STUDIES ON THE NATURAL HISTORY OF THE CARIBBEAN REGION: Vol. 73, 1997

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

by

EVELYN ZOPPI DE ROA & PEDRO ALONSO G.*

ABSTRACT

ZOPPI DE ROA, EVELYN & PEDRO ALONSO G.: Distribution of *Mysidium integrum* (Tattersall) (Crustacea: Mysidacea) in Venezuelan coral habitats. *Studies Nat. Hist. Caribbean Region 73*, Amsterdam 1997: 55-62.

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

* Universal Central de Venezuela, Facultad de Ciencias, Instituto de Zoología Tropical, Apto. 47058 – Caracas 1041-A, Venezuela.

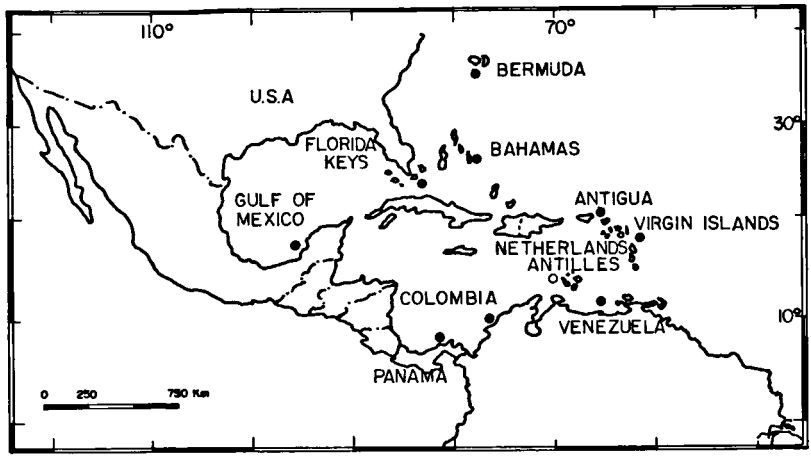

FIGURE 1. Geographical distribution of *Mysidium integrum* in the Caribbean region.

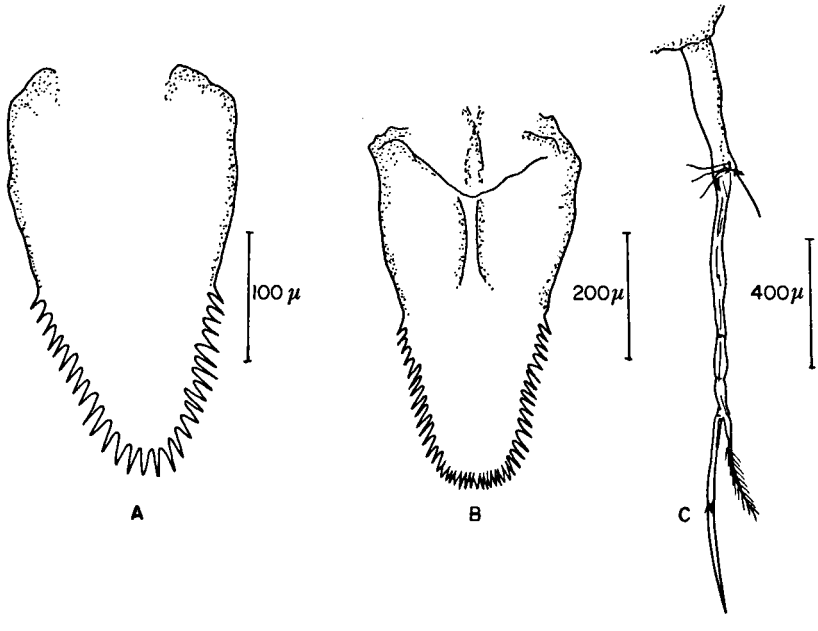

FIGURE 2. *Mysidium integrum*: Telson (A) juvenile; (B) adult; (C) 4th pleopod (♀).

