Zootaxa 3608 (7): 587–594
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3608.7.5
http://zoobank.org/urn:lsid:zoobank.org:pub:C40DAA3A-CD4B-4974-B06E-8BF321A80FA2

Re-description of two species of the cardinalfish genus *Archamia* (Teleostei: Apogonidae) from the Red Sea and Western Indian Ocean

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Abstract

The cardinalfishes *Archamia bilineata* and *A. pallida* were originally described from a small number of specimens collected in the Gulf of Aqaba, Red Sea and Oman, respectively. Both species are re-described using specimens collected recently in Yemen and Kenya, including the first known adult of *A. pallida*. These new collections increased the geographical range of both species considerably. Differences between the two populations now known for each of the species are discussed.

Key words: *Archamia bilineata*, *Archamia pallida*, *Archamia mozambiquensis*, fish taxonomy, Kenya, Yemen

Introduction

The Western Indian Ocean (WIO) has eight species belonging to the cardinalfish genus *Archamia* (Gon & Randall 2003a). *Archamia fucata* (Cantor), an Indo-West Pacific species, is widespread throughout the WIO and farther eastward. *Archamia lineolata* (Cuvier), initially thought to be distributed in the Red Sea and along the east coast of Africa, is a Red Sea endemic, while its east African specimens were described by Gon and Randall (2003a) as a new species, *A. flavofasciata*. These authors also reported the presence of *A. bleekeri* (Günther) in the WIO. Gon & Randall (1995) described three new species of *Archamia* from the WIO area, albeit on the basis of a small number of specimens. These were *A. irida* from the Gulf of Suez, Red Sea, which was later found to be juvenile *A. fucata* (Gon & Randall 2003a); *A. bilineata* from the Gulf of Aqaba, Red Sea; and *A. pallida* from the Gulf of Oman. The seventh species is *A. mozambiquensis* Smith that occurs along the east coast of Africa (Smith 1961, Gon in Smith & Heemstra 1986, Gon & Randall 2003a). The eighth species, *A. buruensis*, was reported from the Laccadive Islands by Jones (1964) and was overlooked by Gon and Randall (2003a). However, Jones & Kumaran (1980) left this species out of their book on the fishes of the Laccadive Islands. In this paper we report the first finding of *A. pallida* in Kenya, including the first known adult of this species, as well as the presence of *A. bilineata* along the Red Sea Coast of Yemen. These discoveries allowed us to re-describe both species using larger sample sizes and to examine differences between populations.

Materials and methods

Methods follow Gon & Randall (2003a). Unless indicated otherwise, length is given as the standard length (SL) of the fish. Pectoral-fin ray counts include the uppermost rudimentary ray. A developed gill-raker is higher than the width of its base and the gill-raker at the angle of the gill arch is included in the lower-limb count. The new material used for this study is lodged with the South African Institute for Aquatic Biodiversity (SAIAB, previously RUSI), Grahamstown, South Africa. The holotypes and paratypes of both species lodged with the Bernice P. Bishop Musuem (BPBM), Honolulu were re-examined by Arnold Suzumoto, the collection manager. Frequency distributions of meristic characters and proportional measurements are given in Tables 1–6.

Accepted by W. Holleman: 6 Dec. 2012; published: 24 Jan. 2013

TABLE 1. Frequency distribution of anal-fin rays in three Western Indian Ocean species of *Archamia*.

	Anal-fin rays				
	11	12	13	14	15
A. pallida (Kenya)		1	29	10	
A. pallida (Oman)			5	2	
A. bilineata (Yemen)	3	34	3		
A. bilineata (Sudan)			2		
A. bilineata (Gulf of Aqaba)		4	4	1	
A. mozambiquensis			3	36	9

TABLE 2. Frequency distribution of pectoral-fin rays in three Western Indian Ocean species of *Archamia*.

