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Observations of the Antipatharian "Black Coral" *Plumapathes pennacea* (Pallas, 1766) (Cnidaria: Anthozoa), Northwestern Gulf of Mexico

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Millepora (Rezak et al., 1985). The condition of the deep reef at the EFGB is currently exceptional and shows essentially no difference in species composition or total coral cover from early monitoring studies at similar depths at the EFGB. Therefore, understanding the role of deeper reef environments, their susceptibility or resistance to bleaching and related causes of mortality (or both), and the effects of being buffered from the impacts of fluctuating and increasing sea surface temperatures is of critical importance. To this end, continued long-term monitoring of these deeper stations will enhance our knowledge of community dynamics (and stability) at the EFGB in particular and provide insight with respect to the effects of depth on coral reef populations in general.

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OBSERVATIONS OF THE ANTIPATHARIAN "BLACK CORAL" *PLUMAPATHES PENNACEA* (PALLAS, 1766) (CNIDARIA: ANTHOZOA), NORTHWESTERN GULF OF MEXICO.—Antipatharians are found throughout the world's oceans but are most common in tropical deep-

TABLE 1. General information on all observation sites.

Site	Location	Date of observation	Bottom depth (m)	Latitude	Longitude	Age of platform (yr)	Depth of horizontal supports (m)
1	WC 630A	10 Oct. 2001	109	28.00344	93.29414	24	10.7 ^a , 24.4
2	HI A 376A	16 May 2001	99	27.96197	93.67089	20	9.5 ^a , 25.3
3	GB 236A	26 Oct. 2004	207	27.76108	93.13772	24	30.5 ^b
4	GB 189A	27 Oct. 2004	219	27.77857	93.30950	13	16.8 ^a , 43.0
5	EFG buoy 6	17 Aug. 1998	22	27.91108	93.59877	—	—

^a *Plumapathes pennacea* not observed at these horizontal support levels; deeper horizontal support levels were not surveyed.

^b No other shallower horizontal level at this platform.

water habitats from 30 to 80 m depth. The black coral *Plumapathes pennacea* (previously known as *Antipathes pennacea*) is a common species in deeper waters of the Caribbean. It has been reported from the Indo-Pacific, southern Atlantic, and western Atlantic (Opresko, 2001). One record of *Antipathes* sp. from the northwestern Gulf of Mexico that was reported in Cairns et al. (1993) was likely *P. pennacea*, but the exact location was not presented. This record was first reported in an unpublished dissertation (Opresko, 1974). Humann and DeLoach (2002) describe *A. pennacea* as common to uncommon in the Bahamas and Caribbean but rare in South Florida. A new family, Myriopathidae, described by Opresko (2001), includes the genus *Plumapathes*. This genus includes two species, *P. pennacea* and *P. fernandezi*, the latter known only from the eastern Pacific (Opresko, 2001).

All species of antipatharians are characterized by slow growth, limited larval dispersal and low rates of recruitment, low natural adult mortality, and long life (see review in U.S. Department of Commerce, 2004). This National Oceanic and Atmospheric Administration (NOAA) reference further comments, "Although the taxon is widespread, species have a patchy distribution and generally occur at a low abundance. Black corals may be globally threatened as a result of overharvesting for the jewelry trade in many parts of the world. However, data on status and trends are limited." Observations of black coral colonies on artificial substrates provided by offshore oil and gas platforms and on a relatively shallow coral reef site in the Gulf of Mexico have not been previously reported and serve to expand this general description.

Study site.—Observations reported in this study are from five sites representing two habitat types: four from offshore oil or gas production platforms and one from the coral reef cap at the East Flower Garden Bank (EFG), within

the NOAA Flower Garden Banks National Marine Sanctuary. The four offshore platforms are located in the following lease block areas (designations by Minerals Management Service, Department of the Interior, for offshore mineral leasing; generally square areas three nmi on a side): West Cameron (WC) 630; High Island (HI) A 376; Garden Banks (GB) 236; and GB 189. These platforms occur 103 to 120 nmi from shore. The EFG is located 110 nmi S-SE of Galveston, TX. The specific site of observation on the EFG was near mooring 6. Positions, bottom depths, and platform ages at the time of observations are presented in Table 1. The relative positions of all five sites are illustrated in Figure 1. Observations were made using compressed air SCUBA at depths between 23 and 43 m, and images were obtained using 35-mm still camera photography.

