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Regional diversity of Amphipoda in the Caribbean Sea

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Abstract: Diversidad regional de Amphipoda en el Mar Caribe. The order Amphipoda is one of the most diverse within Peracarids, and comprises 6 950 described marine species. Amphipod research in the Caribbean Sea began in the late 1 800s, but has increased significantly since 1 980. In this study, we analized the amphipod biodiversity (Caprellidea, Gammaridea, Hyperiidea, and Ingolfiellidea) of the Caribbean Sea. For this, we compiled available data on species diversity of marine amphipods (data bases: WoRMS and OBIS and published species lists) into a comprehensive taxonomic list by country for the ecoregions of the Caribbean. Additionally, we analized the relative contribution of each country to regional diversity and the rate of discovery of new species. The Caribbean amphipod fauna is composed of 535 species within 236 genera and 73 families for the higher taxon. The Western Caribbean ecoregion holds the largest diversity (282 species), while the Eastern Caribbean recorded the lowest one (73). Mexico and Venezuela recorded the largest number of species with 266 and 206, respectively. Twelve countries had less than 50 species. The richest suborder is the Gammaridea with 381 species followed by the suborder Hyperiidea with 116. From the total of 535 amphipod species reported for the Caribbean region, 218 have the Caribbean as the holotype locality, and 132 are endemic (about 25% of the total). Areas of higher diversity seem to be concentrated along the Mexican Caribbean, Cuba and the Northern coast of South America (Venezuela-Colombia); however, such pattern is most likely reflecting local collection efforts and taxonomic expertise rather than actual distribution. Knowledge of amphipod species is mostly limited to shallow, near-shore waters, with little information available on the deep sea fauna. Regional research priorities for this group should be focused on completing shallow water coastal inventories of species in Central America and the Greater and Lesser Antilles. In addition, sampling the deep sea ecosystems should follow along with other particular habitats such as anchialine cave systems. It is also neccessary to increase ecological research efforts, mainly in some speciose suborders, including the Caprellidea and Hyperiidea, known to exhibit high diversity in other tropical localities. Rev. Biol. Trop. 61 (4): 1681-1720. Epub 2013 December 01.

Key words: Amphipoda, diversity, Caribbean Sea, endemism.

The order Amphipoda is one of the most diverse and globally distributed within the superorder Peracarida after order Isopoda. Its members occur worldwide in terrestrial, freshwater, subterranean and marine environments and in virtually all habitats (Foster, LeCroy, Heard & Vargas, 2009; LeCroy, Gasca, Winfield, Ortiz & Escobar-Briones, 2009). They fulfill an important role in the trophic dynamics of many communities, as they breakdown plant material and detritus, and also function as grazers, filter feeders, suspension feeders, commensals, micropredators, scavengers, or as prey for other carnivore species

(Bellan-Santini, 1998; Bellan-Santini & Ruffo, 1998; LeCroy et al., 2009).

Traditionally, the Amphipoda were divided into four suborders: the Gammaridea Latreille, 1802; the Caprellidea Leach, 1814; the Hyperiidea Milne-Edwards, 1830; and the Ingolfiellidea Hansen, 1903 (Barnard, 1969; Bousfield, 1973, 2001; Lincoln, 1979; Martin & Davis, 2001). Despite, Myers & Lowry (2003) reestablished the suborder Corophiidea Leach, 1814, and placed the caprellideans *sensu lato* within it, we decided to use the traditional classification system because these categories will likely change with new phylogenetic studies.

Although there is a significant amount of scientific literature regarding Caribbean amphipod species in a variety of books, journals, and reports, many of these publications are restricted to one or a few species and many of them are old and therefore, not easily available. Comprehensive works on amphipods of the region are relatively rare.