	Left pectoral fin				Right pectoral fin			
	12	13	14	15	12	13	14	15
A. pallida (Kenya)		2	38				39	1
A. pallida (Oman)			6	1			6	1
A. bilineata (Yemen)	12	28			8	31	1	
A. bilineata (Sudan)		2				1	1	
A. bilineata (Gulf of Aqaba)		9				9		
A. mozambiquensis			48				46	1

TABLE 3. Frequency distribution of total gill rakers in three Western Indian Ocean species of *Archamia*.

	Upper arch gill rakers			Lower arch gill rakers							Total gill rakers							
	4	5	6	12	13	14	15	16	17	18	17	18	19	20	21	22	23	24
A. pallida (Kenya)	1	28	3	1	7	22	2				1	7	20	4				
A. pallida (Oman)		6	1		1	4	2						5	2				
A. bilineata (Yemen)	5	35			1	10	29					1	15	24				
A. bilineata (Sudan)		2						2							2			
A. bilineata (Gulf of Aqaba)		3	6				1	7	1						4	4	1	
A. mozambiquensis		2	46					11	35	2						13	33	2

TABLE 4. Frequency distribution of developed gill rakers in three Western Indian Ocean species of *Archamia*.

	Upper arch gill rakers			Lower arch gill rakers							Total gill rakers								
	2	3	4	12	13	14	15	16	17	18	14	15	16	17	18	19	20	21	22
A. pallida (Kenya)	23	9		2	16	13	1				2	13	11	5	1				
A. pallida (Oman)	1	6			5	2						1	4	2					
A. bilineata (Yemen)		26	14		1	25	14						1	18	14	7			
A. bilineata (Sudan)		2						2								2			
A. bilineata (Gulf of Aqaba)		1	8				3	5	1						1	2	5	1	
A. mozambiquensis		19	29					12	34	2						7	16	24	1

TABLE 5. Frequency distribution of gill rakers on the ceratobranchial in three Western Indian Ocean species of *Archamia*.

	Ceratobranchial gill rakers			
	9	10	11	12
A. pallida (Kenya)	15	17		
A. pallida (Oman)	7			
A. bilineata (Yemen)	1	38	1	
A. bilineata (Gulf of Aqaba)		1	8	
A. mozambiquensis		1	32	15

TABLE 6. Minimum and maximum proportional measurements (expressed as percentage of the Standard Length) of *Archamia bilineata* and *A. pallida* by locality.

	A.bilineata		***A.pallida***	
	Yemen	Gulf of Aqaba	Kenya	Oman
Standard length (mm)	24.05–27.1	28.9–37.45	16.4–57.2	29.35–34.5
Body depth	28.85–34.0	31.3–32.25	29.3–38.4	32.5–33.8
Body width	14.7–16.3	14.6–15.8	14.4–17.4	13.9–14.7
Length of head	37.5–42.6	39.7–42.4	38.7–41.35	37.4–39.35
Length of snout	7.4–8.7	6.6–8.1	6.9–9.1	7.3–8.7
Eye diameter	13.4–17.1	13.5–14.7	11.5–13.6	10.7–12.1
Interorbital width	8.8–9.6	8.6–9.35	10.0–10.5	8.6–9.5
Length of upper jaw	18.05–19.3	18.4–19.1	17.4–18.4	16.3–18.3
Length of lower jaw	20.8–22.4	21.75–23.1	18.9–21.1	19.7–20.6
Maxilla width	3.6–4.6	4.2–4.7	3.0–4.1	3.1–4.1
Length of first dorsal spine	7.7–10.9	8.3–8.7	5.6–8.9	7.8–9.2
Length of second dorsal spine	11.15–13.9	11.5–12.7	12.3–15.9	14.3–15.1
Length of third dorsal spine	11.8–13.6	10.15–12.8	12.6–15.5	13.6–15.2
Length of spine of second dorsal fin	12.4–14.8	12.7–13.85	13.55–15.3	15.2–17.1
Length of longest dorsal ray	25.9–27.6	25.8–27.9	24.7–26.8	24.6–27.0
Length of first anal spine	2.5–3.05	2.4–6.4	2.8–4.2	3.7–5.1
Length of second anal spine	9.7–10.7	10.1–10.95	10.2–14.0	13.4–14.1
Length of longest anal ray	20.9–23.5	21.6–23.9	20.6–22.5	21.0–24.4
Length of pectoral fin	23.7–25.8	24.2–26.1	24.9–27.2	24.3–26.8
Length of pelvic fin	15.9–17.9	16.5–18.3	19.5–20.75	19.3–20.8
Length of pelvic spine	10.7–11.8	11.35–12.7	12.3–13.95	13.1–15.7
Depth of caudal peduncle	11.95–14.3	11.9–14.9	12.8–15.9	14.3–15.0
Length of caudal peduncle	20.1–22.3	21.0–23.1	20.0–23.45	20.4–24.4
Caudal spot diameter	4.05–6.8	6.0–7.9	1.8–3.4	3.1–4.8
Snout to first dorsal-fin origin	40.6–43.1	40.0–42.6	38.85–42.35	36.05–39.1
Snout to second dorsal-fin origin	56.7–60.4	56.8–59.65	53.9–58.8	53.1–54.8
Snout to anal-fin origin	59.0–61.0	55.2–58.2	52.7–58.5	51.4–55.2
Snout to pelvic-fin insertion	36.9–39.2	35.3–38.0	35.2–38.8	31.1–34.7

