MEIOFAUNA AND SEDIMENT: HOW ABUNDANCES DIFFER BASED ON GRAIN SIZE

By

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# Table of Contents:

Abstract.................................................................................................................................4  
Introduction............................................................................................................................5  

I. Sampling Methods and Methods Verification  
   1. Introduction..................................................................................................................6  
   2. Methods.........................................................................................................................6  
   3. Results...........................................................................................................................9  
   4. Discussion.....................................................................................................................10  

II. Meiofauna Communities and Sediment  
   1. Introduction..................................................................................................................13  
   2. Methods.........................................................................................................................13  
   3. Results...........................................................................................................................16  
   4. Discussion.....................................................................................................................18  

Future Directions................................................................................................................20  
Conclusion and Discussion....................................................................................................21  
References.............................................................................................................................23
Abstract:

Meiofauna are the nearly microscopic organisms that live in the interstitial spaces between individual granules of sediment. They are found all over the world in almost every place where water meets earth. Because their environment is made up of the surrounding sediment, it is understandable that the grain size of that sediment is a very important factor in the lives of these tiny organisms. I have counted and categorized the communities of nematodes and harpacticoid copepods in two ecologically different sites that are ~256m apart. I have quantified the average grain size for both sites, a saltmarsh (182.69 µm) and a seagrass bed (286.66µm), and have attempted to fit it into an ecological framework for the nematode/copepod communities that live there. I found that between these two habitats, both nematode and copepod communities increased with grain size and that despite ecological differences, the ratio of copepods to nematode in the two sites was not significantly different.
**Introduction:**

The term meiofauna refers to a size class of organism that is generally defined by its ability to pass through a 1mm sieve, but be retained on a 64µm sieve. It is exclusively invertebrate, and while it is made up many different taxa, nematodes and harpacticoid copepods are consistently the most abundant (Heip, 1985; Flach, 2002). Inhabiting the bottom of aquatic environments, meiofauna live on and among the individual granules of sediment, climbing over grains of sand as if they were boulders. Their distribution is somewhat of a mystery, and this group seems to have many cosmopolitan species, with some consistently found around the world (Derycke, 2007; Coomans, 2000). This broad distribution seems to be at odds with the fact that most members of this group do not have a planktonic phase (Bhadury, 2008) and are not physically equipped for long range dispersal (Gerlach, 1977). Regardless of this mystery, the broad distribution of meiofauna allows for comparisons that are not applicable in other systems. For example, as is the case in this study, two sites that differ abiotically, still have meiofauna communities that are similar enough at higher taxonomic levels for direct comparison.

Keeping in mind the size of meiofauna, it is no surprise that extreme care must be taken while studying these tiny creatures. My first goal in this study was to ensure the accuracy of my techniques and to correct for any mistakes that might have been made. Secondly, knowing that my data would be accurate, I wanted to gather, compare, and contrast meiofauna community ratios and abundances from two ecologically distinct locations. My final goal was to take these community data, and fit them into the framework of the surrounding environment, focusing specifically on sediment characteristics. Because meiofauna live on and among the sediment, the many ways sediment can differ plays a large role in their community structure and abundance.
I. Sampling Methods and Method Verification

Introduction:

Meiofauna are extremely small, almost invisible to the naked eye. This can easily complicate the methods of collection and analysis because the propensity to miss an organism is high. As the probability of error increases, so too must the dedication to accuracy. When working with organisms that make their home between individual granules of sediment, great methodological care must be taken to ensure the validity of all results. In the following section, a detailed description of the sampling and analytical methods used will be presented. The methods used to ensure and estimate the validity of the results will also be given.

