

# HOST PREFERENCE OF FLAMINGO TONGUES, *CYPHOMA GIBBOSUM*, AMONG TWO GORGONIANS ON LITTLE CAYMAN ISLAND

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*Abstract:* Grazers are important to many marine benthic systems for the role they play in controlling the abundance and distribution of algae and some benthic invertebrates. However, it remains unclear how much coral grazers influence the structure of coral communities. For the gastropod coral grazer, the Flamingo Tongue snail, *Cyphoma gibbosum*, I evaluated preference for different gorgonian corals. I tested the distribution of *Cyphoma* among two gorgonian taxa, *Eunicea* spp. and *Briareum asbestinum* on the back reef near Jackson's Point on the north side of Little Cayman Island. I used both surveys and reciprocal transplants of *Cyphoma* to test host species preference. *Cyphoma* were more common on the much rarer *Eunicea* spp. However manipulation trials suggested a preference for the Corky Sea Finger, *B. asbestinum*.

*Keywords:* back reef, gorgonian community, Little Cayman Research Center, Corky Sea Finger, Knobby Sea Rod

## INTRODUCTION

Grazers are important to many marine benthic systems for the role they play in controlling the abundance and distribution of algae and invertebrates (Ogden *et al.* 1973; Hay 1981). Many animals consume and damage corals, but their influence on coral community structure is not well understood. Species that graze randomly among the available coral hosts would have a different effect than those that feed preferentially on one or a few corals.

I studied the distribution of the small, gorgonian-grazing Flamingo Tongue snail (*Cyphoma gibbosum*) among two taxa of gorgonian (Knobby Sea Rods, *Eunicea* spp. and Corky Sea Fingers,

*Briareum asbestinum*) on the back reef near Jackson's Point on the north side of Little Cayman Island. In previous observations I had seen *Cyphoma* occupying and grazing on colonies of *Eunicea* spp. I hypothesized that *Cyphoma* would feed preferentially on *Eunicea* spp., predicting there would be more *Cyphoma* on *Eunicea* spp. colonies than on *B. asbestinum* colonies, when corrected for the relative abundance of the two gorgonians. I also used reciprocal transplants to test for host preference and nonrandom feeding patterns in *Cyphoma*.

## METHODS

On Mar 6 - 10 on the back reef of Grape Tree Bay outside the Little Cayman Research Center on the north side of Little Cayman Island, I estimated the densities of *Eunicea* spp. (Knobby Sea Rods) and *B. asbestinum* (Corky Sea Finger) using ten 3 x 2 m plots by counting and measuring colonies of each. I could not identify *Eunicea* to species since most members of this genus can only be distinguished microscopically. I grouped each colony into one of five size categories: 0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm and 40-50 cm by height. I summed the length of colonies within each taxon (using midpoints of the size ranges), and took the mean for all plots, as a measure of abundance.

I estimated *Cyphoma* abundance in the study area using a belt transect of ca. 220 x 5 m, running east-west along the back reef. I searched for two hours, counting *Cyphoma* individuals and aggregations and identifying host to species or genus.

I tested host preference using reciprocal transplants of *Cyphoma* individuals. I moved individuals between gorgonian colonies of the same taxon ("conspecific"), and also between gorgonians of different taxa ("heterospecific"). I controlled for disturbance by removing and replacing individuals on the same colonies ("controls").

## RESULTS

*Briareum* dominated the gorgonian community of the back reef, making up  $84.2 \pm 0.04$  % (mean  $\pm$  1 SE) of colonies of the two gorgonian taxa observed. There was a mean of  $3.73 \pm 0.54$  *B. asbestinum* colonies m<sup>-2</sup> and  $0.65 \pm 0.15$  *Eunicea* spp. colonies m<sup>-2</sup>. Mean length was  $14.71 \pm 1.35$  cm m<sup>-2</sup> for *B. asbestinum*, and  $22.92 \pm 1.85$  cm m<sup>-2</sup> for *Eunicea* spp.

On the first sampling date, I found 46 *Cyphoma* on four different gorgonian taxa (Table 1; density = 0.042 individuals m<sup>-2</sup>). *Pseudoplexaura* and *Plexaura homomalla* both had a very low abundance and very few observations of snail grazers, so I did not consider them further. *B. asbestinum* represented 53.6% of the colonies hosting *Cyphoma*.