Species descriptions

Archamia pallida Gon and Randall 1995

Figure 1a, b

Description. D VI + I,9; A II,13-14 (rarely 12 or 15); P 14 (rarely 13 or 15); total number of gill-rakers 4–6 + 12–15 = 17–20; developed gill rakers 2–3 + 12–15; gill rakers on ceratobranchial 9–10. Body depth 2.6–3.4 and head length 2.4–2.6 in SL; body width 2.1–2.4 in body depth; caudal peduncle least depth 1.4–1.8 in caudal peduncle length and the length 4.1–5.0 in SL; distances from tip of snout to first dorsal–fin origin 2.4–2.8, to second dorsal-fin origin 1.7–1.9, to anal-fin origin 1.7–1.95 and to pelvic-fin insertion 2.6–3.2, all in SL; snout length 4.2–5.9, eye diameter 2.95–3.6, interorbital width 3.8–4.5, upper jaw length 2.1–2.4 and lower jaw length 1.9–2.05, all in head length; maxilla width 4.4–5.9 in upper jaw length. Pectoral-fin length 3.7–4.1 and pelvic-fin length 4.8–5.2 in SL; pelvic-fin spine 1.3–1.6 in pelvic-fin length; length of first dorsal-fin spine 1.4–2.5 in second dorsal-fin spine; length of second dorsal-fin spine 2.5–3.2 and length of spine of second dorsal fin 2.2–3.05 in head length, respectively; length of first anal-fin spine 2.7–4.2 in second anal-fin spine; length of second anal-fin spine 2.7–4.0 and longest anal-fin ray 1.6–1.9 in head length. Preopercle edge with 4–16 (usually 6–11) serrations around angle. Tongue with 1–5 (usually 2–3) small teeth posteriorly on midline.

Colour of adult after death: body pale brown tinged with yellow and peppered with small dark dots, except abdominal area from level of upper pectoral-fin base ventrally (Fig. 1a); head with dark dots, denser on tips of snout and jaws, but with few on cheek and none on throat; upper half of iris blackish; scales above lateral line with dark edge; leading edge of dorsal fins dusky; dark spot at caudal-fin base, ending posteriorly at edge of hypural plate; caudal fin peppered with dark dots becoming smaller posteriorly, its rays reddish distally with dusky tips; other fins transparent with reddish hue.

Colour of adult in alcohol: similar to colour after death; dark spot at caudal-fin base 3.5–7.8 (measured vertically) in caudal peduncle least depth; peritoneum with dark dots of various sizes; stomach and intestine with dense minute dark dots.

