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DISTRIBUTION OF MYSIDIUM INTEGRUM (TATTERSALL) (CRUSTACEA-MYSIDACEA) IN VENEZUELAN CORAL HABITATS

by

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ABSTRACT


This paper reports the occurrence, distribution and some ecological aspects of mysids in six coral habitats along the northern coast of Venezuela. Collections of mysid fauna were made during various months in the years 1980-1983, with simultaneous measurement of environmental conditions. Only Mysidium integrum (Tattersall 1951) has been found to be present in the protected zones of various coral species, and between the spines of the sea urchin Diadema antillarum (Philippi). Depth of water and type of association appear to be critical factors affecting the distribution of this species of mysid.

Key words: Mysidium integrum, microhabitat, coral, sea urchin, Venezuela.

INTRODUCTION

Mysids are crustaceans which pass the first stages of their life cycles, from egg to pre-juvenile, in maternal brood pouches or marsupia. They are important links in the food chains of marine ecosystems, specially as food for juvenile fish and for other crustaceans (Mauchline 1980). The occurrence of mysids is well known in coral habitats (Emery 1968; Bacescu 1975; Aldredge & King 1977; Mauchline 1980) even though there are few studies

FIGURE 1. Geographical distribution of *Mysidium integrum* in the Caribbean region.

**Mysidium integrum**: Telson (A) juvenile; (B) adult; (C) 4th pleopod (♀).
Figure 3. Swarm of *Mysidium integrum* in the proximity of various coral species (A) and between the spines of *Diadema antillarum* (B).
Table 1
Abundance (Mysids/25 liters water sampled), percentages of gravid females and adult sex ratios of *Mysidium integrum* in coral and sea urchin substrate for each locality

<table>
<thead>
<tr>
<th>Locality</th>
<th>Depth (m)</th>
<th>Ind/25 l</th>
<th>In coral substrate</th>
<th>In sea-urchin substrate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morrocoy</td>
<td>2-3</td>
<td>238</td>
<td>78</td>
<td>129</td>
</tr>
<tr>
<td>Isla Larga</td>
<td>1-2</td>
<td>434</td>
<td>108</td>
<td>263</td>
</tr>
<tr>
<td>Los Roques</td>
<td>3-5</td>
<td>528</td>
<td>198</td>
<td>217</td>
</tr>
<tr>
<td>Chichiriviche</td>
<td>2-4</td>
<td>270</td>
<td>94</td>
<td>108</td>
</tr>
<tr>
<td>Los Totumos</td>
<td>2-3</td>
<td>384</td>
<td>113</td>
<td>185</td>
</tr>
<tr>
<td>Bahía Mochima</td>
<td>2-4</td>
<td>211</td>
<td>74</td>
<td>109</td>
</tr>
</tbody>
</table>
of the ecology of mysids in such habitats. This genus had been studied in the Virgin Islands and the Gulf of Mexico (Tattersall & Tattersall 1951), in the Florida Keys (Emery 1968), and in Antigua, Bermuda, the Bahamas, Panama, and Colombia (Brattegard 1969; 1970 a,b; 1973; 1974 a,b; 1975). *Mysidium integrum* is a wide ranging species in the Caribbean region, usually associated with other organisms. The present work was undertaken to compare distribution and ecological aspects of *M. integrum* along the northern coast of Venezuela in two different habitats: coral and sea urchin.

**MATERIAL AND METHODS**

*Mysidium* sampling occurred over a three year period from December 1980 to September 1983 in six coral formations: Bahia Mochima, Los Totumos, Parque Morrocoy, Isla Larga, Chichiriviche de la Costa and Archipiélago Los Roques. A total of 60 samples of mysid aggregation from all localities were collected in coral microhabitats (*Diploria clivosa, Plexaura flexuosa, Montastrea cavernosa*) and in sea urchins (*Diadema antillarum*). By free diving and with a plankton mesh net (369 μm), 5 samples from the aggregations of mysids were taken in each locality. Depth, temperature and salinity were measured for each collection. In the laboratory, mysids were identified, counted and separated by sex and size, and measured from the anterior margin of the carapace to the final segment of the abdomen (Clutter & Theilacker 1971).

**RESULTS AND DISCUSSION**

The three species of *Mysidium* (*M. integrum, M. gracile* and *M. columbicae*) have been found not only in coral habitats but also in mangrove swamps, *Thalassia* flats, muddy sand, etc. (Brattegard 1975). *M. integrum* is the only species found in the coralline zones of the Venezuelan coast (a new record for the country). The finding of this species in Venezuela thus broadens its reported range in the Caribbean region (Fig. 1). Mysids from each locality fit the description of Brattegard (1969) in the 4th adult male pleopod (4-segments) and the number and form of the spines in the telson (x = 52 for adult and x = 24 for juveniles) (Fig. 2). This species of mysid is highly aggregated in swarms. It was also noted that *M. integrum* occurs at depths of less than 5 m, with average temperatures of 27°C and salinity of 36.5‰ (Table 1), although Emery (1968) has reported finding it at greater depths in the Florida Keys. It seems likely that this species is typical of warm shallow waters of the Caribbean coast. In the present investigation, *M. in-
**Table 2**