Table 1. Gorgonian corals hosting *Cyphoma gibbosum* on the back reef of Grape Tree Bay on the north side of Little Cayman Island. The table gives the number of colonies of each gorgonian occupied by *Cyphoma*, and the number of *Cyphoma* found on each taxonomic group.

Gorgonian	Common Name	No. Colonies	No. <i>Cyphoma</i>
<i>Briareum asbestinum</i>	Corky Sea Finger	16	24
<i>Eunicea</i> sp.	Knobby Sea Rod	15	17
<i>Pseudoplexaura</i> sp.	Porous Sea Rod	2	4
<i>Plexaura homomalla</i>	Black Sea Rod	1	1
Total		34	46

Excluding individuals on *Pseudoplexaura* sp. and *P. homomalla* colonies, 58.5% of *Cyphoma* from the transect sampling were found on *B. asbestinum*. Under a null model with no host preferences, we would expect *Cyphoma* to be found on each suitable gorgonian species in abundances proportional to the relative densities of each. *Cyphoma* were found significantly less than expected on the common *B. asbestinum* when considering both the number of colonies ( $t = 6.06$ ,  $df = 9$ ,  $P = 0.0002$ ) and the summed maximum height  $m^{-2}$  ( $t = 2.60$ ,  $df = 9$ ,  $P = 0.029$ ).

*Cyphoma* rejected the new host in 17% of the transplant controls, and response was identical for the two gorgonian taxa. Response did not differ between host taxa in the conspecific transplants ( $\chi^2 = 0.29$ ,  $df = 1$ ,  $P = 0.59$ ); there was 25% rejection of *B. asbestinum* and 37.5% rejection of *Eunicea* spp. However, *Cyphoma* were significantly more likely to leave a *Eunicea* spp. colony (83% rejection) than a *B. asbestinum* colony (16.67%) when transplanted across gorgonian taxa in the heterospecific manipulations ( $\chi^2 = 4.41$ ,  $df = 1$ ,  $P = 0.036$ ).

## DISCUSSION

*Cyphoma* were more abundant on the rarer *Eunicea* spp. than on *B. asbestinum*, supporting the hypothesis that *Cyphoma* prefer

*Eunicea* spp. as a host. There are three possible explanations: 1) *Eunicea* spp. are better hosts for *Cyphoma*, but their abundance is controlled by some unrelated factor; 2) *Cyphoma* prefer *Eunicea* spp. and exert top-down pressure on the gorgonians that limits their abundance; or 3) *Cyphoma* actively seeks out *Eunicea* spp. because they are rare, possibly as a result of some tolerance threshold for secondary compounds produced by other gorgonian hosts. There have been many studies on secondary compounds in gorgonians (e.g. Fenical *et al.* 1981 and La Barre *et al.* 1986), but no evidence that *Cyphoma* choose their host or alter their feeding rates to avoid toxins (Lasker *et al.* 1988).

In contrast, the cross-host transplants suggest preference among *Cyphoma* for *B. asbestinum*. *Cyphoma* may become canalized to a particular host once they commence feeding, although this only holds for those originally feeding on *B. asbestinum*. It is also possible that there are different genotypes that preferentially feed on each gorgonian type, with differing tolerances for the other. While more *Cyphoma* apparently seek out *Eunicea* spp., these individuals are more tolerant of both gorgonian taxa. Individuals that feed on *B. asbestinum* seem to have little tolerance for the alternative. This difference in flexibility may be linked to the relative abundances of

the gorgonians; those that prefer the rarer *Eunicea* spp. would have an advantage if they could easily switch to the more readily available *B. asbestinum*.

If there was some genetic basis for host preference, large changes in gene frequency among *Cyphoma* could have heavy impacts on the structure of the gorgonian community. However, it appears that *Cyphoma* graze on and kill polyps, with little effect on the colony as a whole. Inferences about *Cyphoma*'s impact on community structure require more information on the damage that *Cyphoma* inflict on gorgonians as they feed.

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