

J.L.B. SMITH INSTITUTE OF
ICHTHYOLOGY

SPECIAL PUBLICATION

No. 35

APOLEMICHTHYS KINGI, A NEW SPECIES OF ANGELFISH
(POMACANTHIDAE) FROM SOUTH AFRICA, WITH
COMMENTS ON THE CLASSIFICATION OF
ANGELFISHES AND A CHECKLIST OF THE
POMACANTHIDS OF THE WESTERN INDIAN OCEAN

by

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GRAHAMSTOWN, SOUTH AFRICA

May 1984

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**APOLEMICHTHYS KINGI, A NEW SPECIES OF ANGELFISH
(POMACANTHIDAE) FROM SOUTH AFRICA, WITH COMMENTS ON
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THE POMACANTHIDS OF THE WESTERN INDIAN OCEAN.**

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INTRODUCTION

A new species of angelfish was recently discovered by SCUBA divers on the reefs off Natal. Thanks to the efforts of Dennis King and Pieter van Niekerk, the J.L.B. Smith Institute of Ichthyology was given three beautiful specimens of this new species. In comparing the new species with specimens and descriptions of related species of pomacanthids, some taxonomic errors and deficiencies in the recent literature on angelfishes have come to light. Since a systematic revision of the pomacanthids is beyond the scope of the present paper, these findings are presented in the form of an annotated checklist of the pomacanthids of the Western Indian Ocean. The "Western Indian Ocean" is here defined, in the usual sense, to be that part of the ocean west of 80°E and excluding the Red Sea and Persian Gulf.

ABSTRACT

A new species of angelfish is described from three specimens collected in 30 m off Durban, South Africa. The distinction of the genus *Apolemichthys* is discussed, and an annotated checklist of the pomacanthids of the Western Indian Ocean is presented. The first positive record of *Centropyge bispinosus* (Günther, 1860) from southern Africa is reported, based on a specimen collected at Sodwana Bay (27°30'S).

METHODS

Body depth was measured at the origin of the anal fin; dorsal and anal fin spine lengths were measured from radiographs; standard length (SL) and head length were measured from the front of the upper teeth. The last dorsal and anal fin rays are double, but they are counted as a single ray. Type-specimens of the new species described below are deposited at the J.L.B. Smith Institute of Ichthyology (RUSI) and the U.S. National Museum of Natural History (USNM).

CHECKLIST OF THE POMACANTHIDAE OF THE WESTERN INDIAN OCEAN

(In the following synonymies, only those junior synonyms with a type-locality in the Western Indian Ocean are listed.)

Genus *Apolemichthys* Fraser-Brunner, 1933

Type-species: *Holacanthus trimaculatus* Lacepède, in Cuvier & Valenciennes, 1831, by subsequent designation of Shen and Liu (1979).

DIAGNOSIS: Scales moderate, about 44-49 subvertical series from upper end of gill opening to base of caudal fin; lateral line interrupted below rear end of dorsal fin; scales on cheek small and irregular. Preorbital with small spines along anteroventral edge, the rear margin covered by skin and scales. Supracleithrum ovate or oblong, its rear edge exposed, smooth or serrate. First two to five haemal spines expanded in median plane to form a bony partition between posterior compartments of swimbladder, (Fig. 1A). Preopercle spine not deeply grooved. Soft dorsal and anal fins rounded or angular but not produced; caudal fin rounded. Only one predorsal bone, its shape like that of a hockey stick, (Fig. 1B).

REMARKS: *Apolemichthys* was proposed by Fraser-Brunner (1933) as a new subgenus of *Holacanthus* for three species: *H. xanthurus* Bennett, 1832, *H. arcuatus* Gray, 1831 and *H. trimaculatus* Lacepède, 1831. Smith (1955) elevated *Apolemichthys* to generic rank and added a new species (*A. armitagei*). Whether to recognize *Apolemichthys* as a genus or as a subgenus is a moot point. In addition to Smith (1955), authors in favour of generic rank are Klausewitz and Wongratana (1972), Burgess, (1973), Shen and Liu (1979), Steene (1978) and Allen (1979). Authors not recognizing *Apolemichthys* as a distinct genus include Chen and Chao (1971), Randall & Mauge (1978) and Carlson and Taylor (1981).

The characters by which *Apolemichthys* differed from the other subgenera of *Holacanthus* were given by Fraser-Brunner (1933: 577) in his key to species: "Preorbital convex, without powerful spines. Interoperculum without strong spines. Preopercular spine not deeply grooved. Scales on cheek small, irregular. Dorsal and anal fins not produced. Body yellowish. Scales on head moderate or large, their surfaces not spinulose. Young resembling adults." In his review of the pomacanthids, Allen (1979) recognized six species of *Apolemichthys* and used some of the same characters mentioned by Fraser-Brunner to differentiate this genus. Now the combination of all these characters taken together can be used to separate a group of superficially similar species from all of the other pomacanthids; but whether this group represents a monophyletic taxon is not immediately apparent from either the work of Fraser-Brunner (1933) or Allen (1979).