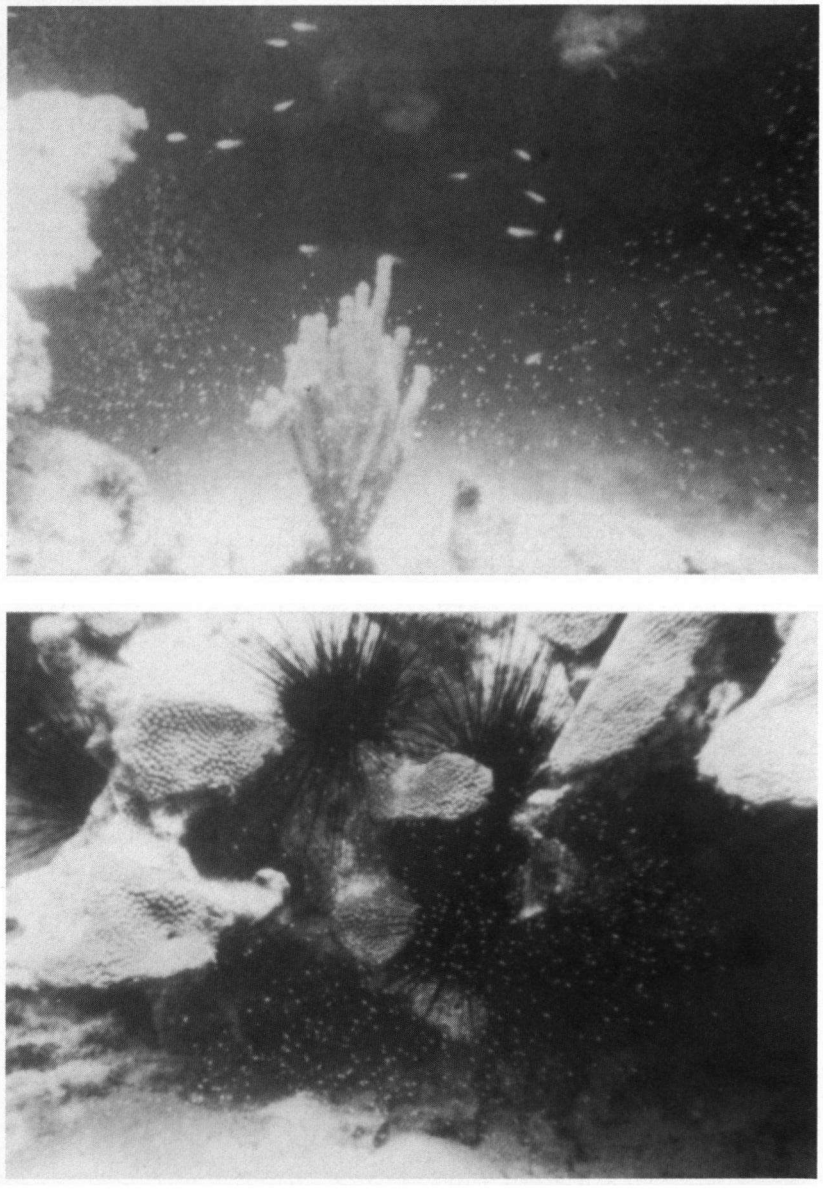

FIGURE 3. Swarm of *Mysidium integrum* in the proximity of various coral species (A) and between the spines of *Diadema antillarum* (B).

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

Locality	Depth (m)	In coral substrate						In sea-urchin substrate					
		Ind/25 l	♂	♀	Juv	%♀g	♂/♀	Ind/25 l	♂	♀	Juv	%♀g	♂/♀
Morrocoy	2-3	238	78	129	31	30	0.60	105	78	15	79	25	0.52
Isla Larga	1-2	434	108	263	63	15	0.41	136	21	34	81	51	0.61
Los Roques	3-5	528	198	217	113	18	0.91	203	47	59	97	68	0.79
Chichiriviche	2-4	270	94	108	68	22	0.87	92	15	27	50	32	0.55
Los Totumos	2-3	384	113	185	86	18	0.61	77	18	26	33	15	0.69
Bahía Mochima	2-4	211	74	109	28	41	0.67	89	16	32	41	18	0.50

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: Bahía Mochima, Los Totumos, Parque Morrocoy, Isla Larga, Chichiriviche de la Costa and Archipiélago Los Roques. A total of 60 samples of mysids 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. columbiae*) 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 ($\bar{x}$= 52 for adult and $\bar{x}$ = 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 greather 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