The first records and descriptions of amphipods in the Caribbean Sea, began with the collections of gammarideans and corophiideans of the H.M.S. Challenger between 1873-76, when Stebbing described *Ampelisca abyssicola* from Culebra Island, St. Thomas (Lesser Antilles) (Stebbing, 1888). Further descriptions included *Shoemakerella cubensis* (as *Lysianax cubensis*) from Cuba (Stebbing, 1897), and *Talorchestia fritzi* (Stebbing, 1903), *Chelorchestia costaricana* (Stebbing, 1906) and *Pseudorchestoidea biolleyi* (Stebbing, 1908) (as *Orchestoidea biolleyi*) from Costa Rica. Other expeditions to the Caribbean, particularly to Puerto Rico and Cuba, provided new amphipod descriptions (Shoemaker, 1933a,b, 1934, 1935, 1948). Hyperiid amphipods are also poorly studied in the Caribbean, and the knowledge we have comes from some historical larger surveys (Shoemaker, 1945, 1948; Fage, 1960; Lewis & Fish, 1969; Shih, 1969; Moore & Sander, 1977, 1979; Gasca & Shih, 2001, 2003; Gasca & Suarez-Morales, 2004; Gasca, 2009a,b) and mainly from the upper layers (0-200m) of the water column. Globally, the ingolfiellideans have a very low biodiversity, with only 44 species. Jan Hendrik Stock explored extensively between 1973 and 1978 more than 25 islands in the Antilles in search of stygobionts, which resulted in a few new descriptions (Stock, 1976, 1977a,b, 1979). More recently, since the late 1960s, several authors have provided important publications on Caribbean amphipods, including descriptions of new species, re-descriptions or additional information, taxonomic lists and inventories, biogeographical and ecological data, and illustrated keys for specific taxa (see Table 1 for a comprehensive reference list by major topics).

In this paper, we analyzed the amphipod biodiversity (Caprellidea, Gammaridea, Hyperiidea, and Ingolfiellidea) of the Caribbean Sea. Our goal was to carry out a spatial analysis of the data that allowed us to determine gaps in knowledge and to test if differences/similarities in composition between ecoregions are due to ecological and biogeographic factors or to geographic inequality in sampling efforts. We hope that this paper will contribute to raise awareness about the value of taxonomic inventories and to indicate how much and where scientific sampling is needed, for a better understanding of the Caribbean amphipod biodiversity.

MATERIAL AND METHODS

Study area: The Caribbean Sea is a large sea, closed off to the West and to the South by the Americas, and bordered to the North and to the East by the islands chains of the Greater and Lesser Antilles (Spalding, 2004). It covers about 2 754 000km^2, has a volume of nearly 6.5x10^{6}km^3, borders over 13 500km of coastline, and is home to 12 island countries, nine continental countries, and 12 island dependencies (to France, The Netherlands, U.K., and U.S.). Towards the East and Northeast, the closely spaced chain of islands, banks, and sills of the Antilles Islands Arc separate the Caribbean from the Atlantic Ocean, and act as a sieve for the inflow of Atlantic water (Andrade & Barton, 2000), whereas towards the Northwest it is linked to the Gulf of Mexico by the Yucatan Channel (Miloslavich, Diaz, Klein,

TABLE 1
Main topics developed in amphipod research in the Caribbean and bibliographical sources

CUADRO 1
Principales tópicos de investigación sobre anfípodos en el Mar Caribe con sus fuentes bibliográficas

