (versus only thin yellow line), and in having the lower half of the body and pectoral-fin base densely pigmented with melanophores (versus a few scattered melanophores on body and pectoral-fin base).

The similarity of *Trimma fishelsoni* with *T. tevegae* led confusion in identification of specimens collected from the vicinity of Jeddah, Saudi Arabia. Winterbottom (1995) included *T. tevegae* in his review of the Red Sea *Trimma* (ANSP, without catalogue number) and used an underwater photograph of *T. caudomaculatum* Yoshino & Araga, 1975, taken by J.E. Randall at the Maldives, as *T. tevegae*. In fact, six specimens of this lot (ANSP 158831, labeled *Trimma* sp.) are *T. flavicaudatum* (Rick Winterbottom, pers. comm.). Three specimens from the Western Australian Museum (WAM 25787.008) were collected by Randall and Vine in 1977 from Jeddah, and were identified by D. Hoese as *T. tevegae*. Recently specimens of this lot were examined and re-identified as *T. fishelsoni* (Winterbottom, pers. comm.). *Trimma tevegae* and *T. caudomaculatum* thus currently not known from the Red Sea. *Trimma fishelsoni* differs from *T. caudomaculatum* and *T. tevegae* in having more pectoral-fin rays (usually 15–16 versus usually 14), and in lacking a dark blotch on the caudal peduncle (dark blotch, covering the posterior caudal peduncle and the basal two-fifths of the caudal fin, present in the other two species).



FIGURE 4. *Trimma fishelsoni*. **A:** SMF 35735, fresh specimen, 20.0 mm SL, female, Al Lith, Saudi Arabia, Red Sea; **B:** SMF 35737, preserved specimen, 21.6 mm SL, male, Al Lith, Saudi Arabia, Red Sea. Photo by S.V. Bogorodsky (A) and T. Suzuki (B).

