

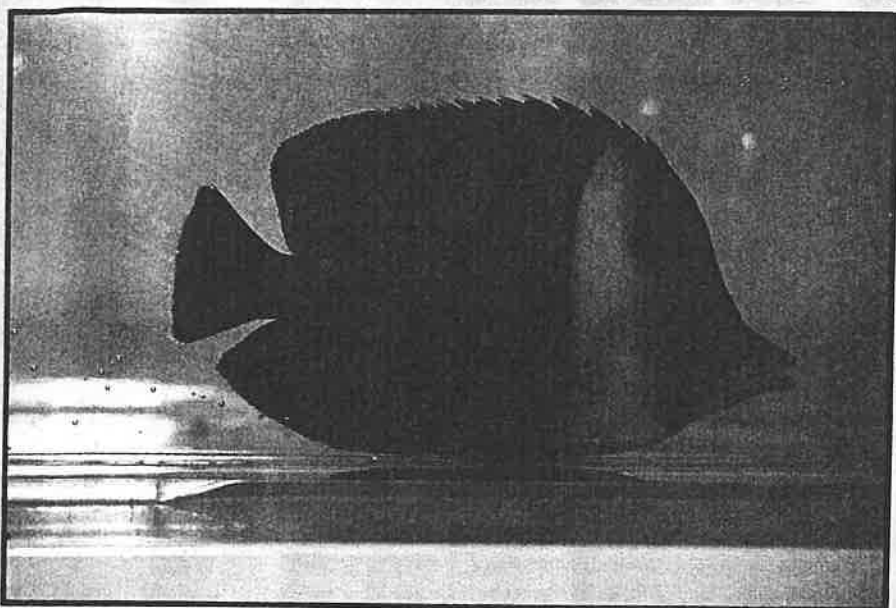
CHAETODON**DIALEUCOS** *sp. nov.***A NEW SPECIES OF SHALLOW WATER BUTTERFLYFISH FROM THE NORTHWEST INDIAN OCEAN**

Figure 1: Holotype of *Chaetodon dialeucos* (CAS 63116, 116.5 mm SL. Photo by Jonathan K.L. Mee, Oman Aquarium.)

Introduction

In 1987 a new species of *Chaetodon* was collected by the authors off Barr al Hikman on the Arabian Sea coast of the Sultanate of Oman. This brings to 93 the total number of species assigned to this genus by Allen (1985, 1986), and to 51 those known to occur in the Indian Ocean and Red Sea.

The senior author first noticed an apparently new species of butterflyfish which occurred in relative abundance on the hitherto unstudied reefs of Barr al Hikman, a large south-trending peninsula about midway along the coast of Oman. Subsequent discussions with Sir Peter Scott and the junior author confirmed that this was a new species.

Dr. John. E. Randall later examined an underwater photograph of the fish and reconfirmed this observation.

The type specimens described below were collected alive during a collecting trip for the Oman Aquarium of the Marine Science and Fisheries Center. These fish were later preserved.

The authors have followed the nomenclature used by Burgess (1978).

Methods

All measurements were made to the nearest tenth millimeter using dial calipers. Counts and measurements of dorsal and anal fin spines and rays were made from radiographs.

In the following description, data in

parentheses apply to the paratype if different from those of the holotype. The format follows that of Carlson and Taylor (1981) for their description of *Holacanthus griffisi*, a new species of angelfish from the allied family Pomacanthidae.

The holotype has been deposited at the California Academy of Sciences, San Francisco (CAS). The paratype has been deposited in the Bernice P. Bishop Museum, Honolulu (BPBM).

***Chaetodon dialeucos*, sp. nov.**

(Figures 1, 2 & 3)

Holotype--CAS 63116, 116.5mm standard length SL, NW Indian Ocean, Sultanate of Oman, SW Barr al Hikman, 20°24'N, 58°13'E, 2.5m, hand nets while skin diving, J.K.L. Mee, 1 July 1987.

Paratype--BPBM 31972, 104.6mm standard length SL, NW Indian Ocean, Sultanate of Oman, SW Barr al Hikman, 20° 24'N, 58° 13'E, 3.5m, hand nets while scuba diving, J.P. Hoover, 1 July 1987.

