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SHORT COMMUNICATIONS

OBSERVATIONS OF DEEP-REEF ICHTHYOFAUNA FROM THE BAHAMA AND CAYMAN ISLANDS, WITH NOTES ON RELATIVE ABUNDANCE AND DEPTH DISTRIBUTION

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ABSTRACT Observations of fish species inhabiting vertical wall habitats were conducted in the Bahama and Cayman islands. Twenty-three species from 12 families were recorded from various sites during the study. Number of species and abundance of individuals decreased with depth on the escarpments observed. *Gramma melacara* was the only species found throughout the depth ranges on all escarpments observed. Information about these habitats is sparse and more investigations are warranted.

INTRODUCTION

In situ observations of deep-reef fishes have been sparse, most often conducted from submersibles, as in Colin (1974, 1976) and Starck and Colin (1978). Observations of fish species inhabiting vertical wall habitats were conducted at three sites along the northernmost section of the Tongue of the Ocean in the Bahama Islands from September 22, 1980, through October 2, 1980, and on one site in the Cayman Islands, British West Indies, from November 21, 1980, through November 28, 1980 (Table 1).

TABLE 1.

Location, date, and depth of each wall dive conducted.

Site	Location	Geographical Location	Date	Depth of Dive
1	Chub Cay, Berry Islands	25°22.5'N 77°48.0'W	9-25-80	61 m
2	Andros Island	24°42.0'N 77°43.5'W	9-28-80	67 m
3	New Providence Island	25°02.5'N 77°34.0'W	9-29-80	52 m
4	Little Cayman Island	19°41.0'N 80°03.5'W	11-23-80	46 m

METHODS AND MATERIALS

All observations were conducted using SCUBA. Dives in the Bahama Islands were conducted from the R/V OLI of the Ocean Learning Institute in West Palm Beach, Florida. Dives off Little Cayman Island were conducted from the

beach. A total of 2.55 man-hours of underwater observation were completed. Fish counts were conducted by swimming over the escarpment edge to maximum depth and making observations upon ascent. Notes on the depth distribution and relative abundance of fish species encountered were written on a piece of plastic slate using a standard graphite pencil. Immediately upon surfacing from a dive, identification of fish species observed was compared with references from Bohlke and Chaplin (1968) and Randall (1968); underwater notes were transferred to a field notebook. Collection of specimens was not attempted due to the limited time available for each dive.

DESCRIPTION OF STUDY SITES

An abundance of hard corals, gorgonian corals, and sponges covered the wall habitats observed in this study, providing considerable habitat space for small cryptic fishes. Unfortunately, the limitations of using SCUBA at the depths encountered precluded anything more than a cursory examination of the species composition of the wall habitats.

The first observation site was located off the southern coast of Chub Cay, Berry Islands, in the Bahamas, approximately 2 miles offshore of Chub Cay Club Marina. The wall drop-off occurred at 37 m. The slope preceding the drop-off was marked by a series of ridges and channels, probably formed by sediment scouring. Coral growth was sparse on the slope, typically covering only the ridges. On the wall face, gorgonian corals and sponges were abundant with sparse hard coral growth. Small overhangs and crevices were abundant.

Site 2 was located off the eastern coast of Andros Island, Bahamas, about 2 miles offshore of Fresh Creek. The escarpment occurred at 46 m. Bottom topography and coral growth were similar to those described for Site 1.

Site 3 was located at the northwestern tip of New Providence, Bahamas. The escarpment was encountered at 15 m. Hermatypic coral growth above the escarpment was well developed. On the wall face, large formations were replaced by small coral heads, luxuriant gorgonian corals, and sponges. At approximately 24 m, a small horizontal ledge jugged out from the wall face. Below the ledge the wall was nearly vertical.

Site 4 was located off the northern coast of Little Cayman Island, British West Indies, about 1 mile offshore from Jackson's Point. The escarpment began at 21 m. Extensive reef development occurred on the shelf above the escarpment. A large ridge of staghorn coral occurred on the edge of the drop-off. The first 11 m formed a steep slope (approximately 50°), becoming nearly vertical at approximately 30 m. Again the wall face was occupied by an abundance of gorgonian corals, sponges, and small, low-profile heads.

RESULTS

Table 2 lists fish species observed, maximum depth of occurrence during observations, abundance estimates, and locality.

DISCUSSION

Thirteen of the 23 species recorded during this study also were reported from deep-reef escarpments in Jamaica and British Honduras by Colin (1974). As reported by Colin (1974), and by Starck and Colin (1978), *Gramma melacara* was by far the most abundant species on the deep wall faces observed during this study. Colin (1976) found *G. melacara* to be the most abundant fish from 90 to 110 m off Whale Cay, Berry Islands, Bahama Islands.