Methods

Collection Site and Conditions:

Samples were taken in the area surrounding the FSU Coastal and Marine Lab in Lanark FL. The marine lab is situated directly on the coast, with the Gulf of Mexico to its south, and a small inlet that feeds into a saltmarsh immediately to the west. This small inlet was a large factor in the selection of this site. The salt marsh it connects to offers a geographically close, but ecologically different sediment habitat than the seagrass beds to the south. Two stations at the lab were used for sampling, one in a seagrass bed just offshore on the Gulf side, and one along the small creek that runs through the adjacent salt marsh. Samples were collected on two separate occasions, both of which were calm days near the end of low tide. The salinity was measured at each station both times samples were collected.
Collection Methods:

Ten samples were taken from both sites on two separate occasions for a total of 20 samples in each habitat. Samples were collected every three meters along a 30 meter transect and were gathered using a coring technique. Each sample consisted of two separate cores, taken directly adjacent to each other. One core for the analysis of meiofauna, and one to assess sediment characteristics. Cores were collected using a thin walled PVC drain pipe and a stop cork. The pipe had an inner diameter of 3.81cm and a ring attached at the 7 cm mark to prevent oversampling. When sampling, the pipe was gently twisted into the sediment to the 7cm line, the stop cork was then placed in the top of the tube and fastened, creating a tight seal. The tube was then quickly removed from the sediment, and the core was examined for accurate dimensions. Samples intended for meiofaunal analysis were immediately fixed in buffered, 4% formaldehyde for 24-48 hours and then transferred to 75% ethanol for long term storage. Cores that were used to determine sediment characteristics were frozen for later use.
Meiofauna Extraction:

In order to separate the meiofauna from the majority of sediment, a decantation method was used. Following the methods of Somerfield and Warwick (2013), the sediment samples were placed in wide mouth beaker with a tight fitting lid. The beaker was filled with water so that the water to sediment ratio was rough 10:1. The beaker was sealed, then inverted five to six times. The lid was removed and the contents were allowed to briefly settle, only long enough for heavy particles to fall out of the water column. The supernatant was then carefully poured off through a 64 µm sieve. This process was repeated ten times for each sample. The contents of the sieve were then carefully washed into a container, preserved with 75% ethanol, and stained with rose bengal for at least 24 hours. In order to assess the accuracy of this decantation method, the leftover sediment of 1 out of every 10 samples was saved, stained, and analyzed so that the efficiency could be calculated.

Subsampling:

Despite the effectiveness of the decantation technique at removing large particles from a sample, a great deal of silt remained present, especially in samples from the saltmarsh. This, in conjunction with higher meiofauna abundances than initially expected, led to the implementation of a sub sampling technique. Again, following the general methods of Somerfield and Warwick (2013), samples were placed on a 30µm sieve, and any excess dye and preservative was washed off with fresh water. The silt mixture was then carefully washed into a 200 mL beaker. The beaker was filled to the 200 mL line and then mixed vigorously with a spatula to homogenize the sample. Samples were mixed in a random motion in order to prevent swirling of the liquid that might cause a concentration of meiofauna in the center. After the sample was sufficiently mixed,
a medical syringe was used to withdraw 10 mL from the beaker for analysis. The accuracy of the syringe was checked using a volumetric cylinder before each use. To evaluate the precision of this method, the remaining silt mixture was periodically saved and analyzed in its entirety.

Results:

Meiofauna Extraction:

The efficiency of the decantation method proved to be far higher than initially anticipated. While there was variation in the efficiency of extraction between the samples collected in the saltmarsh and those collected in the seagrass, the difference was very small, and had little effect on the final counts. Using decantation, an average of 98.6% ± 0.276 of all meiofauna was successfully removed from the salt marsh samples and that which remained consisted almost entirely of nematodes. The seagrass was even more efficient than the saltmarsh, removing a total of 99.98%±0.002 of the overall meiofauna community.

Subsampling:

A Chi Square test was used to assess whether or not the predictions about the composition of the community from the subsample were significantly different from those observed in the total sample. Individuals were sorted into taxonomic groupings such as Nematoda, Copepoda, Ostracoda, and Polychaeta. The subsample community estimates were found to be significantly different from those actually observed ($\chi^2=18.56$, df=7, P=0.05). This meant that my subsamples were not statistically representative of the whole sample. After closer examination of the data, it became clear that these results were being distorted by taxa that were inconsistently sampled, and played little role in overall abundance. For example, there were five ostracods found in one subsample. This lead to an estimated 100 ostracods in the total sample.
Upon sorting and counting the whole sample, the observed number of ostracods was 140. This difference in counts skewed the results of the chi square test. After this realization, the tests were restructured, limiting the taxa to copepods and nematodes. These two taxa were chosen because they were the dominant groups in all samples, and their large abundances allowed for more accurate sampling. The restructured test showed that across all four samples, when limited to nematodes and copepods, the abundance estimates predicted by the subsamples were not significantly different from the abundances of the whole ($\chi^2=2.16$, df=1, P=0.05).