*Mysidium integrum*. Average size for each locality in both microhabitats. A = corals (*Diploria clivosa, Plexaura flexuosa, Montastrea cavernosa*); B = sea urchins (*Diadema antillarum*). N = number of mysids in 25 l of water filtered.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Microhabitat A</th>
<th>Microhabitat B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>Juveniles</td>
</tr>
<tr>
<td></td>
<td>N x ±s.d</td>
<td>N x ±s.d</td>
</tr>
<tr>
<td>Morrocoy</td>
<td>207 4.6 0.28</td>
<td>31 2.1 0.08</td>
</tr>
<tr>
<td>Isla Larga</td>
<td>371 4.7 0.17</td>
<td>63 1.9 0.07</td>
</tr>
<tr>
<td>Los Roques</td>
<td>415 4.6 0.11</td>
<td>113 2.0 0.06</td>
</tr>
<tr>
<td>Chichiriviche</td>
<td>202 5.2 0.33</td>
<td>68 2.2 0.08</td>
</tr>
<tr>
<td>Los Totumos</td>
<td>298 5.8 0.10</td>
<td>86 2.3 0.05</td>
</tr>
<tr>
<td>Mochima</td>
<td>183 5.1 0.20</td>
<td>28 2.2 0.08</td>
</tr>
</tbody>
</table>

**Table 3**

*Mysidium integrum*. Abundance, percentages of gravid females and sex ratios for each locality in both microhabitats (A = corals and B = sea urchins). N = number of mysids in 25 l of water filtered.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Microhabitat A</th>
<th>Microhabitat B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N ♂ ♀ Juv %♀♂</td>
<td>N ♂ ♀ Juv %♀♂</td>
</tr>
<tr>
<td>Morrocoy</td>
<td>238 78 129 31 30 0.6</td>
<td>105 78 15 79 25 0.5</td>
</tr>
<tr>
<td>Isla Larga</td>
<td>434 108 263 63 15 0.4</td>
<td>136 21 34 81 51 0.6</td>
</tr>
<tr>
<td>Los Roques</td>
<td>528 198 217 113 18 0.9</td>
<td>203 47 59 97 68 0.8</td>
</tr>
<tr>
<td>Chichiriviche</td>
<td>270 94 108 68 22 0.8</td>
<td>92 15 27 50 32 0.5</td>
</tr>
<tr>
<td>Los Totumos</td>
<td>384 113 185 86 18 0.6</td>
<td>77 18 26 33 15 0.7</td>
</tr>
<tr>
<td>Mochima</td>
<td>211 74 109 28 41 0.6</td>
<td>89 16 32 41 18 0.5</td>
</tr>
</tbody>
</table>
tegrum was observed in localities where it was found with Diploria clivosa, Plexaura flexuosa, and Montastrea cavernosa corals as well as between the spines of the sea urchin Diadema antillarum (Fig. 3). We found significant differences (Student’s T test) \((\alpha=0.01)\) in abundance, average size and sex ratios when contrasting M. integrum in coral and sea urchin microhabitats.

In the coral microhabitat, M. integrum was numerically greater and old mysids were bigger in size than the mysids found in sea urchin microhabitats, which were fewer and smaller (Table 2). The largest adult forms of mysids were found in the Los Totumos locality \((x = 5.8 \text{ mm})\). The juvenile forms of M. integrum did not vary greatly in size between collection site and microhabitat, their average size being 2.0 mm. In the Los Roques locality the sex ratio of M. integrum was greater: 0.91 in coral microhabitat, and 0.79 in sea urchin microhabitat. The lowest sex ratio were in two other localities: in coral microhabitats 0.41 in Isla Larga, and 0.50 for sea urchin microhabitats in Bahía Mochima (Table 3). The sex ratio values found in each microhabitat and in all localities never reached the 1:1 relation, which indicates a general predominance of M. integrum females. Mauchline (1980) stated that sex ratios within populations of mysids are variable and females frequently outnumber males. In addition, we have observed that M. integrum reproduces throughout the year, either regulary or with reproductive peaks, since there was always an appreciable percentage of gravid females found in each sample taken in any of the periods sampling was done (Table 3). Even though it was not proven experimentally, it is important to note that juveniles of M. integrum were observed toward the centre of the aggregations of mysids. This may suggest a degree of parental care as Clutter (1969) and Hahn & Itzkowitz (1986) reported for other species of this genus.

We think this species of mysid derives a benefit from the coral and sea urchin association, be this alimentary and/or protective, which certain authors have called commensalism (Emery 1968; Randall et al.1974). Another important aspect was reported by Laughlin (1984) who found some mortality of Diadema antillarum in our coast; however the mysids still occur in the protected and shaded zones of the coral formations, even when these sea urchins are absent. In our opinion this supports our idea of benefit obtained from these habitats.

According to what has been observed in this study, the main factors controlling the distribution of this species of mysids appeared to be a prefer-
ence for type of microhabitat (coral or sea urchin), and the environmental conditions found in these tropical habitats (depth, temperature, and salinity). These considerations and eventual additional studies on mysid life history in different environments, can account for the observed trends in the ecology of *M. integrum* on our coasts.

ACKNOWLEDGEMENTS

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REFERENCES