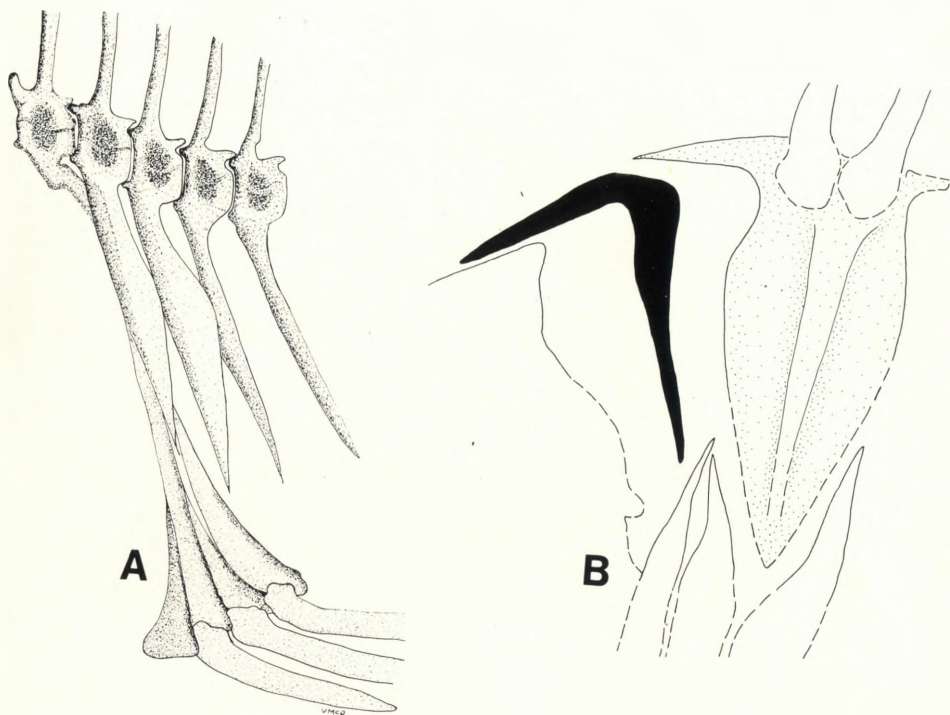


Figure 1. (A) Posteriormost precaudal vertebra plus anterior four caudal vertebrae to show expansion of first two haemal spines of *Apolemichthys trimaculatus*, 100 mm SL; drawn by Virginia McRostie. (B) Predorsal bone (black), anteriormost dorsal fin pterygiophore (stippled) and first three neural spines of *Apolemichthys kingi*, holotype; drawn from radiograph; broken lines indicate parts not clearly discernible.

Shen and Liu (1979) were the first authors to critically compare the genera of Pomacanthids since the work of Fraser-Brunner. Although their paper provides much useful information on the anatomy of pomacanthids, Shen and Liu were able to examine only 33 of the 78+ species of the family. Consequently, their work suffers from a lack of appreciation of intrageneric and intraspecific variation in certain characters. For example, in their description of the skeleton of *Apolemichthys trimaculatus* and *A. xanthurus*, Shen and Liu (1978: 69) state "Tip of forward anterior expansion of the first interhaemal bone conical. . ." This so-called "conical" anterior expansion of the first interhaemal bone (Shen & Liu, 1978: Fig. 14) was thought to be characteristic of species in the subfamily Holacanthinae, whereas species of the subfamily Pomacanthinae were said to have the "tip of forward anterior expansion of the first interhaemal bone quadrate. . .". In fact, within one species, the first anal fin pterygiophore shows a variety of shapes from

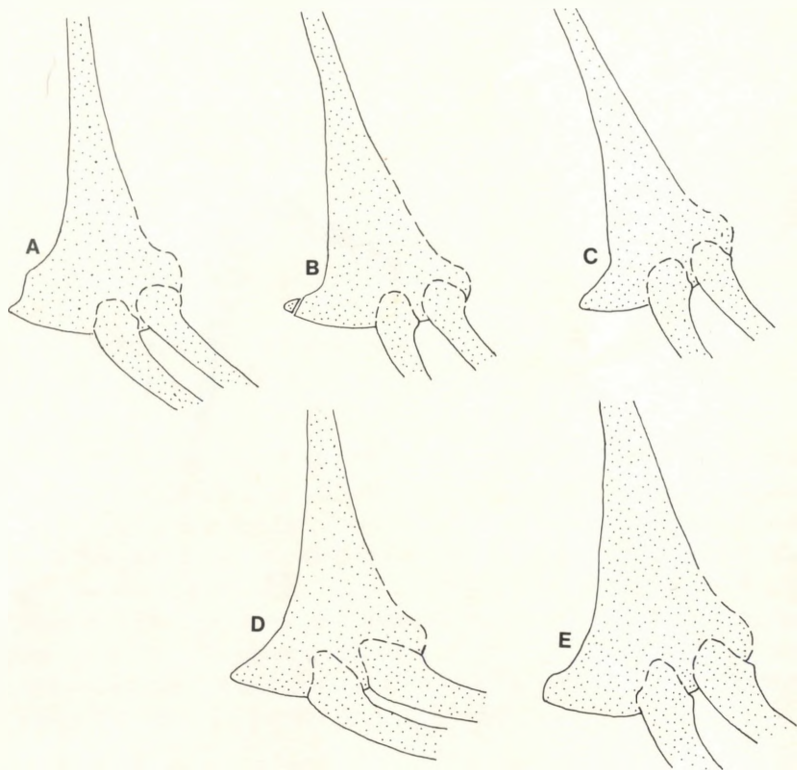


Figure 2. First anal fin pterygiophores of *Apolemichthys kingi*: (A) holotype, 173 mm SL; (B) paratype, 173 mm SL; (C) paratype, 149 mm SL; and *Apolemichthys trimaculatus*: (D) 142 mm SL; (E) 102 mm SL. Drawn from radiographs; broken lines indicate parts not clearly discernible.