Description

Dorsal rays XIII,21; anal rays III,19; pectoral rays 16(15); pelvic rays I,7; lateral line scales 24; scales above lateral line to origin of dorsal fin 6; scales below lateral line to origin of anal fin 11; gill rakers 14.

Body deep, the depth 1.66(1.65) in SL, and compressed, the maximum width 3.5(3.6) in depth; head long 2.9 in SL; predorsal contour approximately straight until level of eye, then concave; snout projecting, 2.5 in head length; diameter of orbit 3.7 in head length; interorbital space slightly convex, the bony width 3.2 in head length; caudal peduncle deeper than long.

Mouth small, terminal, the gape horizontal to slightly oblique. Numerous small brushlike teeth in 6 or more rows at anterior end of jaw. Nostrils anterior to center of eye, the posterior the larger, oval/teardrop shape and rounded anteriorly with flap. Gill membranes strongly attached to isthmus. The lateral line strongly arched, ending beneath midpoint of base of dorsal rays. Scales large, vertically elongate, in horizontal rows, slightly ascending in region of lateral line.

Preopercle right angled and mildly serrate, lachrymal long and smooth, supraorbital smooth.

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Caudal fin truncate to slightly rounded, predominantly scaled. Origin of dorsal fin slightly anterior to a vertical at upper end of gill opening.

Color of holotype in alcohol--Body and eye band brown with each scale on the body portion edged in darker brown to form distinct reticulate pattern. Light brown triangular band running through pectoral fin without dark edged scales. Snout below level of eye nearly white. Pelvic fins dark brown to black, caudal fin darker brown to nearly black terminally, pectoral fins hyaline. Eye light bluish gray.

Color in life (Figures 1 & 2)--Body brown with each scale dark edged to form obvious reticulate pattern. Broad triangular white band behind head. The apex of the white band ends below the third dorsal spine, and broadens ventrally to include the posterior third of the operculum and the insertion of the pectoral fin. Anterior to this the head is brown, merging with a band running through the eye to near the isthmus. The snout is greyish white. The pectoral fins are hyaline. All other fins are dark brown to nearly black terminally. The eyes are completely brown.

Remarks

Chaetodon dialeucos is placed in the chaetodontid subgenus *Rabdophorus* (called *Radophorus* by Allen, 1985), which is characterized by having: fin counts of XII-XIV, 20-25 dorsal rays; III, 19-22 anal rays; blunt angled dorsal and anal fins; a pointed and projecting snout; a head length ratio of 1.9-2.8; a high angularly arched lateral line; a free and smooth lachrymal; and angular scales. Sixteen other species are included in this subgenus (see Allen 1979 for a full list of these). *C. dialeucos* superficially resembles *C. mesoleucos* and *C. nigropunctatus* of the same subgenus. The former is a Red Sea endemic, and there is no evidence that it occurs in Oman. The latter is abundant in Oman. Table 1 provides a summary comparison of these three species. Proportional measurements and meristic characters for *C. mesoleucos* and *C. nigropunctatus* are taken from Burgess (1978), and those for *C. dialeucos* were made by us on the two type specimens described above. *C. dialeucos* shows considerable overlap with *C. mesoleucos*, but is easily distinguished from both species on the basis of color.

The marine fish fauna of the Sultanate of Oman is poorly known. Most previous taxonomic work has focused on the commercial species (Ministry of Agriculture and Fisheries, 1986; White and Barwani, 1971). Barr al Hikman, the collection site for *C. dialeucos*, is a remote area roughly halfway between Muscat in the Gulf of Oman and Salalah in the Arabian Sea.