Topic	Taxonomic group (Suborder)	References
Species description	Caprellidea	Ortiz, Guerra-García & Lalana (1998); Guerra-García (2003a); Guerra-García et al. (2006).
	Gammaridea	Stebbing (1888, 1897, 1903, 1906, 1908); Chevreux (1901); Shoemaker (1926, 1933a,b, 1934, 1948); Stephensen (1933, 1947, 1948); Ruffo (1950, 1954); Barnard (1954, 1960, 1961, 1962, 1964, 1972, 1973); Mateus & Mateus (1966); Holsinger & Peck (1968); Myers (1968, 1977, 1978, 1979); Holsinger (1977, 1990, 1992); Ortiz (1976a,b,c,d,e, 1980,1991); Just (1977, 1983, 1984); Stock (1977a,b, 1978, 1980, 1981, 1983, 1985); McKinney (1978, 1979, 1980); McKinney et al. (1978); Ortiz & Gómez (1979); Ortiz & Lalana (1980, 1989, 1994a,b, 1995, 2002a,b,c); Thomas (1983, 1997); Thomas & Barnard (1983, 1985, 1986, 1989, 1990, 1991a,b); Ortiz & Nazábal (1984a,b, 1988); Ortiz & Veledo (1985); Barnard & Agard (1986); Barnard & Thomas (1987, 1990); Vonk & Stock (1987); Vonk (1988, 1989, 1990, 1991); Ciavatti (1989); Bellan-Santini (1990, 1997); Ortiz, Lalana & López (1992); Ortiz, Lalana & Beltran (1993); LeCroy (1995); Ortiz & Pérez (1995); Lowry & Stoddart (1997); Ortiz & Lemaitre (1997); Jaume & Wagner (1998); Ortiz, Lalana & Lio (1999); Krapp-Schickel & Ruffo (2000, 2001); Martín, Ortiz & Atienza (2000, 2001); Ortiz, Lalana & Sánchez (2000); Ortiz, Martín & Atienza (2000); Ruffo et al. (2000); Berge et al. (2001); Lazo-Wasem & Gable (2001); Ortiz, Cházaro-Olvera & Winfield (2001); Ortiz, García-Debras & Lalana (2002, 2003); Ortiz, Lalana & Varela (2002, 2004, 2006, 2007a,b,c, 2008); Van der Ham & Vonk (2003); Thomas & Klebba (2006, 2007); Ortiz & Thomas (2007); Coleman (2011); Ortiz, Varela & Lalana (2011).
	Ingolfiellidea	Stock (1976, 1979).
Inventories, taxonomic lists and reports	Caprellidea	Díaz et al. (2005); Guerra-García et al. (2006).
	Gammaridea	Shoemaker (1935); McCain (1968); McCain & Steinberg (1970); McKinney (1977); Ortiz (1978, 1979a,b, 1983); Galan (1983, 1984); Stoner & Lewis (1985); Lagarde (1987); Ortiz & Lalana (1993, 1996, 1998, 2002a, 2006); Ortiz & Lemaitre (1994); Villaroel & Graciani (1997); Díaz & Martín (2000a,b,c,d, 2001a,b, 2003, 2005); Martín, Atienza & Díaz (2000); Atienza & Martín (2001); Díaz (2001); Lazo-Wasem & Gable (2001); Martín (2001a,b, 2003, 2007); Ortiz, Lalana & Lio (2001); Escobar-Briones et al. (2002); Martín, Ortiz & Díaz (2002); Ayala & Martín (2003); Martín & Díaz (2003); Van der Ham & Vonk (2003); Varela et al. (2003); Jara (2007); Ortiz, Lalana & Varela (2007c, d,e, 2008); Ortiz, Martín & Díaz (2007); LeCroy et al. (2009); López et al. (2009).
	Hyperiidea	Shoemaker (1945, 1948); Fage (1960); Lewis & Fish (1969); Shih (1969); Moore & Sander (1977, 1979); Ortiz, Lalana & Guevara (1990); Gasca & Shih (2001, 2003); Ortiz, Lalana, Varela & Leal (2003); Gasca & Suárez-Morales (2004); Ortiz, Lopeztegui, Lalana & Varela (2006); Gasca (2009a,b); LeCroy et al. (2009).
	Ingolfiellidea	Stock (1977b, 1979); Vonk & Schram (2003).
Biology, ecology and biogeography	Caprellidea	Guerra-García et al. (2006).
	Gammaridea	Galan (1983, 1984); Sánchez (1985); Thomas (1997); Martín & Díaz (2003); Díaz & Martín (2005); Jara (2007).
	Hyperiidea	Lewis & Fish (1969); Moore & Sander (1977, 1979).
	Ingolfiellidea	Stock (1977b, 1979); Vonk & Schram (2003).
	Caprellidea	Díaz et al. (2005); Guerra-García et al. (2006).
Taxonomic keys	Gammaridea	Galan (1983,1984); LeCroy (1995); Thomas (1997); Ortiz, Alvarez & Winfield (2002); Ortiz, Martín, Winfield, Díaz & Atienza (2004).

Alvarado, Díaz, Gobin, Escobar-Briones, Cortés, Weil, Bastidas, Robertson, Zapata, Martín, Kazandjan & Ortiz, 2010).

We compiled and analyzed the amphipod species composition of the Caribbean region from the Southeastern coast of the Yucatan Peninsula in Mexico (Quintana Roo State) to Belize, Guatemala, Honduras, Nicaragua, Costa Rica, and Panama down to Colombia and Venezuela in South America, and also along the Greater Antilles (Cuba, the Cayman Islands, Jamaica, Hispaniola, Navassa and Puerto Rico), the Lesser Antilles (St. Thomas, Tortola, Anegada, Jost Van Dyke, Virgin Gorda, St. Croix, Anguilla, St. Martin, St. Barthelemy, Saba, St. Eustatius, Barbuda, St. Kitts, Nevis, Antigua, Monserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenadines and Grenada), down to the Southern islands of Barbados, Tobago, Trinidad and the Netherlands Antilles (Bonaire, Curaçao, Aruba).