“conical” to “quadrate” (Fig. 2). In their key to genera, Shen & Liu (1978: 59) state that the subopercle of *Apolemichthys* species is “without spine or spinules”; but in their generic account of *Apolemichthys*, the subopercle is said to have “a small spine anteriorly”. Critical evaluation of their paper is further complicated by their failure to distinguish between derived homologous characters states (synapomorphies) and those which represent convergence, parallelism or shared primitive conditions.

Based on out-group comparison with one or two species of each of the other genera of pomacanthids, I have found two characters that appear to be uniquely-derived, homologous features that may serve to distinguish *Apolemichthys* from related genera. First, the anterior two to five haemal spines are expanded in the median plane to form a bony partition between the posterior compartments of the swimbladder, (Fig. 1A). Second, the supracleithrum is ovate or oblong with its rear edge exposed, (Fig. 3). In the other genera of pomacanthids, the anterior haemal spines are unmodified; and the supracleithrum is narrow and its rear edge is covered by large scales.

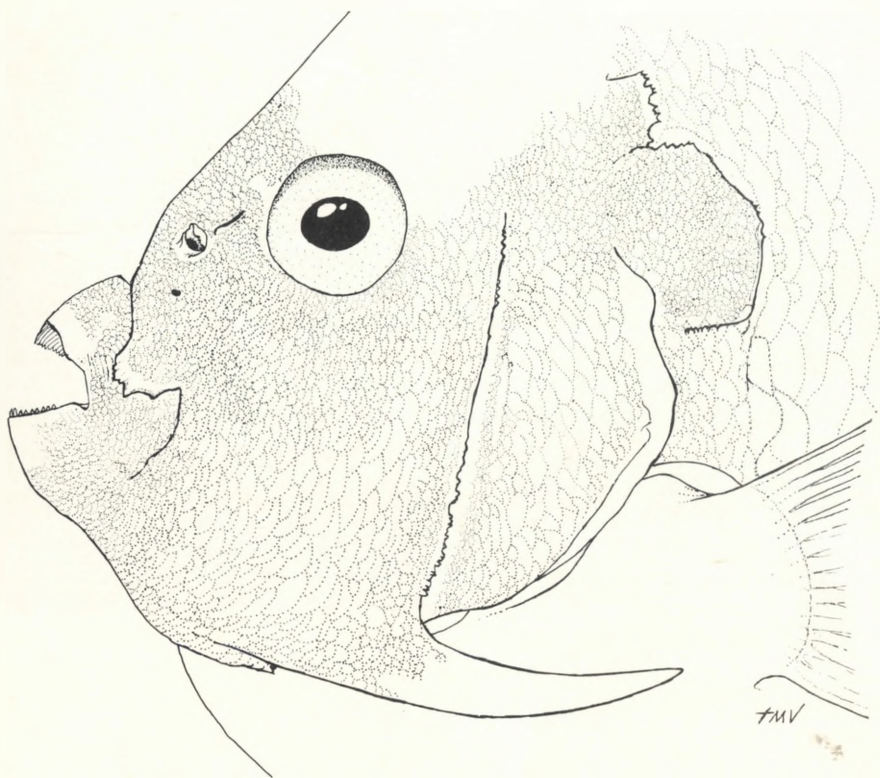


Figure 3. Head of *Apolemichthys kingi*, holotype; drawn by Jean Michel Vincent.

Holacanthus arcuatus Gray, 1831 was one of the three species originally assigned to *Apolemichthys* by Fraser-Brunner (1933). As the specimen of *H. arcuatus* that I examined lacks both of these synapomorphies, this species is here excluded from *Apolemichthys*. Fowler (1941) proposed a new monotypic genus, *Desmoholacanthus*, for *H. arcuatus*. I have examined specimens of *A. trimaculatus*, *A. xanthotis*, *A. xanthurus*, *A. kingi* sp. n., and *A. armitagei*; all of these species exhibit the characteristic modifications of the supracleithrum and the anterior haemal spines. I have not examined any specimens of *H. guezei* Randall & Mauge, 1978 or *H. griffisi* Carlson & Taylor, 1981; but according to the original descriptions, the supracleithrum of each species is oblong or ovate with its rear edge exposed. Thus, both of these species may also belong in *Apolemichthys*.

***Apolemichthys armitagei* Smith, 1955**

Apolemichthys armitagei Smith, 1955: 380, Pl. 4, Fig. B (Mahé, Seychelles).

This species is known only from one adult collected in about 12 m at Mahé, Seychelles. It was wrongly synonymized with *A. trimaculatus* by Allen (1979);

Randall and Mauge (1978) stated that "... the possibility that *armitagei* is an aberrant colour form of *trimaculatus* cannot yet be discounted)." Although *A. armitagei* is still only known from one specimen, I believe that it is a valid species. It differs from *A. trimaculatus* in having the first 4 haemal spines expanded in the median plane (only the first 2 haemal spines of *A. trimaculatus* are expanded in the 6 specimens that I have examined), the swelling at the nape (bulge over the predorsal bone) is less pronounced in *A. armitagei*, the supracleithrum is oblong (more nearly circular in *trimaculatus*), and there are significant differences in the colour pattern.

In *A. armitagei*, there is a large black blotch covering most of the soft dorsal fin and a small black spot on the dorsal surface of the caudal peduncle; in addition, *A. armitagei* lacks the distinct black spots on the nape that are present in *A. trimaculatus*. Small juveniles (less than 4 cm SL) of *A. trimaculatus* have a round black spot at the base of the soft dorsal fin, but this spot is lost at a length of 5-6 cm SL.