Colour of juveniles after death (15.8–26.5 mm): in smallest fish (Fig. 1b) body and tip of snout translucent white with purplish hue; gill cover and cheek purplish, top of head dusky; iris silvery, slightly darker on dorsal half; dark spots internally along vertebral column and along dorsal edge of peritoneum; small, dark brown, oval caudal spot posteriorly at middle of caudal peduncle; line of small orange dots along base of second dorsal, anal and caudal fins; narrow reddish line at mid-body level, immediately below dark vertebral spots, from above anal-fin origin fading out on caudal peduncle usually before reaching dark caudal spot; caudal fin reddish; other fins transparent. With growth body becomes more opaque, slowly concealing internal melanophores; tip of snout and upper half of iris grow darker; cheek and lower part of opercle become more silvery than purple; small orange dots appear on body giving it yellowish hue; vertical line of orange spots across caudal-fin base becomes overlaid with small dark brown spots as is reddish mid-body line; small dark dots appear along ventral edge of caudal peduncle; leading edge of dorsal fins and tips of caudal-fin rays become dusky.

Material examined. Kenya: Diani Beach, SAIAB 96159, 4: 16.6–17.65 mm, beach with sea grass fringe, beach seine, 0–1 m, G. Gouws *et al.*, 13 November 2009; SAIAB 96212, 26: 16.4–24.9 mm, sea grass, beach seine, 0–1m, O. Gon *et al.*, 15 November 2009; SAIAB 96247, 57.2 mm, sea grass, beach seine, 0–1 m, O. Gon *et al.*, 17 November 2009; SAIAB 96234, 27.45 mm, sea grass, hand-net while snorkeling at night, 0.5–1.0 m, O. Gon and G. Gouws, 16 November 2009. Watamu, SAIAB 96309, 11: 24.9–29.6 mm, sea grass, beach seine, 0–1.2 m, M. Morallana *et al.*, 20 November 2009. **Oman:** Masirah Island, BPBP 36158, holotype, 34.3 mm, rock and sand bottom, 12 m; BPBM 36453, paratypes, 2: 31.35–34.5 mm; SAIAB 46949, paratype, 33.15 mm, all collected with the holotype. Data for the remaining paratypes were taken from Gon and Randall (1995).

Archamia bilineata Gon and Randall 1995

Figure 1c–e

Description. D VI+I,9; A II,12–13 (rarely 14); P 12–13; total number of gill rakers 4–6 + 13–17 = 18–23 (usually 19–22); developed gill rakers 3–4 + 13–17 (total usually 17–20); gill rakers on ceratobranchial 10–11. Body depth 2.9–3.5 and head length 2.35–2.7 in SL; body width 1.9–2.2 in body depth; caudal peduncle depth 1.4–1.8 in

caudal peduncle length and the length 4.3–5.0 in SL; distances from tip of snout to first dorsal-fin origin 2.3–2.5, to second dorsal-fin origin 1.7–1.8, to anal-fin origin 1.6–1.8 and to pelvic-fin insertion 2.55–2.8, all in SL; snout length 4.5–6.2, eye diameter 2.3–3.15, interorbital width 4.1–4.8, upper jaw length 2.0–2.3 and lower jaw length 1.7–1.9, all in head length; maxilla width 4.05–5.05 in upper jaw length. Pectoral-fin length 3.8–4.2 and pelvic-fin length 5.5–6.3 in SL; pelvic-fin spine 1.4–1.6 in pelvic-fin length; length of first dorsal-fin spine 1.15–1.5 in second dorsal-fin spine; length of second dorsal spine 2.9–3.7 and length of spine of second dorsal fin 2.7–3.3 in head length, respectively; length of first anal-fin spine 3.3–4.6 in second anal-fin spine; length of second anal-fin spine 3.7–4.3 and longest anal-fin ray 1.6–2.0 in head length. Preopercle edge with 8–14 serrations around angle.