Discussion:

The effectiveness of the decantation method was leagues higher than anticipated. While it may be more labor intensive than other density based methods such as using a colloidal silica solution like LUDOX, it is far more accessible, requiring little more than a beaker and a sieve. It is efficient enough for all but the most specific community analysis and certainly efficient enough for the purpose of this study. The true weakness of this method is more easily seen once the separated samples are sorted. This method transfers a great deal of silt with the organisms, and once analysis is begun, this silt makes counting and identifying individuals much more time consuming. While that does not change the effectiveness of the method, the long processing time reduces the practical sample size significantly.

It was this silt, in conjunction with the vast number of organisms in each sediment core that led to the use of a subsampling method. It was only because of this subsampling method that it was possible to analyze 40 samples in the time frame of this project. While it was regrettable that the accuracy of this method broke down past the major taxa, it has provided useful data concerning the overall meiofauna abundance in the habitats studied. This method provided useful data on the communities of nematodes and harpacticoid copepods which have been shown
to be the largest taxa of meiofauna globally (Heip, 1985). In the end, the use of subsamples was a necessity, as counting the samples in their entirety was not realistic. While limiting my analysis to copepods and nematodes was necessary for this study, I did not want to disregard the importance of the other forms of meiofauna. There was a large diversity of organisms seen in these samples and many of them have been shown to affect their surrounding habitats. Ostracods have been shown to be extremely effective bioindicators for anthropogenic pollution (Ruiz, 2004) and despite their small numbers, meiofaunal polychaetes are an important part of solute transport (Aller, 1992:1998). These individuals were of great interest to me, but their community analysis would have required the processing of entire samples, and there was not sufficient time. The four samples that were fully counted for methodological verification each took 6 to 8 hours apiece. Had this system been applied to the entire study, the final sample size would be no more than 8 or 9. Because subsampling was used, however, a sample size of 40 was obtained, and the resulting abundance, nematode, and copepod data was much more robust for it.

Finally, the results of both the meiofauna extraction and subsampling techniques illustrate the importance of verifying the methods of a project. I now know that if I had failed to check the accuracy of the meiofauna extraction, it would have had little effect on the validity of my results. If I had not checked my sampling methods, however, I would have assumed that the community estimates were accurate down through all taxa. I would have no doubt drawn incorrect conclusions based on bad data. The methods used to test a hypothesis are the core of experimentation and observation. Because of this, it is only through the accuracy of our methods that any meaningful conclusions can be drawn from experimentation. Unfortunately, it is sometimes the case that a certain set of methods is used in a single piece of work, and is then cited and recited at face value. Bolstered by citations and literature, this set of methods can
occasionally reach an air of near infallibility without anyone taking the time to think critically about whether or not it even make sense. When these methods are effective and accurate, little to no harm is done, however, when they are inaccurate it can lead to droves of studies with fatal inaccuracies. Once such an error takes root, it becomes extremely difficult to correct, and scientists that attempt to point out these inaccuracies are often admonished. It is for reasons like this that such lengths were taken to ensure the accuracy of the data collected in this study.
II. Meiofauna Communities and Sediment

Introduction:

Many studies have assessed and shown the important role grain size plays in the total abundance and ratios of the higher taxa of meiofauna (Boeckner, 2009). The composition of the sediment can affect these communities in many ways. Interstitial space, oxygen content, and food availability can all vary based on grain size. For example, as grain size increases, so too does interstitial space. As the interstices become larger, there is more freedom of mobility for organisms with appendages and chaetae, as well as higher oxygen contents. Larger grain size allows for deeper penetration of oxygen rich water, but comes at the cost of organic content. As the oxygen rich water penetrates deeper into the large grains, it is able to carry off more organic particulate than in finer grained sediment. As meiofauna rely on both oxygen and organic content for survival, and these two abiotic factors vary in opposite directions as a function of grain size, it should not be a surprise that sediment size plays a large role in their ecology. In this chapter, I focus on the meiofauna community data gathered from the saltmarsh and seagrass beds and attempt to fit it into the framework of accompanying sediment data.