Apolemichthys guezei (Randall & Mauge, 1978)

Holacanthus guezei Randall & Mauge, 1978: 298, Fig. 1 (Réunion Island).

Known only from Réunion in depths of 60-80 m.

Apolemichthys kingi sp. n.

Figs. 1-4

HOLOTYPE: RUSI 19800, male, 173 mm SL; South Africa, No. 1 Reef off Durban, depth 30 m; collected by Dennis R. King; 17 April 1982.

PARATYPES: RUSI 19801, female, 149 mm SL; locality and depth as above; collected by Pieter van Niekerk; 23 Jan. 1983. USNM 265102, female, 173 mm SL; off Durban, depth c. 23 m; collected by Pieter van Niekerk; 19 Feb. 1983.

DIAGNOSIS: Dorsal fin rays XV,16-17. Dorsal half of body with alternating, wavy, vertical stripes of black and orange-yellow; anteriorly the orange fades gradually to greenish yellow and the black stripes become narrower, breaking up into several small black spots on the nape. Ventral part of body, pelvic and anal fins pale grey; ventral third of anal fin darker than rest of fin. Caudal fin and peduncle black with tiny, faint, yellow spots at base of fin and narrow white edge, broadest dorsally, along rear margin of fin. Dorsal fin black, with wavy, longitudinal, orange lines posteriorly breaking up into spots, the distal edge of fin with a narrow, silvery-white border. Head and chest brownish grey; lower lip and preopercle spine pale bluish grey. Supracleithrum black, with a reddish-orange mark at lower front edge of black area. A reddish-orange stripe joining eyes across front of snout. Rear edge of operculum with a narrow white border. Pectoral fin rays dusky, the membrane clear, the upper edge of the fin black.



Figure 4. *Apolemichthys kingi*, holotype, 173 mm SL, RUSI 19800; photograph by D.R. King.



Figure 5. *Centropyge bispinosus*, 7 cm total length, from Sodwana Bay; photograph by D.R. King.

DESCRIPTION: (Measurements are given in Table 1; data from the paratypes, if different from the holotype, are given in parentheses.) Dorsal fin rays XV,16 (XV,17); anal fin rays III,18 (III,17; IV,17); pectoral fin rays 17 (16); gill-rakers 5+14 (4+14); lateral-line scales in anterior segment, which ends below last dorsal fin ray, 32 (31, 33); lateral-line scales in posterior segment, which extends to caudal fin base, 5 (3, 4); lateral scale series (from supracleithrum to caudal fin base) 44 (45); branchiostegal rays 6; vertebrae 10+14; pyloric caeca (17).

Blody depth 1.8 (1.7), head length 3.5 (3.3) in SL; body depth/maximum width 2.7 (2.6, 2.9); eye 4.6 (3.6, 4.5), interorbital 2.7 (3.0), preopercle spine 2.5 (2.7) in head length. Dorsal head profile slightly convex; no swelling at nape. Lips mostly covered with scales. Teeth slender, compressed, with curved, flattened tips; 4 or 5 rows of teeth in each jaw; teeth of outermost row closely-set, moveable, and much larger than inner teeth, about 36 (34, 38) in upper jaw and about 38 (42) in lower jaw; tips of some teeth brownish; inner rows of teeth more or less interrupted and confined to middle half of jaws; chevron-shaped patch of small conical teeth on vomer (no teeth on vomer of 149 mm SL paratype); no teeth on palatines. Gill-rakers much shorter than gill filaments. Anterior nostril tubular, the rear edge of the tube elongated; posterior nostril elongate, about 6 times longer than wide. Preorbital projecting anteriorly, with small, irregular serrae; posterior edge of preorbital covered by skin and scales. Vertical edge of preopercle with irregular, small serrae; preopercle spine subequal to interorbital width, without a deep groove, the lateral surface exposed, the medial surface covered by a loose sheath of skin; lower edge of preopercle smooth. Subopercle smooth; edge of interopercle with 3 or 4 (1-5) small serrae mostly hidden by scales.

Median fins rounded posteriorly, without filaments. Pelvic fins reach the anus on the holotype, but on both paratypes they fall well short of the anus. Pectoral fins not reaching vertical at anus; dorsal two and ventralmost pectoral fin rays unbranched. First anal fin soft-ray unbranched (except on specimen with 4 anal spines).

Predorsal bone configuration is shown in Figure 1B. Swim-bladder bifurcated posteriorly, the two large rounded lobes separated by the first anal fin pterygiophore and the expanded haemal spines of the first two caudal vertebrae.

COMPARISONS: *A. kingi* differs from all other species of pomacanthids in coloration; it further differs from all other species of *Apolemichthys* in having 15 dorsal fin spines (all other species have 13 or 14 dorsal spines).

REMARKS: *A. kingi* is named in honour of Mr. Dennis R. King of Durban. Mr. King was the first person to tell us of this new species and he also collected the holotype. The common name "tiger angelfish", proposed by Mr. King's daughter, is the name that will be used in the forthcoming revision of *The Sea Fishes of Southern Africa*. *A. kingi* has also been seen by divers in 25 m on a reef off Tongaat, 25 km north of Durban (D.R. King, personal communication).

***Apolemichthys trimaculatus* (Lacepède, 1831)**

Holacanthus trimaculatus Lacepède, in Cuvier & Valenciennes, 1831: 196, Pl. 182 (Moluccas).