The coral reefs around Barr al Hikman are the most extensive in the Sultanate (Salm, 1988). Some of these Hikman

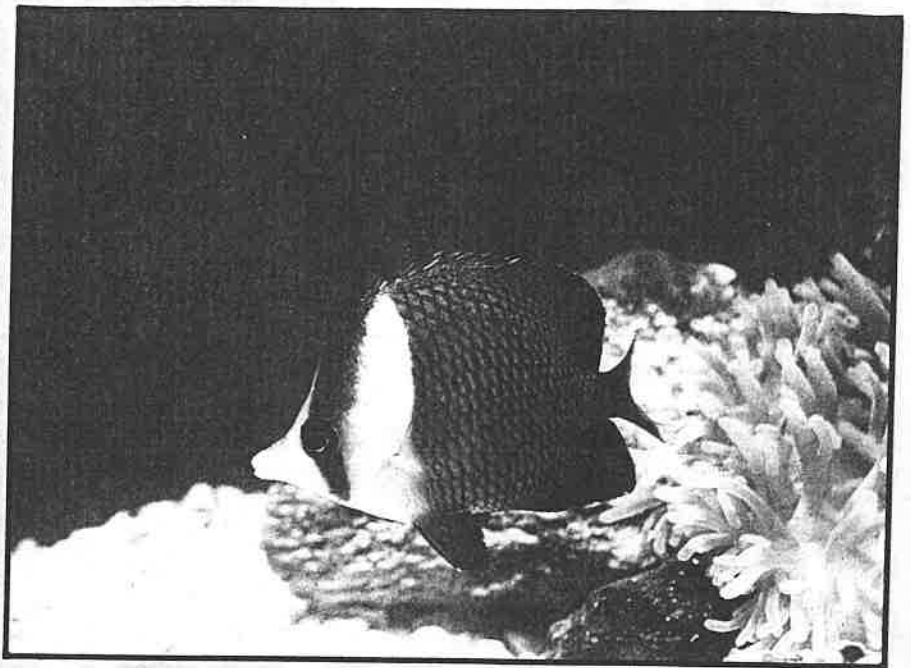


Figure 2: Subadult *Chaetodon dialeucos* in aquarium. (Approx. 75 mm SL. Photo by John P. Hoover, Oman Marine Science and Fisheries Center.)

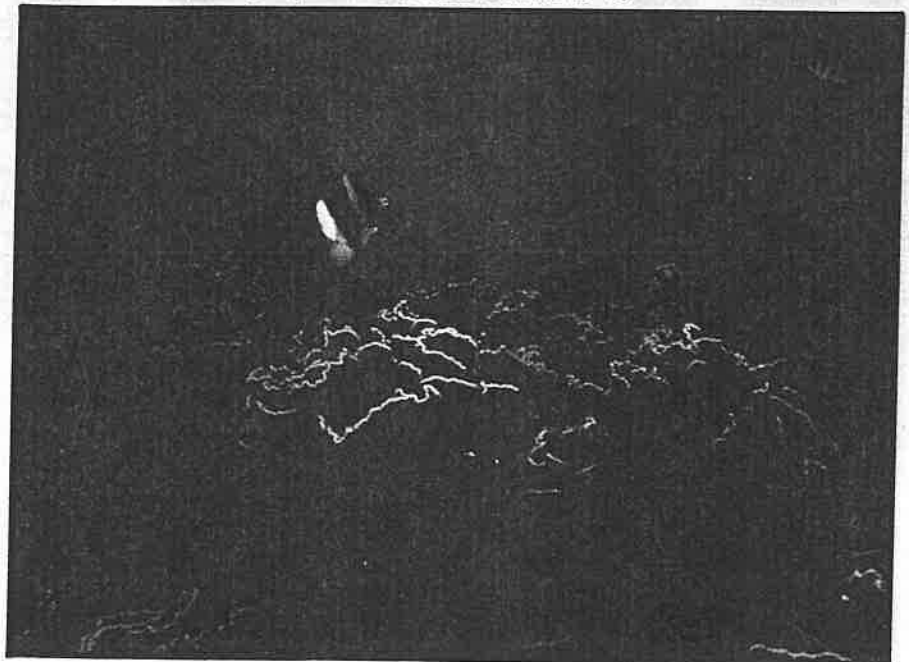
reefs, which measure many square kilometers, are of further interest because they are built exclusively of the cabbage coral *Montipora foliosa*. Elsewhere in Oman there are few well developed examples of coral reefs. Coral assemblages covering underlying rock without development of true reef framework are more common. These remote Hikman reefs are unique in the Sultanate from another perspective: the Hikman residents, who have traditional fishing rights to the area, prohibit all fishing on the reefs for commercial purposes. Fishing is permitted during times of adversity, but for domestic use

only. This is a self-enforced community doctrine which effectively maintains the reef as a living coldstore (Salm, 1988).