Colour in life: Body translucent greyish white, sometimes tinged with greenish yellow on head and caudal peduncle, and with three dark brown to blackish stripes (Fig. 1c); upper stripe blackish from interorbital area to posterior end of head, continuing on body above lateral line as line of faint small dark brown dots usually ending below second dorsal-fin base; mid-body stripe blackish from of snout through to posterior edge of eye, continuing as dark brown, somewhat narrower stripe across opercle and body, tapering out on caudal peduncle, or reaching lower edge of black caudal spot; lower stripe starts with several small, blackish spots from lower edge of eye to posterior edge of opercle below pectoral-fin base; it continues subcutaneously and ventrolaterally across abdomen and along anal-fin base, ending as series of dark dots on ventral surface of caudal peduncle.

Colour in alcohol: Similar to the description in Gon & Randall (1995). Dark stripe from occiput to dorsal-fin origin continues along each side of dorsal fins to end of second dorsal-fin base; latter portion of this stripe may be indistinct, appearing as series of dark dots along one or both dorsal-fin bases; series of small dark dots, sometimes partially joined into dark line from ventral edge of eye to lower pectoral-fin base, continuing posteriorly as fairly wide subcutaneous, dusky stripe slightly above ventral edge of body to end of anal-fin base (Fig. 1e; see also Discussion below).

Material examined. Red Sea: Yemen, Uqban, Karaman Island, SAIAB 69178, 2: 24.9–26.2 mm; SAIAB 69268, 14: 24.05–26.1 mm; SAIAB 69280, 10: 25.1–27.1 mm; SAIAB 69289, 20: 24.85–27.15 mm; SAIAB 69326, 5: 25.2–26.6 mm. Sudan, Marsa Fijab, BMNH 1960.3.15.284–285, 2: 23.5–24.4 mm. Egypt, Gulf of Aqaba, BPBM 21514, holotype, 31.0 mm, coral knoll, 12 m; BPBM 36452, paratypes, 2: 28.9–37.45 mm; SAIAB 46950, paratype, 31.85 mm; MNHN 1977–826, 3: 29.7–30.6 mm, all collected with the holotype. Data for the remaining paratypes were taken from Gon and Randall (1995).

Discussion

Apart from Fishelson & Gon (2008), who listed a specimen (removed from one of the lots included in the present study) of *A. bilineata* from Yemen in the material used for their study of the reproductive biology of cardinalfishes, no new distributional records of these two species have been published since their description by Gon & Randall (1995). In more recent literature, these names have been included in regional checklists (e.g. Manilo & Bogorodsky 2003, Golani & Bogorodsky 2010, Al-Jufaili *et al*. 2010) and taxonomic reviews (Gon & Randall 2003a, b) citing the original descriptions.

Archamia pallida was described from seven juvenile fish (29.35–34.5 mm SL) collected at a depth of 12 m in Masirah Island on the Omani coast of the Arabian Sea. In a research visit to Kenya in 2009 we collected numerous specimens of this species in Diani Beach (south of Mombasa) and Watamu (near Malindi) using an 8 m long beach seine net in a sea-grass bed at a depth of 0.5 to 1.2 m. We expect this species to occur in a similar habitat along the coast of Tanzania and possibly even Mozambique. We initially identified these specimens as juveniles of *A. mozambiquensis*, a species found along the east coast of Africa from Kenya to South Africa (Gon & Randall 2003a) and Madagascar. We suspect it could be present in museum collections misidentified as *A. mozambiquensis*. The distinctive yellow-orange stripe and short ventral bars of live *A. mozambiquensis* (Fig. 1f) are lost in preservative (Fig. 1g) making it very similar to *A. pallida* (Fig. 1a). The new, larger range for the length of the first dorsal spine in *A. pallida* (1.4–2.5 in second dorsal spine) reported in this study results in a small overlap with this character in *A. mozambiquensis* (2.15–3.25 in Gon & Randall 1995, 2003a). This leaves the number of gill rakers (Tables 3–5) as the most reliable way to separate these two species.