In the Western Indian Ocean, this wide-ranging species is known from Sri Lanka, Seychelles (Mahé), Mauritius, Réunion, D'Arros, Aldabra, Cosmoledo, Assumption and Mafia Islands, Zanzibar, and various localities along the east African coast south to Sodwana Bay (27°30'S). *A. trimaculatus* is also known from the Maldives, and Nicobar Islands (Klausewitz, 1972) and from several localities in the Western Pacific Ocean (Allen, 1979).

***Apolemichthys xanthotis* (Fraser-Brunner, 1951)**

Holacanthus (Apolemichthys) xanthotis Fraser-Brunner, 1951: 43, Pl. 1, Fig. 1 (Al Mukalla, Gulf of Aden).

Apolemichthys xanthotis: Klausewitz & Wongratana, 1970: 328, Figs. 3-6; Allen, 1979: 256, Figs. 352-354.

This species is known only from the Red Sea and Gulf of Aden.

***Apolemichthys xanthurus* (Bennett, 1832)**

Holacanthus xanthurus Bennett, 1832: 183 (Ceylon).

Apolemichthys xanthurus: Klausewitz & Wongratana, 1970: 324, Figs. 1, 2 & 6; Allen, 1979: 258, Figs. 355 & 356.

This species is very similar to *A. xanthotis*; the two species appear to be allopatric, as *A. xanthurus* is known only from Sri Lanka, the east coast of India and Mauritius.

Genus *Centropyge* Kaup, 1860

Allen (1979) includes 28 species in this genus, of which 5 occur in the Western Indian Ocean. Smith (1955) elevated the subgenus *Xiphipops* Jordan & Jordan, 1922 to generic rank, but this action has not been followed by other workers.

***Centropyge acanthops* (Norman, 1922)**

Holacanthus acanthops Norman, 1922: 318 (Durban, Natal).

Centropyge acanthops: Fraser-Brunner, 1933: 596, Fig. 28; Allen, 1979: 259, Fig. 357.

Centropyge fisheri (non Snyder): Smith, 1949: 235, Pl. 30, Fig. 588.

Xiphipops fisheri (non Snyder): Smith, 1955: 379.

Xiphipops flavicauda (non Fraser-Brunner): Smith, 1955: 380; 1961: 568.

This species differs from the endemic Hawaiian species *C. fisheri* in colour pattern. The specimen from Durban that was reported by Smith (1955) as *X. flavicauda* is actually *C. acanthops*. The number of lateral scale series for *C. acanthops* was given erroneously by Fraser-Brunner (1933) and Smith (1949) as 44 and 40-45. My counts of 7 fish are 27-30. This species is known only from Somalia to East London and from Mauritius; it is common along the coast of Natal.

***Centropyge bispinosus* (Günther, 1860)**

Figs. 5 & 6

Holacanthus bispinosus Günther, 1860: 48, 516 (on *Holacanthus diacanthus* (non Boddaert): Bleeker, 1857; type-locality Amboina).

Centropyge bispinosus: Smith, 1955: 379; Allen, 1979: 328.

This species is widely distributed in the Indo-West Pacific. It is known in the Western Indian Ocean from Sri Lanka, the Maldives, Seychelles, Kenya, Pemba Island (Tanzania), and Sodwana Bay (South Africa). A colour transparency of a specimen collected at Sodwana Bay in February 1984 is reproduced here as Figure 5. This specimen is the first positive record of *C. bispinosus* from southern Africa.

Smith (1955: 379) corrected his earlier (1949) erroneous synonymy of *C. multispinis* and *C. bispinosus*. In addition to coloration and number of gill-rakers, *C. bispinosus* has more anal fin-rays (17-19, versus 16 or 17 in *C. multispinis*), fewer pectoral rays (16 versus 17), fewer lateral scale series (42-45, versus 45-48) and the front of the snout has a less pronounced notch over the upper jaw (Fig. 6).

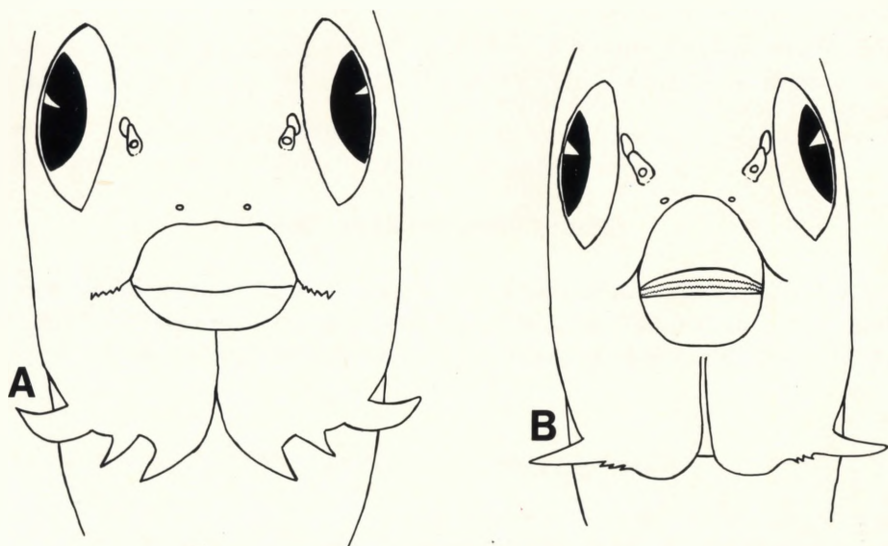


Figure 6. Anterior view of heads to show snout configuration of (A) *Centropyge bispinosus*, and (B) *C. multispinis*. Note pronounced U-shaped notch over upper jaw in *C. multispinis*. Diagrammatic; both specimens about 60 mm SL.