Diversity inventories: To compile the available data on marine Amphipoda species diversity in the Caribbean, we used two approaches. The first approach summarized the number of marine amphipod species for Caprellidea, Gammaridea, Hyperiidea and Ingolfiellidea using georeferenced species records from the open-access databases (WoRMS and OBIS) and from local, country, and regional checklists. The second approach was to produce revised species lists for the group by country (where information was available).

Data analysis: The presence/absence data for each Amphipoda taxon was used to calculate a Sørensen distance matrix. This symmetrical index excludes double absences in the calculation. Only countries with 10 or more amphipod species were included in the matrix. To analyze the relative contribution of each country to the Caribbean regional diversity, we used the contribution partition analysis proposed by Lu, Wagner & Chen (2007), using species richness as a measure of diversity. The gamma (regional) diversity is the sum of the alpha (local) and beta (interlocal) diversities. Using these estimates, we calculated the index of relative contribution for each country where the larger the number of species listed, the higher the alpha diversity value. Based on the number of endemic species by country, the relevance of this country to the relative contribution to the gamma diversity changed.

Additionally, in order to determine the rate of description of new species, we arranged the number of species records per year and produced cumulative curves for all suborders. Based on the fact that the quality of taxonomic inventories depends on the availability of identification guides and taxonomic experts, our review also related these sources to each higher taxon.

RESULTS

Diversity and distribution: There are 535 species identified within 236 genera and 73 families that have been reported for the Caribbean Sea. The most speciose taxon are the Gammaridea with 387 species (72.34%), followed by the Hyperiidea with 116 species (21.68%), the Caprellidea with 25 (4.67%) and the Ingolfiellidea with 7 (1.31%) species. A complete taxonomic listing of these species and their distributions within the Caribbean is presented in a supplementary table (Appendix 1).

Regarding the regional distribution of these species, each taxon apparently exhibits its own spatial pattern of species richness, as no common distribution pattern was evident (Table 1 and 2). The Western Caribbean ecoregion had the largest diversity (282 species), followed by the Southern Caribbean (230 species), while the Eastern Caribbean ecoregion had the lowest diversity (73 species). When examined by country, Mexico and Venezuela were the most species-rich with 266 and 206 species respectively, followed by Cuba with 168 species. The species number of the three countries combined accounted for 49.72% of the total amphipod species reported for the Caribbean. Twelve countries had less than 50 species (Table 2). When the richness was standardized by coastline length, the average number of

species per 100 kilometers of country-coastline was 5±8species/100km, with Mexico having the highest richness (29.4species/100km), and Nicaragua the lowest (0.2species/100km). When standardized by the Economic Exclusive Zone (EEZ) coverage, the average number of species was 0.05±0.08species/100km^2 of EEZ, with Mexico having the highest number of species (0.30species/100km^2) of EEZ, followed by Costa Rica (0.12species/100km^2), and Nicaragua having the lowest (0.001species/100km^2).

The Gammaridea were clearly the most speciose taxon in all countries and ecoregions. The Southern Caribbean ecoregion (represented by Venezuela, Aruba, Curaçao, Bonaire, Trinidad and Tobago) encompassed the largest gammaridean diversity (188 species), while the Eastern Caribbean ecoregion (Lesser Antilles) had the lowest diversity (54 species) (Table 2). When examined by country, Venezuela had the highest diversity with 169 species, followed by Mexico and Cuba, with 140 and

TABLE 2
Number of Caribbean Amphipoda species per country within the five ecoregions

CUADRO 2
Riqueza de especies del orden Amphipoda por país en cada ecorregión del Mar Caribe