Methods:

Meiofauna Analysis:

The meiofauna communities were analyzed using a stereoscopic microscope. The subsample from the syringe was released onto a sieve plate with a base of 64 µm mesh. This allowed for the majority of liquid to drain off, and helped to keep the contents of the subsample stationary while under observation. The sieve plate was marked with grid lines creating 1 cm²
sections. This made sorting quick and precise as each box was counted and recorded before moving to the next one. A pair of jeweler's forceps was used when collecting or reorienting individuals, and a fine tipped needle was used as probe in the event a clump of silt formed. All individual organisms were counted and categorized based on a morpho-species strategy and type organisms were photographed, and preserved when possible.

Sediment Analysis:

Sediment was analyzed following the methods of Folk, in his book *Petrology of the sedimentary rocks* (Folk, 1968). As mentioned in the previous chapter, samples intended for granulometric analysis were frozen for long term storage. These samples were removed from the freezer and allowed to thaw for 12 hours before being placed in a 64 µm screen and rinsed thoroughly with fresh water. Each sediment core was then placed in a drying oven set at 40 C for 48 hours and allowed to dry completely. Once dry, samples were removed from the oven and allowed to acclimate to room temperature. A ceramic pestle and mortar was used to gently break up any sediment aggregates. Special care was taken to avoid crushing any of the sediment components. Samples were then mixed and weighed out into approximately ~30g samples. These were then fractionated using a stack of sieves. The sieve stack was made up of 6 sieves with different mesh sizes stacked in descending order with the largest sieve at the top and the smallest at the bottom. The mesh sizes were as follows, 1000 µm, 500 µm, 250 µm, 125 µm, 64 µm, and the pan. Once the sample was placed in the sieve stack, the stack was covered, and shaken by hand for 10 minutes in a rotary motion with a bump. After 10 minutes, the sieves were separated, and their contents carefully removed and weighed. These data were recorded and the samples were returned to their containers.
Data Analysis:

Meiofauna:

The community data gathered from the meiofauna samples did not fit a normal distribution. This lead to the use of the Wilcoxon-Mann-Whitney test whenever the significance of continuous data was calculated. This includes the nematode and harpacticoid copepod abundance data, and the mean abundance data of both habitats. As with my subsampling data, when direct categorical comparisons were made, such as the comparison of copepod proportions between sites, a Chi Square was used. In all cases, the significance level was set at P=0.05.

Granulometry:

The granulometric data was analyzed using the program GRADISTAT; a program specially designed for processing sediment data. It runs through Microsoft excel, and outputs data in the form pioneered by Folk as well as several other data types (Folk, 1968: Blott, 2001). A full description of its function as well as detailed instructions for use can be found online in its original publication article (Blott, 2001). The time saving value of this program cannot be overstated and I am extremely grateful to its authors.

These data are presented in the form of the graphic mean, which is considered the most accurate and inclusive form of granulometric data and was presented by Folk (1968). Similar to the community data, the means from this analysis did not fit a normal distribution, and therefore were also tested for significance using the Wilcoxon-Mann-Whitney test. All statistical work in this study was completed using the program Microsoft Excel 2013.
Results:

Community analysis:

After processing 40 subsamples, 5163 individuals were hand counted, extrapolating from the 5% subsample, the final count was 103,260 individuals. Of these individuals, ~76,600, or ~78.18%, originated in the seagrass, while the remaining ~26,660, ~25.82%, were found in the saltmarsh. The results and comparisons of the nematode/copepod data had two main findings: that total abundance was significantly different between both sites, and upon analysis with a Chi Square, that the nematode/copepod ratio was not significantly different ($\chi^2=0.349$, df=1, $P=0.05$). On average, the total abundance of meiofauna in the seagrass was nearly triple that of the saltmarsh. In regards to the ratio of harpacticoid copepods to nematodes, it was not significantly different between the saltmarsh and seagrass beds. These data are summarized in the graphs below.

Graph 1: Total abundance separated by habitat. All values are averages of the 20 samples taken from each site. $P<0.05$. Error bars represent standard error.
Graph 2: Average nematode abundance separated by habitat. P<0.05. Error bars represent standard error.

Graph 3: Average copepod abundance, separated by habitat. P<0.05. Error bars represent standard error.