FIGURE 1. Photographs of three Western Indian Ocean species of *Archamia*: **(a)** *A. pallida* SAIAB 96247, 57.2 mm, adult female, Diani Beach, Kenya (G. Gouws). **(b)** *A. pallida* SAIAB 96212, 15.8–26.5 mm, juveniles, Diani Beach, Kenya (G. Gouws). **(c)** *A. bilineata* El Quseir, Egypt (S.V. Bogorodsky). **(d)** *A. bilineata* BPBM 21514, holotype, 31.0 mm, Gulf of Aqaba, Egypt (J.E. Randall). **(e)** *A. bilineata* SAIAB 69268, 25.9 mm, Karaman Island, Yemen (O. Gon). **(f)** *A. mozambiquensis* SAIAB 187776, 79.1 mm, Durban, South Africa (G. Gouws). **(g)** *A. mozambiquensis* SAIAB 98566, 71.6 mm, Mahanoro Beach, Anosy, Madagascar (O. Gon).

Only one adult of *A. pallida* was captured in several tows of the net during day and night suggesting that juveniles use the sea-grass bed as a nursery area while adults are in deeper water. The adult of this species (Fig. 1a) has a deeper body than the juvenile (Fig. 1b) and has dark spots covering most of its body. The dark spots appear above lateral line in the juvenile fish and spread ventrally and posteriorly as the fish grows. Most of the Kenyan specimens of this species had fewer (2 versus 3 in Omani fish) developed gill rakers on the upper limb of the first gill arch (Table 4), whereas other meristic characters were in agreement (Tables 1–5). In addition, the interorbital width of the Kenyan fish was slightly larger (10.0–10.5% versus 8.6–9.5%SL in the Omani fish); the spine of their second dorsal fin was somewhat shorter (13.55–15.3% versus 15.2–17.1%SL, Table 6); and the pre-pelvic distance in these specimens was a little longer (35.2–38.8% versus 31.1–34.7%, Table 6).

Archamia bilineata was described from six specimens (28.9–37.45 mm SL) collected on a coral knoll at 12 m depth in the northern part of the Gulf of Aqaba. The specimens from Yemen were collected on a substrate of reef, boulders and sand at 28–38 m. They differed from the Gulf of Aqaba fish in having fewer gill rakers (Tables 3–5), a somewhat smaller dark caudal spot and a slightly longer pre-anal distance (Table 6). While the two groups of specimens do not overlap in the total number of gill rakers, they do overlap in the number of developed gill rakers (Tables 3–4). Gon & Randall (2003a, b) presented two colour photos of *A. bilineata*, including a tank photo of a fresh dead fish collected in Sudan (their pl. 1E) and an underwater photo from Egypt (their pl. 1F). Unfortunately, the specimen from Sudan and two others in the same lot (BPBM 27387) were lost in the 1980s (Arnold Suzumoto, BPBM, Honolulu, pers. comm.), before they were recognized as a new species. The dark caudal spot in the underwater photo (measured on the photo) was 2.5 in the caudal peduncle least depth and within the range of this character in the Yemeni fish. The dark caudal spot of the more southern, Sudanese fish was 1.85 in the peduncle's least depth and within the range of the specimens from the Gulf of Aqaba. In two other Sudanese specimens, found at the Natural History Museum, London, the dark caudal spot diameter (2.4 and 2.5 in peduncle depth) agreed with the Yemeni population. By contrast, the total number of gill rakers in these two specimens agreed with fish from the Gulf of Aqaba (Tables 3) and the number of developed gill rakers was in the overlapping range of the two populations (Table 4). The size of the dark caudal spot in the fish from Yemen (40: 24.05–27.15 mm) was variable. The smallest and largest caudal spots (2.9 and 1.9 in caudal peduncle least depth, respectively) were both found in fish 25.7 and 26.0 mm long. The small sample of nine fish from the Gulf of Aqaba precludes a meaningful comparison of this character with the fish from Yemen. Nevertheless, a small overlap between the two groups was noted (Table 6) as caudal spots measuring 1.9–2.0 in the caudal peduncle least depth were found in four specimens of the former group and in seven fish from Yemen. Obviously, more specimens from the Gulf of Aqaba and from the main Red Sea area north of Yemen are necessary to establish whether the two populations are distinctly different.