Ecoregion	Amphipoda Suborders				Total species	Coastline (km)*	No. spp./100km of coastline	EEZ (km^2)*	spp./100km^2 EEZ
	Caprellidea	Gammaridea	Hyperiidea	Ingolfiellidea					
WESTERN CARIBBEAN	13	156	112	1	282				
México (Yucatán)	13	140	112	1	266	905	29.4	88 874	0.30
Belize	0	37	0	0	37	516	7.2	35 351	0.10
Guatemala	0	1	0	0	1	150	0.7	1 642	0.06
Honduras	0	2	0	0	2	644	0.3	18 151	0.01
SOUTH-WESTERN CARIBBEAN	9	111	0	0	120				
Nicaragua	0	1	0	0	1	503	0.2	87 930	0.001
Costa Rica	0	31	0	0	31	212	15	25 090	0.12
Panama	0	33	0	0	33	1 295	2.5	143 442	0.02
Colombia	9	67	0	0	67	1 760	3.8	472 891	0.01
SOUTHERN CARIBBEAN	12	188	24	6	230				
ABC*	0	22	0	5	27				
Venezuela	12	169	24	1	206	2 800	7.4	470 666	0.04
Trinidad & Tobago	0	8	0	0	8	362	2.2	74 199	0.01
GREATER ANTILLES	11	177	28	0	216				
Cuba	10	131	27	0	168	3 755	4.5	350 751	0.05
Cayman Islands	0	4	0	0	4	160	2.5		
Jamaica	0	5	3	0	8	1 022	0.8	258 137	0.003
Hispaniola	0	18	0	0	18	3 051	0.6	382 658	0.004
Puerto Rico	1	30	0	0	31	501	6.2	205 529	0.02
EASTERN CARIBBEAN	3	54	16	0	73				
Lesser Antilles	3	54	16	0	73				

(ABC*=Aruba, Bonaire and Curacao and*=Coastline information taken from The world fact book (http://www.cia.gov/library/publications/the-world-factbook/geos) and Economic Exclusive Zone (EEZ) information was taken from www.seaaroundus.org/eez/eez.aspx)

131 species respectively, while Nicaragua and Guatemala had the lowest with only one species each. Gammaridea are composed of 49 families (Table 3), of which the Melitidae and Hadziidae were the most diverse, with 57 and 31 species, respectively, while 10 families were only represented by one species (Appendix 1). The most eurytopic species within the region were *Parahyale hawaiensis* (eight countries), *Ampelisca lobata* and *P. fascigera* (seven countries); in contrast 208 of the 387 species of Gammaridea were reported as unique to one country. The genus *Ampelisca* was the most speciose, with 23 species.

The highest diversity was recorded in Caprellidea for the Western Caribbean ecoregion (13 species), the lowest occurred in the Eastern Caribbean (three species) (Table 2). Mexico displayed the highest diversity values, with 13 species, representing 52.0% of reported for the Caribbean, followed by Venezuela with a total of 12 species and Cuba with 10 species. This taxon, composed of five families (Table 3), includes the Caprellidae and Pariambidae, the most diverse taxa, with ten and seven species respectively (Appendix 1). In the Caribbean, the genus *Caprella* and *Deutella* were the most speciose with five species reported, respectively. The most eurytopic species were *Paracaprella pusilla, Deutella incerta* and *Hemiaegina minuta*, represented in four countries, respectively.

The highest species richness (112 species) in the Hyperiidea occurred in the Western Caribbean ecoregion, mainly from Yucatan in the Mexican Caribbean where pelagic samples have frequently been obtained (Table 2). Species of this taxon were reported only in five of the 17 countries analyzed herein. In the Caribbean Sea, the hyperiids are represented by 19 families (Table 3), of which the Scinidae holds 17 species, followed by the Lestrigonidae and Platyscelidae with 14 species each (Appendix 1). The genus *Scina* is the most diverse with 16 species. The most eurytopic species is *Lestrigonus bengalensis*, occurring in five countries, in contrast to 70 of the 116 species in this suborder reported in one country.

For Ingolfiellidea, only seven species within one genus and one family were reported for the Caribbean Sea (Table 3, Appendix 1). Of these species, six were recorded in the Southern Caribbean ecoregion (Aruba, Curaçao, Bonaire and Venezuela) and the remaining species in the Western Caribbean (Mexico, Yucatan) (Table 2), and all were reported only for one country.

TABLE 3
Species, genera and families of Caribbean amphipods

CUADRO 3
Número de species, generos y familias de los anfípodos presentes en el Mar Caribe

Suborder	Family	Genus	Species
Caprellidea	5	2	25
Gammaridea	49	179	387
Hyperiidea	18	44	116
Ingolfiellidea	1	1	7
Total	73	236	535