Results.—General comments: All platforms were surveyed by numerous diving scientists for a separate study of scleractinian corals from the surface to the depths of observations reported in this study. It is unlikely that any antipatharians were missed on any platform surfaces shallower than that reported for the minimum depth of observation. The number of vertical legs on each platform totaled eight for platforms 1–3 and four for platform 4. Total surface area of the four different platforms varied widely because of various engineering details. However, areas where antipatharian colonies were observed were typically on horizontally oriented support structures connecting vertical pilings. The surface area represented by the horizontal structure alone is roughly 600 m² for an eight-piling structure and 200 m² for a four-piling structure at a depth of 30 m (using dimensions of 0.4-m-diameter pipe and 55 × 15 m dimensions for an eight-piling structure and 30 × 15 m for a four-piling structure).

Platform 1 (WC 630A): Observations here included a visual count of 10 colonies attached

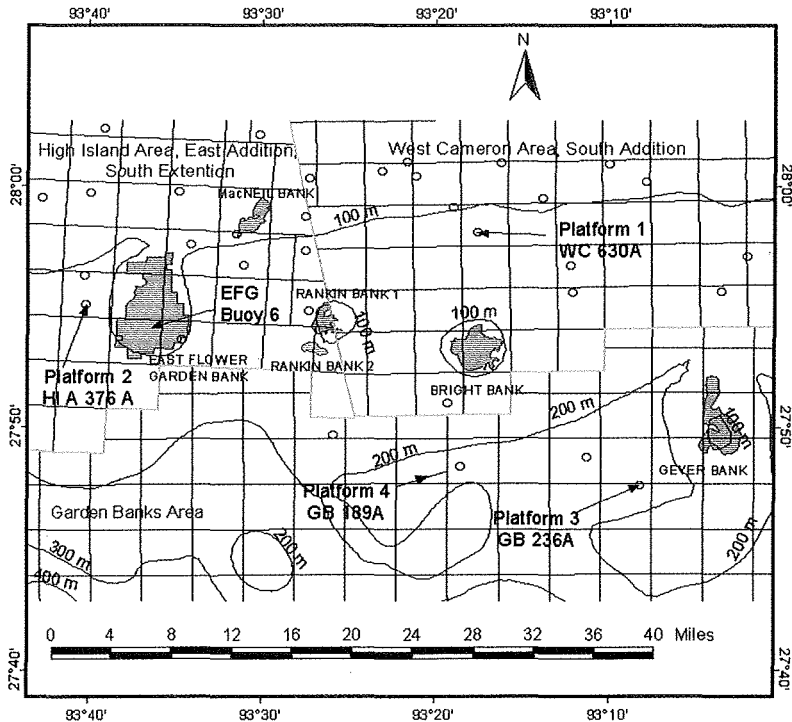


Fig. 1. Location of the five sites where *Plumapathes pennacea* was observed and photographed. Platform 1 at West Cameron (WC) 630A, water depth 103 m; platform 2 at High Island (HI) A 376A, water depth 100 m; platform 3 at Garden Banks (GB) 236A, water depth 207 m; platform 4 at GB 189A, water depth 219 m; and site 5, buoy 6 at the crest of the East Flower Garden Bank, water depth 22 m. Existing active platforms are represented by small circles. Shaded areas of named topographic features are designated as "No Activity Zones" by the Minerals Management Service.

to vertical and horizontal platform structures ranging in depth from 24 to 33 m. All but one of these observations was on horizontal support structures where the total surface area was calculated from engineering blueprints. The total surface area represented at this 24-m depth level is 573 m². This represents a density of 0.016 colonies m⁻². The colony shown in Figure 2 was not directly measured but was approximately 40 cm in height, as estimated from other images that included the proximity of a diver. Some colonies were larger than that shown. No colonies were observed at <24 m depth. Project objectives and diving limitations prevented further surveys deeper than 33 m, and it is not known if additional specimens may have been present at deeper depths on the platform. A small sample was collected from one of the colonies. D. M. Opresko identified the sample as *P. pennacea* (courtesy S. Cairns, pers. comm.; Opresko, pers. comm., who notes, however, that further study is needed to verify that western Atlantic populations are indeed conspecific with those from the Indo-Pacific, the type locality of the species).

Platform 2 (HI A 376A): Here, three colonies of *P. pennacea* were observed and recorded on digital video between depths of 25 and 32 m. As on the previous structure, deeper depths on the platform could not be surveyed. None was observed at depths less than 25 m. Surface area calculations for this structure at these depths totals 644 m², resulting in a density estimate of 0.005 colonies m⁻². Identifications at this site were not confirmed by collection, but all specimens were visually similar to that collected and identified from platform WC 630A.