Granulometric analysis:

After using GRADISTAT to calculate the graphic mean for all sediment samples, it was found that mean grain size was relatively homogeneous among samples within the same habitat, but that it was significantly different between habitats. Mean grain sizes were classified based on Folk (1968). The data is summarized in table 2 below.

Table 2: Both values are averages of the 20 graphic means produced by GRADISTAT for each site. For all values in this table p<0.05.

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Grain Size</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seagrass</td>
<td>286.66μm</td>
<td>Medium Sand</td>
</tr>
<tr>
<td>Saltmarsh</td>
<td>182.69μm</td>
<td>Fine Sand</td>
</tr>
</tbody>
</table>
Discussion:

Notes on Granulometric analysis:

Here I would like to outline the reasoning for some of my methods as well as address an oversight in my data collection. First, my method for partitioning the sediment can only give qualitative results. Without the use of a Ro-Tap machine to vigorously shake the sieve stack, the final fractions of sediment were not perfectly separated. My method of shaking and tapping, while effective, could not yield the same level of precision as a Ro-tap. The time increment of 10 minutes of shaking and tapping was selected, because after that time, each individual sieve could be removed from the stack, shaken and tapped over a large piece of white paper, without losing any noticeable granules. Again, while this cannot compete with the standard of 15 minutes of vigorous shaking in a machine, it still yielded results that were able to illustrate the difference in grain sizes between the two habitats. An oversight of my analyses was failing to collect the silt/clay fraction that passed through the 64 µm sieve during sample preparation. As this silt/clay partition has been shown to have a large effect on both nematode and harpacticoid copepod communities (Heip, 1985; Coull, 1970) my failure to quantify it was a massive blunder. That being said, the sand fractions were still shown to be significantly different, and empirical data would lead me to believe that the silt levels in the saltmarsh were much higher than in the seagrass.

Community analysis

Finding a higher abundance of meiofauna in the seagrass environment was unexpected. Heip et al.(1985) showed that both nematodes and harpacticoid copepods reach their peak abundances in muddy or fine sediments. These results are odd, because the average grain size in
the saltmarsh was significantly smaller than in the seagrass and yet abundance was still lower. The trend of smaller grain size = higher abundance is almost universally true in nematodes (Heip, 1985) and true to a certain extent in harpacticoid copepods (Wigley, 1964; Challis, 1969). It appears that there is a threshold of grain size for harpacticoid copepod communities. Communities increase as grain size decreases towards that threshold (Veit-Kohler, 2005). However, once that threshold is crossed, they drop sharply as the fraction of mud/silt increases. This occurs as the fine mud and silt particles fill the interstitial spaces between larger granules, making motility very difficult (Wigley, 1964; Challis, 1969). This information is useful to this study, as it helps to make sense of the larger harpacticoid copepod communities in the seagrass. It is possible that the smaller grain size is enough of a detriment to keep community levels lower in the saltmarsh. This does not help explain the higher abundance of nematodes in the seagrass. All references I could locate that discussed nematode populations and sediment characteristics claimed that abundance should increase as grain size shrinks. This leads me to believe that there are other significant factors affecting the nematode communities and that further studies are needed in order to make sense of this differences.

The second finding of the community analysis was that there was no significant difference in the copepod/nematode ratio between the two habitats. I found this to be very odd. These two habitats are abiotically very different from the standpoint of meiofauna. The saltmarsh has a finer grain size, higher organic content and a huge variations in both salinity and temperature throughout the day. That two groups of organisms with such different morphologies and mobility strategies maintained the same community ratio in environments that differ abiotically was completely unexpected.
In this section, I would like to discuss some of the other taxa found during my sample analysis. I must preface this with the fact that these data were not found to be statistically significant due to the rarity of most of these organisms. Despite this, these data may still offer an interesting perspective on the two habitats examined. The general theme of higher abundances in the seagrass appeared to remain consistent with most other taxonomic groups. This includes ostracods, platyhelminthes and especially polychaetes, which seemed to appear much more often in the seagrass. While again, I cannot make a significant statement with such observations, they do seem to make ecological sense, particularly concerning the polychaetes. The many chaetae that give polychaetes their name may cause the same problems faced by copepods. The silt levels of the saltmarsh may be high enough to cause mobility issues for organisms like copepods and polychaetes that rely on appendages for movement.