Advances in regional knowledge: The first amphipod descriptions were made by Linnaeus in 1758 (*Gammarus locusta*, *Gammarus pulex,* and *Cyamus ceti*). Between 1800 and 1850, an average of 6.28 species were described per year and then, between 1850 and 1900, this number increased to 44.64 new descriptions per year, and to 51.04 between 1850 and 1900. Between 1900 and 1950, the number of descriptions almost doubled to 97.70 species per year, and since 1950, about 103.18 species are described per year (Fig. 1A). The accumulation curve of world species discoveries (Fig. 1B) shows no sign of leveling off, indicating that a full inventory of these taxa is still far from being completed despite two centuries of efforts. In the Caribbean region, the description of species began in 1888 with *Ampelisca abyssicola* by Stebbing and increased at a slow rate changing in trend with a substantial accumulation of species in the 1980s (Fig. 2). As in the global graph, species description in the Caribbean region is far from reaching an asymptote, and at present, 218 species of amphipods (40.75% of the Caribbean

total) have been described from this region. Of these, 60.55% (132 species) are endemic to the Caribbean region, while the remaining 39.45% (86 species) have been reported elsewhere, mainly for the Gulf of Mexico and Florida.

Similarity analysis: In the cluster tree generated with the Sorensen Distance Index, the amphipod fauna of Cuba, Mexico and Venezuela was aggregated into one group (Fig. 3). The similarity between Mexico and Venezuela is based on 119 common species (22.24% of the total species in the region), while the similarity between Cuba and Mexico is based in 99 common species (18.50% of the total species in the region; Table 4). Mexico, Cuba and Venezuela share species with other countries in the region (14, 13 and 10 countries,

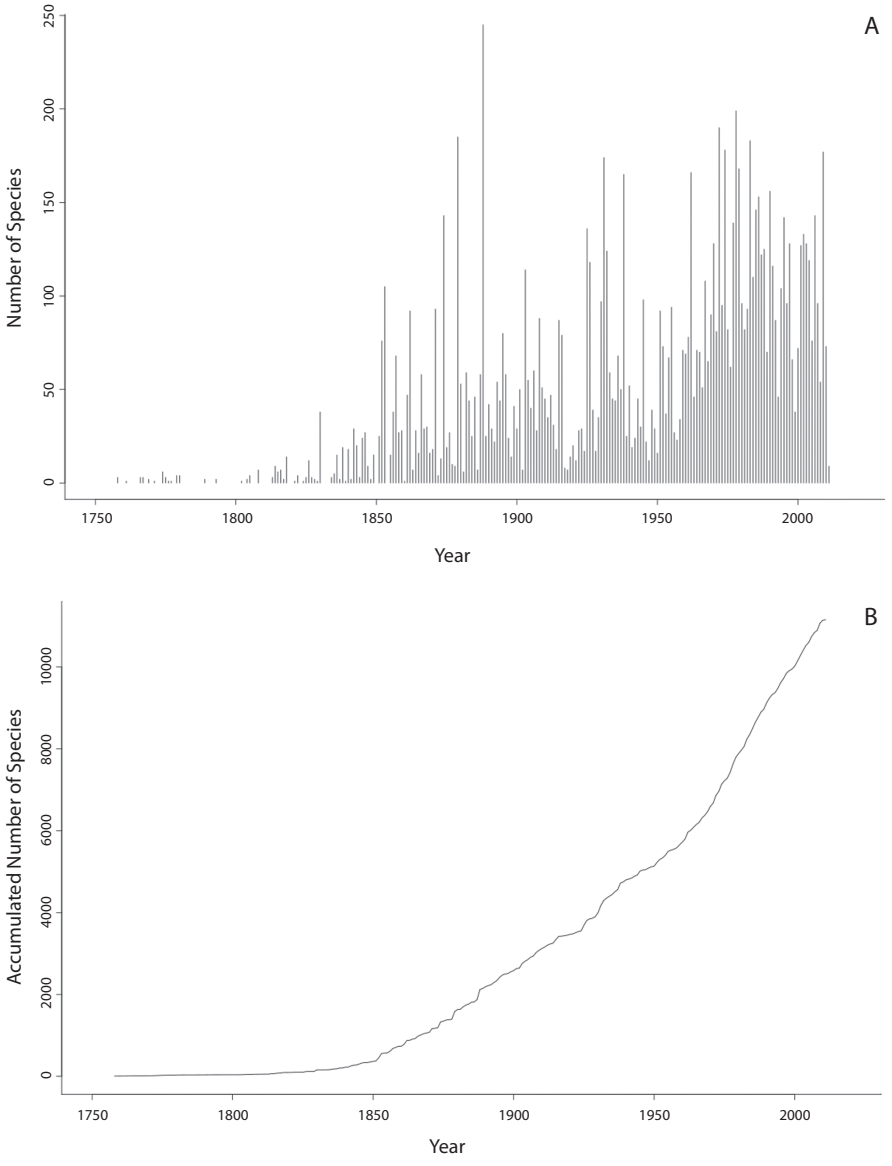

Fig. 1. (**A**) Amphipoda species discoveries around the world; (**B**) Cumulative Amphipoda species discoveries around the world.