Platform 3 (GB 236A): Twenty separate colonies were counted during a single survey dive on this platform. All colonies but one, estimated to be at a depth of 38 m, were on horizontal support structures at a depth of 30 m. Using surface area measurements from the very similar eight-leg platform HI A 376A of 640 m², these observations represent a density of 0.03 colonies m⁻². The largest specimen measured 70 cm in length, whereas the other colonies were smaller, measuring only 10–25 cm in

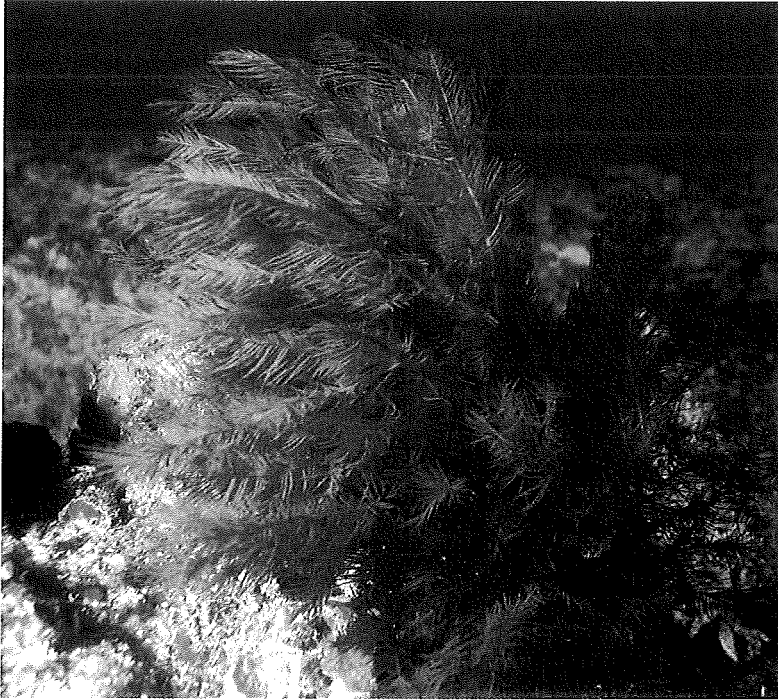


Fig. 2. *Plumapathes pennacea* colony measuring approximately 40 cm in height attached to the upper surface of a horizontal platform structure on WC 630A at a depth of 27 m.

length. No colonies were observed shallower than 30 m. A small specimen was collected from a colony at 30 m and again appears identical to the identified *P. pennacea* from WC 630A.

Platform 4 (GB 189A): Only two *P. pennacea* colonies were observed on this four-leg structure at 43 m. Both were substantial in size and similar to that shown in Figure 2. This structure was located at the edge of the continental shelf, where the bottom depth was 219 m and horizontal supports were deeper than on typical platforms located farther inshore. Because of limited observation time, the entire 43-m horizontal level could not be surveyed. Density estimates are not reasonable because of the uncertainty of the area surveyed.

Site 5 (EFG): The single observation made here was at a depth of 23 m near mooring 6 installed on the crest of the bank. The specimen was growing out from a crevice between living colonies of the scleractinian coral *Montastraea franksi* (Fig. 3). The branches extended no more than 12–15 cm above the substrate (Fig. 3 was taken on 17 Aug. 1998). Identification of this colony was by direct observation

and detailed film images of coloration and morphology.

Discussion.—It is believed that all the above observations are new records for the Gulf of Mexico and a range extension for *P. pennacea* occurrence on a coral reef. Cairns et al. (1993) did report a single specimen designated *Antipathes* sp. that was likely *P. pennacea* from an unspecified location in the northwestern Gulf of Mexico. Earlier studies that described biological communities on offshore platforms in the northern Gulf of Mexico did not report *Plumapathes* (Gallaway et al., 1979, 1981; Gallaway and Lewbel, 1982). These studies, however, rarely sampled fouling communities below a depth of 30 m. Furthermore, offshore oil and gas platforms have only recently been deployed in deepwater near the edge of the continental shelf.

This is the first observation of an antipatharian on the coral reefs of the East or West Flower Garden Banks of which the authors are aware. These observations also appear to be the first for this species from the entire northern Gulf of Mexico region. Only one other record in published literature may have been the same species (Cairns et al., 1993). Multiple un-