***Centropyge eibli* Klausewitz, 1963**

Centropyge eibli Klausewitz, 1963: 177, Figs. 1 & 2 (Tillanchong Is., Nikobars); Steene, 1978: 100, Figs. 143 & 144; Allen, 1979: 328.

C. eibli was originally described from the Nikobar Islands (not the Maldives, as stated by Steene, 1978). It was not reported by Klausewitz (1972) in his paper on Maldivian pomacanthids, but Allen (1979) recorded it from the Maldives, Sri Lanka, Thailand, Indonesia and Australia.

***Centropyge flavipectoralis* Randall & Klausewitz, 1977**

Centropyge flavipectoralis Randall & Klausewitz, 1977: 236, Fig. 1 (Trincomalee, Sri Lanka).

This species is known only from Sri Lanka (Allen, 1979).

***Centropyge multispinis* (Playfair, 1867)**

Holacanthus multispinis Playfair, in Playfair & Günther, 1867: 37, Pl. 6, Fig. 4 (Zanzibar).

Holacanthus somervillii Regan, 1908: 228, Pl. 24, Fig. 6 (Coetivy, Seychelles).

Centropyge multispinis: Smith, 1955: 378, Pl. 5, Fig. A; Klausewitz, 1972: 365, Fig. 3; Steene, 1978: 106, Fig. 156; Allen, 1979: 328.

This species is common on the east coast of Africa from Kenya to Sodwana Bay, Natal. It also occurs at Aldabra, Cosmoledo and Providence Islands, D'Arros, Astove, Alphonse, Seychelles, Maldives, Sri Lanka and Thailand (Smith, 1955; Allen, 1979). Klausewitz (1972) records this species from the Red Sea and the New Hebrides, but these areas were not included in the distribution by Allen (1979).

Genus *Genicanthus* Swainson, 1839

In his revision of *Genicanthus*, Randall (1975) recognized 9 species in this genus. *G. caudovittatus* is definitely known from the Western Indian Ocean; *G. lamarck* has been reported in this area, but this record is doubtful.

***Genicanthus caudovittatus* (Günther, 1860)**

Holacanthus caudovittatus Günther, 1860: 44 (Mauritius).

Holacanthus zebra Sauvage, 1891: 263, Pl. 32, Fig. 2 (Mauritius).

Holacanthus caudibicolor Sauvage, 1891: 267, Pl. 33, Fig. 2 (Mauritius).

Genicanthus caudovittatus: Smith, 1955: 382, Pl. 5, Fig. G; Randall, 1975: 409, Figs. 9-11.

Genicanthus melanospilos (non Bleeker): Smith, 1955: 381, Pl. 5, Fig. B.

This species occurs in the Red Sea and along the African coast from Kenya to Baixo Pinda, Mozambique (Randall, 1975); it is also known from Mauritius.

***Genicanthus lamarck* (Lacepède, 1802)**

Holacanthus lamarck Lacepède, 1802: 526, 530 (no type-locality).

Genicanthus lamarck: Smith, 1955: 382; Randall, 1975: 398, Figs. 1-3.

The presence of this species in the Western Indian Ocean needs confirmation. It was recorded from Shimoni, Kenya by Smith, based on a single small specimen that was subsequently lost. There are no other records of this species from the Indian Ocean.

Genus *Pomacanthus* (Lacepède, 1802)

Of the 13 valid species listed for *Pomacanthus* by Allen (1979: 251), 8 species are known from the Western Indian Ocean. The following genera are considered synonyms of *Pomacanthus*: *Pomacanthodes* Gill, 1862; *Acanthochaetodon* Bleeker, 1876; *Arusetta* Fraser-Brunner, 1933; and *Heteropyge* Fraser-Brunner, 1933 = *Euxiphipops* Fraser-Brunner, 1934; and *Pomacanthops* Smith, 1955.

***Pomacanthus annularis* (Bloch, 1787)**

Chaetodon annularis Bloch, 1787: 114. Pl. 215, Fig. 2 (East Indies).

Pomacanthus annularis: Fraser-Brunner, 1933: 559, Fig. 7; Steene, 1978: 132, Figs. 199 & 200.

Pomacanthodes annularis: Smith, 1955: 383.

This species is known from Sri Lanka to the Solomon Islands (Steene, 1978). It was recorded from "several localities in East Africa" by Smith (1955), but there are no specimens collected by him in the J.L.B. Smith Institute of Ichthyology. Fraser-Brunner (1933) listed a specimen from Delagoa Bay. Allen (1979) did not list *P. annularis* from either east Africa or South Africa.

***Pomacanthus asfur* (Forsskal, 1775)**

Chaetodon asfur Forsskal, 1775: xii, 61 (Lohajae, Red Sea).

?*Holacanthus aruset* Lacepède, 1802: 528, 537 (Arabia).

Holacanthus coerulescens Rüppell, 1828: 133 (Red Sea).

?*Holacanthus haddaja* Cuvier, in Cuv. & Val., 1831: 175 (Massaua, Red Sea).

?*Holacanthus mokhella* Ehrenberg, in Cuv. & Val., 1831: 177 (Massaua, Red Sea).

Pomacanthus asfur: Fraser-Brunner, 1933: 572, Fig. 15; Allen, 1979: 302, Figs. 444-446.