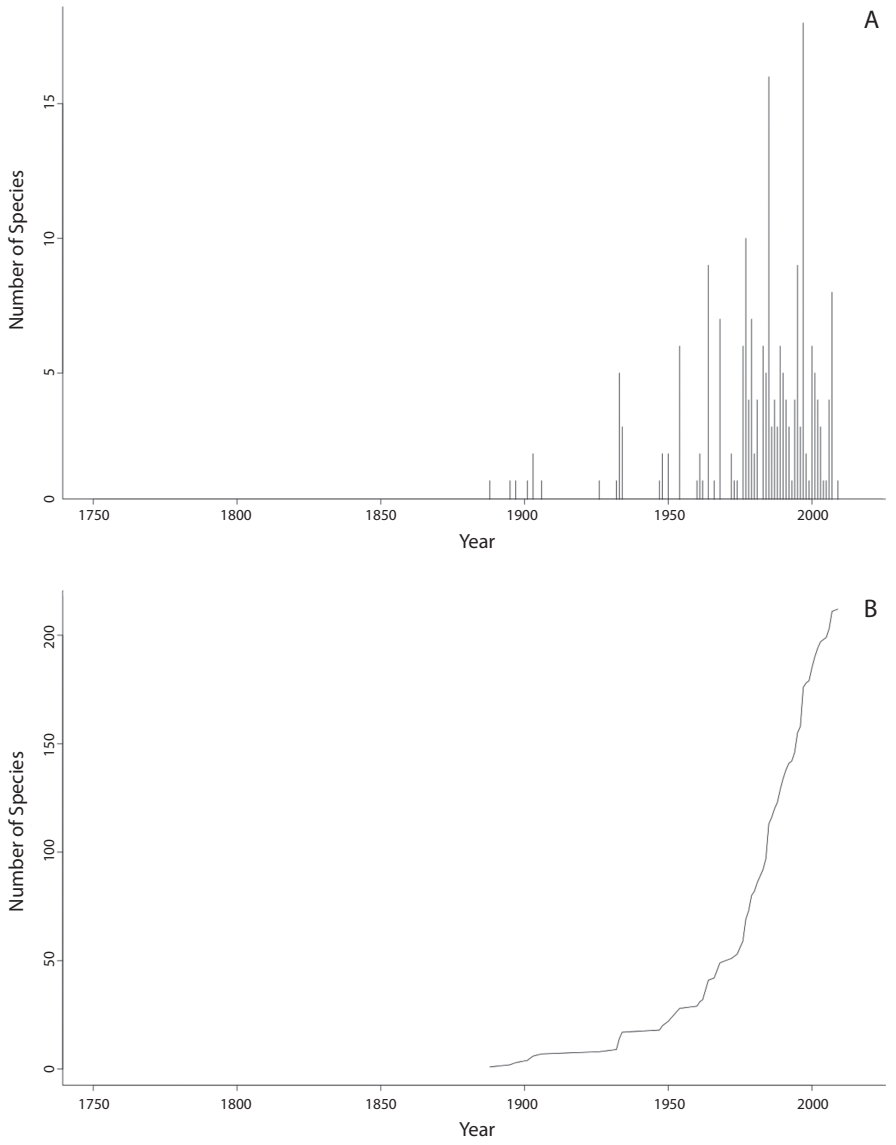

Fig. 2. (**A**) Amphipoda species discoveries in the Caribbean Sea; (**B**). Cumulative Amphipoda species discoveries in the Caribbean Sea.

respectively). Countries with the highest alpha diversity were Mexico, Venezuela, and Cuba and those contributed proportionally to the gamma diversity. The Lesser Antilles contributed to regional diversity, despite having fewer species than i.e. Colombia. Aruba, Curaçao and Bonaire contributed more to the regional diversity than countries with higher alpha diversity values, i.e. Puerto Rico, Costa Rica, and Belize (Fig. 4).