Locality	Microhabitat A						Microhabitat B					
	Adults			Juveniles			Adults			Juveniles		
	N	$\bar{x}$	±s.d	N	$\bar{x}$	±s.d	N	$\bar{x}$	±s.d	N	$\bar{x}$	±s.d
Morrocoy	207	4.6	0.23	31	2.1	0.08	93	3.8	0.09	79	2.0	0.04
Isla Larga	371	4.7	0.17	63	1.9	0.07	55	3.5	0.11	81	1.9	0.08
Los Roques	415	4.6	0.11	113	2.0	0.06	106	3.4	0.08	97	1.9	0.09
Chichiriviche	202	5.2	033	68	2.2	0.08	42	3.9	0.05	50	2.1	0.08
Los Totumos	298	5.8	0.10	86	2.3	0.05	44	4.1	0.08	33	2.2	0.06
Mochima	183	5.1	0.20	28	2.2	0.08	48	3.6	0.10	41	2.0	0.05

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

Locality	Microhabitat A						Microhabitat B					
	N	♂	♀	Juv	%♀g	♂/♀	N	♂	♀	Juv	%♀g	♂/♀
Morrocoy	238	78	129	31	30	0.6	105	78	15	79	25	0.5
Isla Larga	434	108	263	63	15	0.4	136	21	34	81	51	0.6
Los Roques	528	198	217	113	18	0.9	203	47	59	97	68	0.8
Chichiriviche	270	94	108	68	22	0.8	92	15	27	50	32	0.5
Los Totumos	384	113	185	86	18	0.6	77	18	26	33	15	0.7
Mochima	211	74	109	28	41	0.6	89	16	32	41	18	0.5

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) (α=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 ($\bar{x}$ = 5.8 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 Bahia 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 myside. 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

We would like to thank Lic. GONZALO PÉREZ and IAN MACLURE for their advice during translation of the manuscript. Also to Lic. GLADYS BETANCOURT, Lic. MIGUEL BONNIN and Mr. WILLIAN VASQUEZ thanks are due for invaluable help in the collection of specimens.

REFERENCES

BRATTEGARD, T, 1969. Marine Biological Investigations in the Bahamas. 10. Mysidacea from shallow water in the Bahamas and Southern Florida. Part 1. *Sarsia 39*: 17-106.

BRATTEGARD, T., 1970a. Marine Biological Investigations in the Bahamas 11. Mysidacea from shallow water in the Bahamas and Southern Florida. Part 2. *Sarsia 41*: 1-35.

BRATTEGARD, T., 1970b. Mysidacea from shallow water in the Caribbean Sea. *Sarsia 43*: 111-154.

BRATTEGARD, T., 1973. Mysidacea from shallow water on the Caribbean coast of Colombia. *Sarsia 54*: 1-65.

BRATTEGARD, T., 1974a. Additional Mysidacea from shallow water on the Caribbean Coast of Colombia. *Sarsia 57*: 47-86.

BRATTEGARD, T., 1974b. Mysidacea from shallow water in the Caribbean Coast of Panama. *Sarsia 57*: 87-108.

BRATTEGARD, T., 1975. Shallow water Mysidacea from the Lesser Antilles and other Caribbean regions. *Stud. Fauna Curaçao 47*: 102-115.

CLUTTER, R., 1969. The microdistribution and social behavior of some pelagic mysid shrimps. *J. Exp. Mar. Ecol. 3*: 125-155.

CLUTTER, R. & G. THEILACKER, 1971. Ecological efficiency of a pelagic Mysid shrimp: Estimates from growth, energy budget and mortality studies. *U.S. Fish. Bull. 69*: 93-117.

EMERY, A.R., 1968. Preliminary observations on coral reef plankton. *Limnol. Ocean. 13 (2)*: 293-303.

HAHN, P. & N. ITZKOWITZ, 1986. Site preference and homing behavior in the Mysid shrimp *Mysidium gracile* (Dana). *Crustaceana 51*, part 2.

LAUGHLIN, R., 1984. Massive mortality of the Black Urchin, *Diadema antillarum* in the Archipiélago Los Roques. *XXXIV Conv. Anual Asovac.* (In press).

MAUCHLINE, J., 1980. The biology of mysids and euphasids. *Adv. in Mar. Biol. 18*: 1-369.

RANDALL, J., R. SCHROEDER & W. STARK, 1974. Notes on the biology of the echinoid *Diadema antillarum. Caribb. J. Sci. 4*: 421-433.

TATTERSALL, W.M. & O.S. TATTERSALL, 1951. The British Mysidacea. *Ray Soc. London 136*: 1-460.