There was no colour difference between the preserved fish from Yemen and the Gulf of Aqaba. Gon & Randall (2003a, b) were not certain the underwater photo presented in both papers is *A. bilineata*. An apparent difference between that underwater photo and the tank photos of the holotype (Fig. 1d; Gon & Randall 1995: fig. 3) and the Sudanese specimen shown in the former two papers (on different backgrounds) is in the expression of the upper body stripe. In the tank photos this stripe runs as a straight line of dark brown dots from above the eye to below second dorsal-fin base. It is different in the underwater photo where this stripe is solid black, curving toward the middle of the body and running posteriorly parallel to and much closer to the lower mid-body stripe. However, a close inspection of the enlarged version of the underwater photo in Gon & Randall (2003b: pl. 4B) revealed the upper stripe as a line of faint brown dots above the solid black stripe. Furthermore, the latter represents internal pigmentation of the dorsal part of the vertebral column and follows its contour. Dark pigmentation of the vertebral column is also clearly visible in the juveniles of *A. pallida* from Kenya (Fig. 1b).

Although Gon & Randall (1995; 2003a, b) described only two dark stripes on the side of the body of *A. bilineata*, one above eye and along upper edge of the lateral line, and another along the middle of the body, they did describe the dark pigmentation along the anal-fin base and on the ventral surface of the caudal peduncle. The third, lower stripe described above from the Yemeni specimens includes these dark areas. It is actually faintly visible between the pelvic and anal fins of the holotype in the photo in Gon & Randall (1995, fig. 3). In that photo the ventral part of the body in front of the anal-fin is overexposed, but in a darkened version of the same photo (Fig. 1d) this lower stripe is more evident. It is present as an irregular dark area on the lower part of the body in the underwater photo of this species in Gon & Randall (2003a, pl. 1F; 2003b, pl. 4B), but is clearly visible in the underwater photo in Fig. 1c as well as in the tank photo in Gon & Randall (2003b, pl. 4C).

Gon & Randall (1995) did not report teeth on the tongue of the type specimens of *A. pallida* (Oman) and *A. bilineata* (Gulf of Aqaba). However, many of the Kenyan specimens of *A. pallida* had teeth on the posterior part of their tongue arranged in a single series or a small cluster medially. Examination of the holotype and several paratypes (BPBM 36158 and 36453, respectively, A. Suzumoto, pers. comm.; SAIAB 46949) of this species revealed small teeth medially on the tongue. Similarly, such teeth were discovered in five of our specimens of *A. bilineata* from Yemen and are apparently also present in the holotype and two paratypes (BPBM 21514 and 36542, respectively, A. Suzumoto, pers. comm.) of this species. Gon & Randall (2003a) found lingual teeth in *A. flavofasciata* and *A. lineolata* which are, like *A. bilineata* and *A. pallida*, endemic to the Western Indian Ocean.

Acknowledgements

We thank the Western Indian Ocean Marine Science Association (WIOMSA) and the National Research Foundation (NRF) of South Africa for financial support; the collecting expedition from which this work resulted was supported by grants from WIOMSA's Marine Science for Management Programme (MASMA/OR/2008/07) and from South Africa's African Coelacanth Ecosystem Programme. We are grateful for the assistance provided by the Shimoni landing site's management committee, Kenya Marine Fisheries Research Institute (particularly through the monitors, Daniel Ocharo and Kenneth Omondi), the Department of Fisheries officials and the local fishermen. We thank Arnold Suzomoto of the Bernice P. Bishop Museum, Honolulu, for examining the type specimens in this museum's collection and James Maclaine for providing information on specimens held at the Natural History Museum, London. Uwe Zajonz of the Senckenberg Museum, Frankfurt kindly shared specimens collected in Yemen with SAIAB. Elaine Heemstra of SAIAB assisted with the preparation of images. Sylvia de Moor of Grahamstown, South Africa edited images and prepared the colour plate. We thank John E. Randall of BPBM and Sergey V. Bogorodsky of the Station of Naturalists, Omsk, Russia for the use of their photographs.

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