The three nominal species listed with a question mark could apply to either *P. asfur* or the very similar *P. maculosus*. *P. asfur* is known from the Red Sea and Gulf of Aden (Allen, 1979). It was recorded from Zanzibar by Playfair & Günther (1867); Smith (1955) reported "a specimen almost positively identified under water at Aldabra."

***Pomacanthus chrysurus* (Cuvier, 1831)**

Holacanthus chrysurus Cuvier, in Cuv. & Val., 1831: 188 (no type-locality).

Holacanthus rodriguezi von Bonde, 1934: 448, Pl. 23, Fig. 1 (Zanzibar).

Pomacanthus chrysurus: Fraser-Brunner, 1933: 558, Fig. 6; Allen, 1979: 304, Figs. 447, 448 a & b.

Smith (1955) synonymized von Bonde's species with *P. chrysurus*, an action with which I fully concur. *P. chrysurus* is known from the Gulf of Aden to Bazaruto Id., Mozambique (21°31'S), also from Aldabra, Providence and the Seychelles (Smith, 1955). Dennis King has recently photographed this species at Aliwal Shoal off Umkomass, Natal (30°12'S); this sighting is a new record for southern Africa.

***Pomacanthus imperator* (Bloch, 1787)**

Chaetodon imperator Bloch, 1787: 51, Pl. 194 (Japan).

Pomacanthus imperator: Fraser-Brunner, 1933: 556, Pl. 1; Steene, 1978: 134, Figs. 201-204.

P. imperator is the most widely distributed species of pomacanthid, ranging from the Red Sea to the Hawaiian Islands (Allen, 1979). Along the east African coast, it extends south of Durban, and juveniles have been found at East London.

***Pomacanthus maculosus* (Forsskal, 1775)**

Chaetodon maculosus Forsskal, 1775: 62 (Lohajae, Red Sea).

Holacanthus lineatus Rüppell, 1828: 133 (Massaua, Red Sea); 1835: 32, Pl. 10, Fig. 2.

Pomacanthus maculosus: Fraser-Brunner, 1933: 561, Fig. 9; Smith, 1955: 383, Pl. 5 Fig. D; Allen, 1979: 306, Figs. 450-452.

Pomacanthops filamentosus Smith, 1955: 383, Pl. 4, Fig. A (Tekomazi Id., Mozambique).

I agree with Klausewitz and Nielsen (1965) that *P. filamentosus* is a synonym of *P. maculosus*. This species is known from the Red Sea and Persian Gulf south to at least Porto Amélia, Mozambique; also reported from Aldabra (Smith, 1955).

***Pomacanthus semicirculatus* (Cuvier, 1831)**

Holacanthus semicirculatus Cuvier, in Cuv. & Val., 1831: 191 (Timor, Buru, Waigiu, Port Praslin, New Ireland).

Holacanthus alternans Cuvier, in Cuv. & Val., 1831: 193 (Madagascar).

Holacanthus caeruleus Cuvier, in Cuv. & Val., 1831: 194 (Massaua, Red Sea).

Holacanthus ignatius Playfair, 1867: 852, Pl. 41 (Seychelles).

Holacanthus poecilus Peters, 1868: 454 (Zanzibar).

Holacanthus reginae Lienard, in Sauvage, 1891: 268, Pl. 34, Fig. 2 (Madagascar).

Holacanthus alternans var. *meleagris* Alcock, 1896: 303 (Palk Strait).

Holacanthus lasti von Bonde, 1934: 449, Pl. 23, Fig. 2 (Shearwater Patches north of Zanzibar).

Pomacanthus semicirculatus: Fraser-Brunner, 1933: 563, Fig. 10; Steene, 1978: 136, Figs. 205-210.

The distribution of this species extends from the Red Sea to the central Pacific Ocean (Samoa); on the east African coast, it is common from Somalia to southern Natal, and juveniles are found in Algoa Bay (34°S).

***Pomacanthus striatus* (Rüppell, 1835)**

Holacanthus striatus Rüppell, 1835: 32, Pl. 10, Fig. 2 (Massaua, Red Sea).

Holacanthus rhomboides Gilchrist & Thompson, 1908: 161 (Natal).

Pomacanthus striatus: Fraser-Brunner, 1933: 560, Fig. 8; Allen, 1979: 310, Figs. 457 & 458.

P. striatus occurs only in the Western Indian Ocean from the Red Sea south to Knysna, South Africa (23°E).

Genus *Pygoplites* (Fraser-Brunner, 1933)

One species.

***Pygoplites diacanthus* (Boddaert, 1772)**

Chaetodon diacanthus Boddaert, 1772: Pl. 9 (Amboina).

Pygoplites diacanthus: Fraser-Brunner, 1933: 587, Fig. 25; Steene, 1978: 138, Figs. 211-213.

This species ranges from the Red Sea to the central Pacific Ocean (Tahiti); along the east African coast, it reaches south to Sodwana Bay, Natal.

ACKNOWLEDGEMENTS

I am grateful to Dennis King and Pieter van Niekerk for providing specimens and photographs of the new angelfish, *Apolemichthys kingi*. Mr. King also supplied the colour photographs of *Centropyge bispinosus*. Margaret M. Smith and Wouter Holleman read the ms. and offered suggestions for its improvement. Joan Wright typed the manuscript on a Hewlett-Packard Word Processor.

TABLE 1. Proportional measurements of type-specimens of *Apolemichthys kingi* expressed as a percentage of standard length.

