

## Re-occurrence of the Threebanded Butterflyfish, *Chaetodon humeralis* (Chaetodontidae), with Notes on its Distribution in Southern California

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The threebanded butterflyfish, *Chaetodon humeralis* Günther 1860, is an eastern Pacific endemic species whose range has been reported as northern Chile to San Diego, California, reaching the Galápagos and Cocos Islands (Miller and Lea 1972, Grove and Lavenberg 1997). It is easily distinguishable from the three other chaetodontid species, *C. falcifer*, *Johnrandallia nigrirostris*, and *Forcipiger flavissimus*, found in the eastern Pacific and cannot be confused with any Indo-West Pacific species. Two juvenile specimens are herein reported from southern California.

On 1 November 1997, Hugh Khim, a student at the University of California, San Diego, was free diving at 10 m along the wall of the underwater canyon in the La Jolla marine reserve. While observing other juvenile fish hiding along the one-meter high siltstone wall, he discovered a juvenile threebanded butterflyfish, approximately 4 cm total length (TL). This fish was found some three weeks later by Khim and Robert Snodgrass who videotaped it; it had not moved from its original location. Water temperatures in La Jolla at this time and during the preceding weeks were above 20°C, even at depths exceeding 20 m (R. McConnaughey, pers. comm.).

In King Harbor, Redondo Beach, California, on 12 December 1997, while conducting routine ichthyotranssects with Matthew Craig, Daniel Pondella of the Vantuna Research Group (VRG) at Occidental College observed a solitary threebanded butterflyfish at the end of the west breakwater (latitude 33°50.5 N, longitude 118°23.7 W). That day on a subsequent dive it was found at the same location and captured with a hand net. The depth of capture was 10 m and the water temperature was 17.3°C, the ambient temperature of Santa Monica Bay at the time. This specimen, 46.5 mm TL, was photographed (Fig. 1), preserved and given to the Marine Vertebrates Collection at the Scripps Institution of Oceanography in La Jolla (SIO 98-23).

The last verified collection or known observation of *C. humeralis* in California was during a warm-water period approximately 140 years ago (Hubbs and Rehnitzner 1958). During the Pacific Railroad Survey, Lt. W. P. Trowbridge collected two specimens from San Diego (USNM 3170); however, these fish were not catalogued until after Girard's work on these collections (1854; 1858) and were not included in books of California fishes (Barnhart 1936, Roedel 1948, 1953). Hubbs and Rehnitzner (1958, p. 279) note:



Fig. 1. Left lateral view of the threebanded butterflyfish, *Chaetodon humeralis*, (38.6 mm SL, SIO98-23) captured in King Harbor, Redondo Beach, California on December 12, 1997. Photograph by Daniel J. Pondella, II.

The low catalog number (3170) indicates that the specimens were in fact entered in the collection nearly 100 years ago. Lt. W. P. Trowbridge was one of the most effective of the West Coast collectors on the Pacific Railroad Surveys. Somehow the species escaped inclusion in Girard's reports on the fishes collected by these surveys. Presumably the specimens came to light after the bulk of the collections had been studied and cataloged, for the number is higher than those recorded for the species reported by Girard. In this connection it may be noted that Girard (1858: 338) referred to other specimens from San Diego that had become "misaid in the moving of the Smithsonian collections from one end of the building to another a few months since." Some slight doubt regarding the validity of the San Diego record can not be dispelled, but we believe that *C. humeralis* is to be added to the list of tropical fishes that occurred at San Diego during the warm period a century ago.

A trip by Matthew Craig to the National Museum of Natural History found the specimens were catalogued as described by Hubbs and Rehnitz (1958) with the locality listed simply as "San Diego". The specimens (68.9, 89.2 mm TL, Table 1) were in good condition. The two fish observed in 1997 are fairly small, allowing inferences into settlement processes. Two possibilities are that they either recruited from the ichthyoplankton or rafted into these reefs. The USNM specimens are much larger than the 1997 specimens.

Although previously collected as far north as the San Benito Islands (SIO 84-

Table 1. Counts and measurements for the three museum specimens of threebanded butterflyfish, *Chaetodon humeralis*, from southern California. Lengths given in millimeters.

Counts and measurements	Specimens		
	SIO98-23	USNM3170	USNM3170
Standard length	38.6	59.9	75.9
Total length	46.5	68.9	89.2
Dorsal fin elements	XIII, 20	XIII, 18	XIII, 19
Anal fin elements	III, 17	III, 16	III, 16
Lateral line scales	32	34	35
Pectoral rays (I)	16	17	16

227), the typical northern range does not extend past Magdalena Bay (*eg.* SIO 62-105, SIO 64-55 and R. N. Lea, pers. comm.). The specimen found in King Harbor, Redondo Beach, California represents the known northern limit of this species, an extension of some 150 kilometers from the historic San Diego locality.

Much attention has been given to the warming trends of coastal waters along our coasts of the Americas beginning in the mid 1970's (Hayward 1997) and recently exasperated by the 1997-98 major El Niño Southern Oscillation (ENSO) event. It is probable that the recruitment of these two juvenile individuals is related to this event.

Various expatriated fishes to the Southern California Bight with the northern limits of their ranges normally at Magdalena Bay, or occasionally at the San Benito Islands, have been noted since the shift from Oregonian dominated fauna to a San Diegan fauna beginning with the 1978-79 ENSO (*eg.* Brooks 1987, Lea and Fukuhara 1991, Lea and Rosenblatt 1992, Lea and McAlary 1994, Lea and Walker 1995, Pondella 1997). The long-term success of these individuals and the continued presence of these species in the Southern California Bight are uncertain. However, as indicators of environmental change (Radovich 1961, Mearns 1988, Stephens et al. 1988) the recruitment of tropical and subtropical (Panamic) species in the temperate waters of southern California is strong evidence of the current ENSO strength.

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