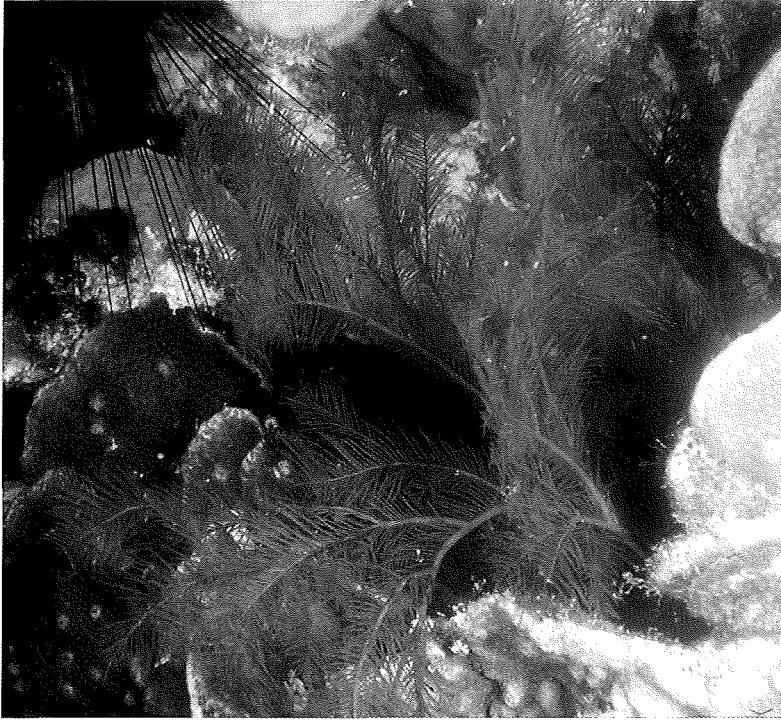


Fig. 3. *Plumapathes pennacea* (visual identification) at a depth of 22 m on crest of the coral reef at the East Flower Garden Bank.

published observations have documented *P. pennacea* on the Flower Garden Banks and other hardbottom locations in the northwestern Gulf of Mexico during remotely operated vehicle (ROV) surveys since this initial observation (E. Hickerson, pers. comm.). Other antipatharian species such as *Cirrhopathes* spp. are common throughout the Gulf of Mexico and on the Flower Garden Banks, but at greater depths (Rezak et al., 1985).

The presence of antipatharian corals on artificial substrates created by offshore platforms has new implications for the distribution of this group. Offshore platforms are now numerous in areas of the Gulf of Mexico where both antipatharians and scleractinian corals can recruit and thrive (Sammarco et al., 2004). One obvious variable is the fact that there are now hundreds of these artificial hard substrate habitats extending from substantial depths to the sea surface where none existed before the installation of oil and gas platforms in the northern Gulf of Mexico. The four study platforms are located in very high water quality regions near the edge of the continental shelf remote from coastal waters and potential anthropogenic influences. All study platforms had been in place for at least 10 yr and, for

two of the four, up to 24 yr. Of particular note was the variety of sizes of specimens on platform GB 236A. This range in colony length from 10 cm to as much as 40–50 cm likely represents different years of successful recruitment to that single habitat site. The significant size of the observed antipatharians suggests that they may be reproductive, resulting in local production, but this remains to be confirmed. One other record of note for this species was from another artificial substrate in the Caribbean. *Antipathes pennacea* was reported on a 37-yr-old shipwreck in Jamaican waters at depths of 30–32 m, similar to observations reported in this study (Oakley, 1988).

Water quality and other habitat characteristics necessary for successful recruitment and development of antipatharians are reflected by the presence of numerous hermatypic scleractinian corals on all four platforms. Scleractinian corals on platforms WC 630A and HI A 376A have been reported in Sammarco et al. (2004). Hermatypic coral species occurring on one or more of the sample platforms discussed in this study include *Madracis decactus*, *Montastraea cavernosa*, *Stephanocoenia intersepta*, and *Diploria strigosa*.

The presence of these new artificial habitats

where none existed only a few decades earlier has clearly influenced antipatharian population dynamics within the Gulf of Mexico. Both the platforms and the Flower Garden Banks represent habitats with exceptional water quality and other conditions that allow settlement and growth of *P. pennacea*.

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FIRST DOCUMENTATION OF THE ROPER INSHORE SQUID, *LOLIGO ROPERI* (COHEN 1976), IN THE GULF OF MEXICO.—Roper's inshore squid, *Loligo roperi*, is a small squid (dorsal mantle length [DML] to 72 mm) that becomes mature at around 43 mm DML (Cohen, 1976). Past collections suggest that this species is associated with islands in the western Atlantic, ranging from the Caribbean shelf off Panama and Colombia, through the Greater and Lesser Antilles within the Caribbean Sea, and north to the Bahama Islands (Fig. 1; from Cohen, 1976). There have been no previous reports of this species from the Gulf of Mexico, although two other *Loligo* spp., the longfin inshore squid (*Loligo pealeii*) and the slender inshore squid (*Loligo plei*), are known to occur in this area (Hixon et al., 1980; Roper et al.,