	HOLOTYPE	PARATYPES	
	RUSI 19800	USNM 265102	RUSI 19801
Standard length	173	173	149
Body depth	56.1	54.9	55.7
Body width	20.9	21.1	21.5
Head Length	28.9	30.1	28.2
Orbit diameter	6.2	6.6	7.8
Interorbital width	10.9	10.1	10.3
Preopercle spine length	11.6	11.0	10.4
Front edge of preorbital to eye	8.4	7.9	7.2
Least depth of caudal peduncle	13.5	13.2	13.5
Length of caudal peduncle (horizontal)	7.1	7.6	6.7
Length of 1st dorsal spine	8.7	8.1	9.1
Length of 2nd dorsal spine	11.6	12.1	12.8
Length of 3rd dorsal spine	14.2	15.0	15.6
Length of 4th dorsal spine	14.3	15.6	15.8
Length of 15th dorsal spine	16.8	17.3	16.4
Length of 1st anal spine	10.4	9.8	10.7
Length of 2nd anal spine	15.0	13.3	15.4
Length of 3rd anal spine	17.9	16.8	18.1
Length of 4th anal spine	—	18.5	—
Longest pectoral fin ray	20.2	20.8	19.9
Length of pelvic fin spine	16.2	16.1	16.9
Length of pelvic fin	20.8	—	23.5
Length of uppermost branched caudal ray	19.7	—	19.5
Length of middle caudal rays	—	—	20.8
Length of lowermost branched caudal ray	—	—	19.0

REFERENCES

- ALLEN, G.R. 1979. *Butterfly and Angelfishes of the World*. Volume 2. John Wiley & Sons, New York; pp. 145-352.
- BURGESS, W.E. 1973. *Apolemichthys xanthopunctatus*, a new species of angelfish (family Pomacanthidae) from the Pacific Ocean. *Tropical Fish Hobbyist (U.S.)* 21: 55-89.
- CARLSON B.A. and L.R. TAYLOR. 1981. *Holacanthus griffisi*. A new species of Angelfish from the Central Pacific Ocean. *Freshwater and Marine Aquarium*. 4(5): 8-11.
- CHEN, J.T. and L.N. CHAO. 1971 A review of Chaetodontidae of Taiwan. *Biological Bulletin* 39. Department of Biology, College of Science, Tunghai University. *Ichthyological Series IX*: 1-69.
- FOWLER, H.W. 1941. The George Vanderbilt Oahu Survey - The Fishes. *Proceedings of the Academy of Natural Science of Philadelphia*. 93: 247-279.
- FRASER-BRUNNER, A. 1933. A Revision of the Chaetodont fishes of the sub-family Pomacanthinae. *Proceedings of the Zoological Society of London*. 103: 543-599.
- FRASER-BRUNNER, A. 1950. *Holacanthus xanthotis*, sp. n., and other Chaetodont fishes from the Gulf of Aden. *Proceedings of the Zoological Society of London* 120(1): 43-48.
- KLAUSEWITZ, W. 1972. Litoralfische der Malediven. II. Kaiserfische der Familie Pomacanthidae (Pisces: Perciformes). *Senckenbergiana biologica* 53(5/6): 361-372.
- KLAUSEWITZ, W. and J.G. NIELSEN. 1965. On Forsskal's Collection of Fishes in the Zoological Museum of Copenhagen. *Spolia Zoologica Musei Hauniensis XXII. Skrifter udgivet af Universitetets Zoologiske Museum Kobenhavn*. pp. 1-29, pls. 1-38.
- KLAUSEWITZ, W. and T. WONGRATANA. 1970. Vergleichende Untersuchungen an *Apolemichthys xanthurus* und *xanthotis*. (Pisces: Perciformes: Pomacanthidae). *Senckenbergiana biologica* 51(5/6): 323-332.
- RANDALL, J.E. 1975. A Revision of the Indo-Pacific angelfish genus *Genicanthus*, with descriptions of three new species. *Bulletin of Marine Science* 25(3): 393-421.
- RANDALL, J.E. and W. KLAUSEWITZ. 1977. *Centropyge flavipectoralis*, a new angelfish from Sri Lanka (Ceylon). (Pisces: Teleostei: Pomacanthidae). *Senckenbergiana biologica* 57(4/6): 235-240.
- RANDALL, J.E. and L.A. MAUGE. 1978. *Holacanthus guezei*, a new angelfish from Reunion. *Bulletin Muséum national d'histoire naturelle. Paris*. 353(5/6): 297-303.
- REGAN, C.T. 1908. Report on the marine fishes collected by Mr. J. Stanley Gardiner in the Indian Ocean. *Transactions of the Linnean Society of London (Zoology)* 12(2): 217-255, 9 pls.
- SHEN, S.C. and C.S. LIU. 1978. Clarification of the Genera of Angelfishes (Family Pomacanthidae). *Acta Oceanographic Taiwanica Science Reports National Taiwan University* 1978: 57-77.

- SMITH, J.L.B. 1949. *The Sea Fishes of Southern Africa*. Central News Agency Ltd. (Johannesburg). pp. 1-550.
- SMITH, J.L.B. 1955. The Fishes of the Family Pomacanthidae in the Western Indian Ocean. *Annals and Magazine of Natural History VIII*(12): 377-384 pls. IV & V.
- STEENE, R.C. 1978. *Butterfly and Angelfishes of the World*. Vol. 1. Australia. John Wiley & Sons, New York. pp. 1-144.
- VON BONDE, C. 1934. A collection of marine fishes from Zanzibar. *Annals of the Natal Museum VII*(3): 435-458.