Although *C. dialeucos* was regularly seen over the *M. foliosa* reefs (Figure 3), it was more abundant over the mixed coral assemblages fringing the southeastern and southwestern shores of the Barr. Extensive study of the Oman coast by the senior author indicates that *C. dialeucos* does not penetrate the Gulf of Oman. The northernmost limit of its range is around Ra's al Hadd, which forms the southern boundary of the gulf. In the south, the species is found to

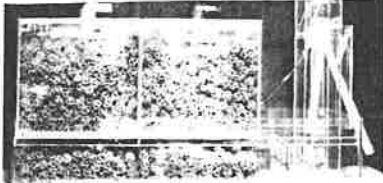
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Figure 3: Adult *Chaetodon dialeucos* over cabbage coral *Montipora foliosa* at 2 meters. (Barr al Hikman, Sultanate of Oman, February 1987. Photo by Dr. Rodney V. Salm, IUCN, using Fujichrome 50 and a Nikonus V.)



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within at least 40 kilometers of the Sultanate's border with the People's Democratic Republic of Yemen (PDRY). It is likely that the range of *C. dialeucos* extends well into the PDRY.

Despite the distribution of *C. dialeucos* along nearly 1,500 kilometers of Oman's coastline, its range centers around Barr al Hikman. Elsewhere, juveniles of the species are rarely encountered. In the southern 1,000 kilometers of its range, only large single or paired individuals of *C. dialeucos* were observed.

Around Barr al Hikman, *C. dialeucos* was frequently seen in less than 1 meter of water. This is of particular interest, as no shallow water butterflyfishes have been described from the Indian Ocean since Ahl's revision of the genus 66 years ago (Ahl, 1923). Since that time, the only shallow water butterflyfishes described worldwide have been from remote island groups, such as Rapa and Easter Island in the Pacific Ocean (Randall, 1975; Randall and Caldwell, 1973).

Chaetodon dialeucos was the most common member of the family Chaetodontidae seen in the collection area. At the time the type specimens were collected, the only other chaetodontid seen was *Heniochus acuminatus*. Low numbers of *C. nigropunctatus*, *C. melapterus*, and *C. vagabundus* have been recorded from the area by the senior author.

At Barr al Hikman, *C. dialeucos* was

usually seen in pairs or small groups of less than ten individuals which seemed to have a home territory. However, loose aggregations of up to 20 individuals may occur over large coral heads or other prominent features, such as the wreck at Ra's al Hadd.

There is nothing in the shape of its mouth, its observed behaviour, or its

distribution along the coast of Oman to suggest that *C. dialeucos* is an exclusive coral polyp feeder. It was observed to browse occasionally at the base of coral colonies, but never on the living corals themselves.

At Ra's al Hadd *C. dialeucos* is found in low numbers deeper than 10 meters

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Table 1
Comparison of proportional measurements and meristic characters for *Chaetodon dialeucos*, *C. mesoleucos* and *C. nigropunctatus*