This higher abundance was true for almost all taxa, with the exception of foraminifera. I found foraminifera representatives in 18 of the 20 salt marsh cores, while only 7 of the 20 seagrass beds contained foraminifera. Despite searching the literature, I was unable to find any previous work that might help explain this difference. It is also important to note that only 1 or 2 foraminifera were usually found in a samples, if present at all.

Finally, an observation that was of great interest to me involved one particular sample in the seagrass. While sorting through the first set of seagrass samples, most of the cores had relatively similar communities of organisms. Because of this, it struck me as odd when I found a small collection of annelid worms in one core that were unlike the annelids I had found anywhere else. This on its own piqued my curiosity, however, what I really found interesting was that when I collected the second set of sediment cores from the seagrass, I found identical
annelid worms at the same place along the transect. While I was unable to identify the organism, this small pocket of annelid endemism remains of interest to me.

**Future Directions:**

1. At the outset of this study, one of my main goals was to compare the total organic content in the sediment of these environments. This would have been helpful in addressing questions such as food availability as well as shedding light on how much of the interstitial space might be filled with organic matter, thus reducing the ease of movement. Unfortunately, I was unable to use the equipment required due to its full time use in another project. This is a direction I would have liked to pursue had there been more time. I feel that it may have helped explain the difference in nematode abundances.

2. Harpacticoid copepods are one of the only, if not the only, taxa of meiofauna that can leave the benthos of their own accord (Allderedge, 1985; Bell 1988). Once in the water column, these copepods cannot swim very far, however, it has been shown that currents, even small ones, can carry these suspended animals great distances (Gerlach, 1977; Boekner, 2009). Taking this information into account, and having now assessed the basic distributions in the seagrass and saltmarsh, a future direction I would like to pursue would be the study of connectivity between the two habitats. This could be done by selecting sites within the saltmarsh creek, and directly out from the outflow. Sampling would be taken at high and low tides. Harpacticoid copepods would be the ideal individuals for this study due to their mobility and the speed at which they establish themselves (Thistle, 1980; Chandler 1983). While Fleeger et al.(1984) completed a
similar study, they focused solely on the variations tides had on the salt marsh
abundances, and paid no attention to the sub tidal areas into which the marsh flowed.
Their study found that at least half of the copepod species present in the marsh fluctuated
with the tides and while they did not feel that tidal currents could carry meiofauna
extremely far, I believe that in areas near the outflow of the marsh, there might be some
exchange.

**Conclusion:**

Meiofauna play many essential roles in our ecosystems, whether we see them or not. In
most aquatic environments, they make up the numerically largest group of metazoans. These
high abundances allow them to have large effects on the benthic environment in which they live.
Meiofauna contribute to the ecosystem in at least 3 major ways: 1. as detritivores, they break
down excess organic matter and assist in nutrient regeneration. 2. Their vast numbers make them
an essential part of the benthic food web, providing a consistent food source for the trophic
levels above. 3. meiofauna are extremely sensitive to anthropogenic inputs, which allow them to
function as bio indicators (Coull, 1999). In these three capacities, meiofauna offer huge
ecosystem services and their true value is difficult to estimate. Studies like this one allow us to
better understand how meiofauna communities change across habitats and the current condition
of their populations. This knowledge is valuable as we can only begin to estimate the effects
meiofauna communities have on the ecosystem, if we know what the communities look like, and
what factors cause them to change. I have counted and cataloged the nematode and copepod
communities from two sites that are ecologically very different. These data have shown me that
abiotics do not always cause communities to change in the way we expect. The fact that
nematode abundance increased with grain size, and that the ratio of nematodes to copepods did not differ between habitats was a surprise. It illustrates that while much is known about meiofauna and how it is affected by certain abiotic factors, those relationships may not be universally true and that individual effects are difficult to disentangle. Abiotic factors shift in importance and roles in relation to each other, and what was the most important factor in one habitat, may be negligible in another. When studying meiofauna, individualized conceptual frameworks must be applied based on the unique characteristics of the habitat in order to make sense of the communities that live there.
References:


Gerlach A. 1971. On the Importance of Marine Meiofauna for Benthos Communities. Oecologia. 6(2):176-190