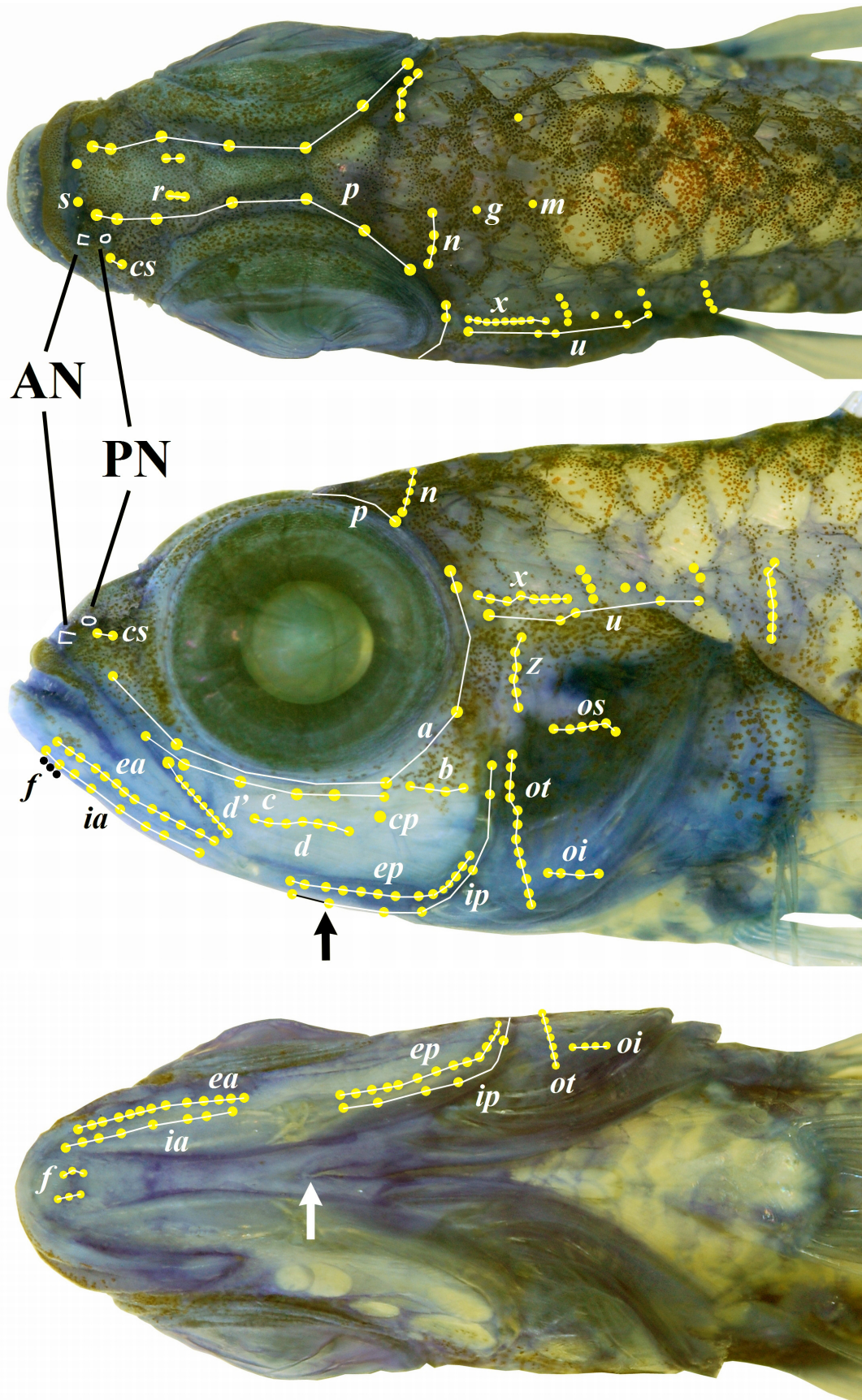


FIGURE 5. *Trimma fishelsoni*, SMF 35737, cephalic sensory papillae of head. Dorsal (top), lateral (middle) and ventral (bottom) views of head. Dots represent the sensory papillae; AN= anterior nares, PN= posterior nares; arrows show position of lower end of gill opening. Photo and drawing by T. Suzuki.



FIGURE 6. Underwater photographs of alive individuals. **A:** *Trimma fishelsoni*, Dahab, Gulf of Aqaba, Red Sea; **B:** *Trimma taylori*, Al Lith, Saudi Arabia, Red Sea. Photos by S.V. Bogorodsky.

The three specimens of *T. fishelsoni* from Al Lith were collected together with *T. taylori* (Fig. 6B) close to the entrance of a small cave on a reef wall. These two species can be easily confused under water. In the Gulf of Aqaba they are not observed together, with individuals of *T. fishelsoni* often swimming in a dispersed group close to the substrate and quickly retiring inside a cave or holes when alarmed, whereas *T. taylori* forms small groups swimming at some distance from reef, and usually swim away when alarmed.

Discussion

Among six Red Sea *Priolepis*, two are endemic species, the deep-water *P. goldshmidtae* and the new species *P. melanops* n. sp. *Priolepis randalli* occurs from the northern Red Sea to the Arabian Gulf, but only a few specimens

are known. Three other species *P. cincta*, *P. compita*, and *P. semidoliata* are broadly distributed from the east coast of Africa to the South Pacific. At present nine valid species of *Trimma* have been recorded from the Red Sea, six of which are endemic to the Red Sea and the adjacent Gulf of Aden: *T. avidori* (known also from the Gulf of Tadjoura, Djibouti), *T. barralli*, *T. filamentosus*, *T. fishelsoni*, *T. flavicaudatum* (also reported from the Gulf of Aden), and *T. quadrimaculatum*. Winterbottom (1995) gave southernmost record of *T. filamentosus* at Jeddah; three specimens (BPBM 27444) from Towartit Reef in Sudan and a specimen (SMF 35727; Fig. 7) from Al Lith, Saudi Arabia extend the range of distribution of the species. Because no differences in the specimen compared to the original description were found (in contrast to *T. fishelsoni*), a diagnosis is not provided. *Trimma mendelssohni* is confined to the Western Indian Ocean (including the Red Sea), and the other two species, *T. sheppardi* and *T. taylori*, are widespread in the Indo-western Pacific. Winterbottom *et al.* (2014b) carried out genetic analysis on 42 of the then 73 described valid species to document the extent of cryptic diversity in *Trimma*, which revealed 94 distinct lineages. They recognized three haplogroups in the *T. taylori* species group, with Group 3 including samples from the type locality (Hawai'i). More study is needed to determine the status of each lineage in comparison with Red Sea specimens currently identified as *T. taylori*. Relationship of the Red Sea *Trimma* is still uncertain and under separate study.



FIGURE 7. *Trimma filamentosus*, SMF 35727, 23.0 mm SL, Al Lith, Saudi Arabia, Red Sea. Photo by S.V. Bogorodsky.

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