During observations off Chub Cay and Andros Island, both in the Bahamas, the escarpment was encountered in relatively deep water, 37 m and 46 m, respectively. Fish

TABLE 2.
Maximum depth of observation and abundance estimates of fish species observed during study.

Family, Genus, and Species	Observation Depths (m)				Species Abundance
	Site 1	Site 2	Site 3	Site 4	
Holocentridae					
<i>Holocentrus rufus</i> (Walbaum)			48		1 juvenile
Serranidae					
<i>Cephalopholis fulva</i> (Linnaeus)			24		2 adults
<i>Epinephelus guttatus</i> (Linnaeus)			24		1 adult
<i>Hypoplectrus puella</i> (Cuvier)		52			1 adult
<i>Liopropoma</i> sp.			50		1 adult
<i>Mycteroperca bonaci</i> (Poey)				30	1 adult
<i>Serranus baldwini</i> (Evermann and Marsh)		55			1 adult
Grammidae					
<i>Gramma loreto</i> Poey			24		Many adults and juveniles
<i>Gramma melacara</i> Bohlke and Randall	61	67	52	46	Very many adults and juveniles
Lutjanidae					
<i>Lutjanus apodus</i> (Walbaum)				28	4 adults
<i>Ocyurus chrysurus</i> (Bloch)				30	5 adults
Haemulidae					
<i>Haemulon plumieri</i> (Lacepède)		50			1 adult
Chaetodontidae					
<i>Holacanthus tricolor</i> (Bloch)			24	30	1 adult and 1 juvenile
<i>Prognathodes aculeatus</i> (Poey)			24	30	3 adults
Pomacentridae					
<i>Chromis cyaneus</i> (Poey)			24	30	Many adults
<i>Chromis insolatus</i> (Cuvier)			24		Many adults and juveniles
<i>Chromis multilineatus</i> (Guichenot)			24		Many adults
<i>Pomacentrus partitus</i> Poey	50	52			7 adults
Labridae					
<i>Bodianus pulchellus</i> (Poey)		52			1 juvenile
<i>Clepticus parrai</i> (Bloch and Schneider)			52	30	Many adults
Sphyraenidae					
<i>Sphyraena barracuda</i> (Walbaum)				40	4 juveniles
Gobiidae					
<i>Gobiosoma</i> sp.				46	1 adult
Tetraodontidae					
<i>Canthigaster rostrata</i> (Bloch)			24		1 adult

fauna associated with the sparse coral growth at the escarpment edge was represented by scattered individuals of the families Serranidae, Chaetodontidae, Pomacentridae, Labridae, and Scaridae. On the wall face off Chub Cay from 37 to 61 m, only two species were recorded, and off Andros Island from 46 to 67 m, only six species were recorded, four of which were represented by only one individual.

In contrast to the first two observations, observations off New Providence, Bahamas, and Little Cayman Island, B.W.I., revealed the escarpment in 15 m and 21 m of water, respectively. Coral growth at the escarpment edge was well developed, and the associated fish fauna was extensive. Over 60% of the species listed in Table 2 were recorded only from the New Providence and Little Cayman escarpments. I attributed this difference in abundance of species and individuals to the fact that the escarpment edge at those two sites was located in relatively shallow water, thus placing the "drop-off" in closer proximity to the highly populated shallow reef habitat. As observation depth on the vertical face of those walls increased, species abundance decreased, as did abundance of individuals with the exception of *Gramma melacara*.

I believe a secondary factor influencing species and individual abundance at site 3 was the occurrence of the horizontal ledge on the wall face approximately 9 m below the escarpment edge. Observations around that ledge revealed 9 of the 13 species recorded on that escarpment. I believe that reef fish probably migrate freely from the well-developed reef above the escarpment to the ledge and back, since the two sites are separated by only 9 m. *Gramma loreto* was common above the escarpment and was the most abundant fish at the ledge. Above the ledge on the wall face and below the ledge, *G. melacara* replaced *G. loreto*.

Overlap of the two species was slight, corresponding with the findings of Starck and Colin (1978).

It is likely that the differences in ichthyofauna between the shallow coral reef and the deep vertical wall face are influenced by water depth as well as by substrate orientation. More extensive observations along with acquisition of quantitative data would be required to arrive at any acceptable conclusions.

In situ observations and sampling are important to study adequately the deep reef and escarpment habitats. Open circuit SCUBA as well as deep submersibles have been used in these areas, and both have assets and drawbacks. Perhaps both methods used in conjunction would prove effective. Lock-out diving from a submersible is another alternative. More intense examination of this unique and interesting habitat type is warranted, as little is known of the ichthyofaunal species composition, community structure, and potential existence of undescribed species occurring there.

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