Ratios/Characters	<i>C. dialeucos</i> (SL = 104.6, 116.5mm)	<i>C. mesoleucos</i> (SL = >79mm, n = 7)	<i>C. nigropunctatus</i> (SL = >89mm, n =)
Depth/S.L.	1.6-1.7	1.6-1.8	1.5-1.6
Head/S.L.	2.9	2.9-3.1	3.1-3.3
Eye/Head	3.4, 3.6	3.4-3.6	3.0-3.5
Snout/Head	2.5	2.3-2.7	3.0-3.3
Maxillary/Head	3.8	3.5-3.9	2.8-3.2
Interorb. W./Head	3.2	3.4-3.8	3.8-4.3
Caud. Ped./S.L.	7.7, 8.0	8.1-9.2	8.2-9.1
Pect. Fin/S.L.	4.9, 5.2	3.7-4.2	3.8-4.0
Pelvic Sp./S.L.	4.9, 5.1	4.7-5.5	5.2-5.7
Predorsal L./S.L.	2.2, 2.3	2.3-2.4	2.3-2.4
Prepelvic L./S.L.	2.5, 2.8	2.3-2.5	2.2-2.5
Dorsal Sp. No. 1/S.L.	10.7, 11.3	9.7-11.5	11.1-13.6
No. 2/S.L.	8.3, 9.0	6.7-10.0	8.5-10.6
No. 3/S.L.	6.5, 6.8	5.2-6.9	6.7-8.0
No. 4/S.L.	5.1, 5.2	4.7-6.1	5.1-6.5
Anal Sp. No. 1/S.L.	7.7, 7.7	6.7-9.3	8.6-9.3
No. 2/S.L.	5.2, 5.3	4.5-5.5	5.5-6.0
No. 3/S.L.	5.0, 5.3	4.5-6.3	5.1-6.4
Dorsal	XIII, 21	XIII, 21-23	XIII, 21-23
Anal	III, 19	III, 18-20	III, 18-20
Pectoral Rays	15, 16	14-15	14-15
L. 1. Scales	24	22-25	36-39
Scales above L. 1.	6	7-8	7-8
Scales below L. 1.	11	13-14	16-18
Gill Rakers	14	14-16	15-16

from page 8/11

over rock with small scattered coral colonies, and in greater numbers in 8-10 meters on a wreck situated nearly 1 kilometer offshore. Off the southern coast it is found both in areas with abundant coral and in areas devoid of coral or with few small scattered coral colonies. However, as breeding seems to be confined to the central portion of its range, a link is indicated with the coral reefs there.

One specimen of *C. dialeucos* has been maintained alive in a small closed system aquarium and has survived one year to date. It has adapted well to captivity, even feeding on prepared flake foods, but it has been slow to adjust to new additions to its diet. It is nonaggressive towards tankmates, but has not been kept with other chaetodontids.

Etymology

Chaetodon dialeucos is named for its conspicuous white triangular band. The authors suggest that the species be given the common name of "Oman Butterflyfish" in honor of the Sultanate of Oman where it was first found, and in appreciation of the Sultanate's dedication to environmental conservation and marine research.

Acknowledgements

The studies which led to the discovery of the reefs of Barr al Hikman and of the new butterflyfish species were undertaken as a part of the Coastal Zone Management Project conducted for the Ministry of Commerce and Industry by the International Union for Conservation of Nature and Natural Resources (IUCN). The senior author is grateful to Mr. Ralph Daly, Advisor for Conservation of Environment in the Diwan of Royal Court, for advice and assistance concerning these studies, and to the Diwan of Royal Court Royal Flight for aerial survey of the coast of Oman, including Barr al Hikman.

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Our thanks are extended also to Sir Peter Scott for his interest in pursuing the identity of the fish, to Dr. John E. Randall and Dr. John E. McCosker for review of the manuscript, and to Dr. Jeff Kidner and Dr. Paul Riek for preparing the radiographs.

Author's Note: A photograph and popular account of the collection of this fish appeared in *Marine Fish Monthly*, January 1989 issue, by a different author. In this article the name was given as "tentatively . . . *Chaetodon omanensis* . . ." In order to avoid future nomenclatural problems, the authors have abandoned this name in favor of *C. dialeucos*.

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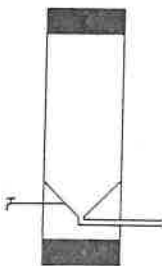
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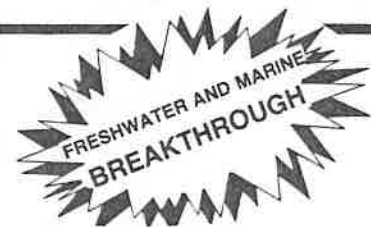
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