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**GNATHOSTOMULIDA FROM THE TWIN CAYS, BELIZE, MANGROVE
COMMUNITY**

BY

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Figure 1. Species-rich sampling site for gnathostomulids at West Bay (“Candy’s Trail”) with *Thalassia testudinum* in fine-to-medium sand among roots of *Rhizophora mangle*.

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ABSTRACT

Gnathostomulida, a phylum of microscopic, interstitial marine worms, are well represented in detritus-rich sandy sediments that are usually found between coral reefs, seagrasses and mangroves. Of 25 species encountered in more than 100 sediment samples collected in southern Belize between 1974 and 2004, 18 species were found in the vicinity of Twin Cays.

INTRODUCTION

Gnathostomulida are small, unsegmented, acoelomate worms that live in the interstices of marine sand. Similar in habitus to free-living Turbellaria, as they were first described (Ax, 1956), they are now considered a phylum (Riedl, 1969; Sterrer, 1972) on the basis of their unique features, particularly a monociliary epidermis (each epidermal cell carries only a single cilium), and a bilaterally symmetric pharynx equipped with complex cuticular mouth parts. Found exclusively in shallow marine sand, Gnathostomulida are thought to graze on the bacterial and fungal microflora which coats sand grains. Their preference for detritus-rich sand, in which they occur at the boundary between reduced and oxygenated sediments, suggests that in addition to very low oxygen requirements they may have mechanisms for sulfide detoxification. Only 94 species, in 25 genera, are currently known worldwide (Sterrer, 2001), many with cosmopolitan distribution. Gnathostomulida may be among the most primitive living Bilateria (Ax, 1985; Sterrer et al., 1985), with possible phylogenetic affinities to Rotifera and Micrognathozoa (Giribet et al., 2004).

During nine visits to the Carrie-Bow Cay Field Station in southern Belize (Rützler and Macintyre, 1982) between 1974 and 2004, I collected more than 100 sediment samples which yielded a total of 25 species of Gnathostomulida (including seven species and two genera new to science), the largest number from any area in the world (Sterrer, 1998). While most samples came from the immediate vicinity of Carrie-Bow Cay, two came from the Pelican Cays (Sterrer, 2000); the nearby mangrove island of Twin Cays was sampled repeatedly.

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METHODS

Collecting and specimen extraction are detailed in Sterrer (1998). Using snorkeling or scuba, the upper 5 centimeters of sediment are scooped into a bucket by hand until the latter is full; a primary sample thus consists of about 10-15 liters of sand with a little overlying seawater. In the lab, this primary sample is periodically subsampled by scooping the superficial layer of sand (about 500 ml) into a flask and shaking it in an isotonic magnesium sulfate solution. The floating meiofauna is then poured through a 63- μ m sieve and allowed to recover before it is sorted into species and analyzed under the phase-contrast microscope. Extraction ends when the sample ceases to produce gnathostomulids, usually after 7-12 days.

RESULTS

Sediment samples taken from the vicinity of Twin Cays contained 18 out of a total of 25 species of Gnathostomulida recorded in the greater Carrie Bow Cay region (Table 1). None of the species were unique to Twin Cays. Whereas the muddy bottoms in mangrove channels never contained gnathostomulids, the sampling program confirmed the preference of this phylum for fine-to-medium, even coarse, sand but always with a high admixture of marine (not terrigenous) detritus as is typically found among and between seagrasses, mangroves, and coral reefs. In this preferred environment, diversity may reach a dozen species per sample and gnathostomulids may outnumber all other meiofauna including nematodes. Two sites off West Bay were sampled repeatedly being particularly productive and together producing all of the 18 species: the first ("Candy's Trail") in the intertidal to 0.5 m among roots of Red Mangrove where fine-to-medium sand is interspaced with short *Thalassia testudinum* (Fig. 1); and the second about 50 meters offshore from the first, where *Thalassia* grows in medium-to-coarse sand at 1-2 m depth with *Clypeaster* and *Oreaster* as conspicuous macrobenthos.

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Table 1. Gnathostomulida from the greater Carrie-Bow Cay region

(species recorded in Twin Cays are in bold)

Genus	species	Author
Order Filospermoidea		
Family Haplognathiidae		
<i>Haplognathia</i>	<i>asymmetrica</i>	Sterrer, 1991
<i>Haplognathia</i>	<i>belizensis</i>	Sterrer, 1998
<i>Haplognathia</i>	<i>lunulifera</i>	(Sterrer, 1969)
<i>Haplognathia</i>	<i>rosea</i>	(Sterrer, 1969)
<i>Haplognathia</i>	<i>ruberrima</i>	(Sterrer, 1966)
Family Pterognathiidae		
<i>Cosmognathia</i>	<i>aquila</i>	Sterrer, 1998
<i>Cosmognathia</i>	<i>arcus</i>	Sterrer, 1991
<i>Cosmognathia</i>	<i>manubrium</i>	Sterrer, 1991
<i>Pterognathia</i>	<i>alcicornis</i>	Sterrer, 1998
<i>Pterognathia</i>	<i>crocodilus</i>	Sterrer, 1991
<i>Pterognathia</i>	<i>ctenifera</i>	Sterrer, 1969
<i>Pterognathia</i>	<i>swedmarki</i>	Sterrer, 1966
<i>Pterognathia</i>	<i>ugera</i>	Sterrer, 1991
Order Bursovaginoidea		
Suborder Scleroperalia		
Family Clausognathiidae		
<i>Clausognathia</i>	<i>suicauda</i>	Sterrer, 1992
Family Mesognathariidae		
<i>Labidognathia</i>	<i>longicollis</i>	Riedl, 1970
<i>Tenuignathia</i>	<i>rikerae</i>	Sterrer, 1976
Family Paucidentulidae		
<i>Paucidentula</i>	<i>anonyma</i>	Sterrer, 1998
Family Onychognathiidae		
<i>Onychognathia</i>	<i>rhombocephala</i>	Sterrer, 1998
Family Gnathostomulidae		
<i>Gnathostomula</i>	<i>axi</i>	Kirsteuer, 1964
<i>Gnathostomula</i>	<i>peregrina</i>	Kirsteuer, 1969
Suborder Conophoralia		
Family Austrognathiidae		
<i>Austrognathia</i>	<i>christianae</i>	Farris, 1977
<i>Austrognathia</i>	<i>microconulifera</i>	Farris, 1977
<i>Austrognatharia</i>	<i>medusifera</i>	Sterrer, 1998
<i>Austrognatharia</i>	<i>sterreri</i>	(Kirsteuer, 1969)
<i>Austrognatharia</i>	<i>strunki</i>	Farris, 1973