DISCUSSION

The crustaceans, along with the mollusks, are the most speciose taxonomic groups among the marine fauna, with 44 950 reported species

(Bouchet, 2006). Despite the lack of a larval stage, and therefore, with limited dispersal capability, the order Amphipoda is a relatively species-rich group within the crustaceans, representing 15% of the total if we consider that the number of marine amphipod species is 6 950 (Vader, 2005), or up to 26% if we consider that the number of species is 11 780 (WoRMS, 2012).

In this sense, the 535 amphipod species reported in the Caribbean region represent a small contribution to global diversity. Despite this apparent low richness, large percentage of unique species, represent an important contribution to the endemic regional diversity. When comparing this amphipod diversity across geographical regions, the Caribbean has a larger diversity than the Patagonian Shelf (98 species) and the Tropical West Atlantic (107 species) (Miloslavich, Klein, Díaz, Hernández, Bigatti, Campos, Artigas, Castillo, Penchaszadeh, Neill, Carranza, Retana, Díaz de Astarloa, Lewis, Yorio, Piriz, Rodríguez, Yoneshigue-Valentin, Gamboa & Martín, 2011), but lower than Australia (888 species; Butler, Rees, Beesley & Bax, 2010), the South American Humboldt Current region (860 species; Miloslavich et al., 2011), the Southern Ocean (797 species; De Broyer, Lowry, Jazdzewski & Robert, 2007; Zeidler & De Broyer, 2009), and Japan (544 species; Fujikura, Lindsay, Kitazato, Nishida & Shirayama, 2010). In order to establish management and conservation plans, hotspots of endemism should be identified, the species in need of protection prioritized, and their population size estimated. This should also lead to recommendations to upgrade their current conservation status. There is currently little published recognition that the diversity associated with the islands exists at all and as a result, not only its conservation has received little attention, but these species have often been affected by diverse, ongoing anthropogenic activities.

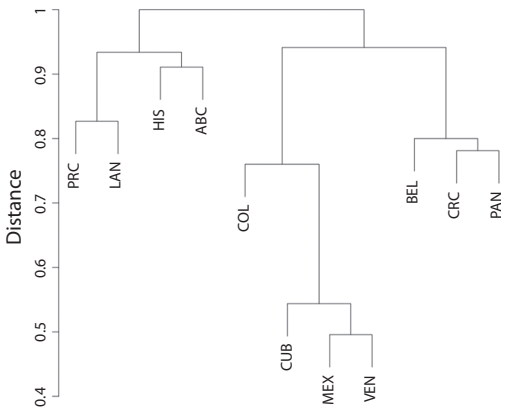

Fig. 3. Cluster tree based on species presence/absence matrix and generated with the Sørensen distance index. PRC Puerto Rico, LAN Lesser Antilles, HIS Hispaniola, ABC Aruba, Bonaire and Curacao, CRC Costa Rica, PAN Panama, BEL Belize, COL Colombia, CUB Cuba, MEX Mexico, VEN Venezuela.

Gammaridea are the most diverse taxon among the Amphipoda, with at least 8 300 species according to WoRMS (2012). In the Caribbean, gammaridean amphipods were also the most diverse group (387 species), representing about 72% of the regional biodiversity. One of the most comprehensive reviews in marine gammaridean was carried out by Barnard & Karaman (1991) who provided not only keys, diagnoses and species lists for the group, but also discussed their geographic distribution based on thermal zones and depth, and some aspects of endemicity. According to these authors, in terms of generic diversity, the Gammaridea are mainly a cold water group, whereas tropical regions seem to be poor in tropical endemic genera. A higher richness in cool and temperate environments, contrasting with poor diversity in the tropics, is also a general trend in freshwater amphipods (Vainola, Witt, Grabowski, Bradbury, Jazdzewski & Sket, 2008). In the tropics, even if many new species are expected to be described, it is unlikely that any of these ones will be associated with a new genus (Barnard & Karaman, 1991). In the Caribbean region, four new genera have been described since Barnard's and Karaman's work in 1991: *Ottenwalderia* (Jaume & Wagner, 1998), *Miramarassa* (Ortiz, Lalana & Lio, 1999) *Pleusiroides* and *Tantena* (Ortiz, Lalana & Varela, 2007a,b respectively). Other important components of this taxon in the Caribbean are the subterranean and cave

taxa, whose present distribution and biogeographic pattern reflect their origin. In the case of marine and brackish species, it has been suggested that they may have derived from epigean marine or brackish water ancestors as they adapted to fluctuating sea levels, and even some freshwater species may have derived from marine and brackish species that were caught inland during regression of seawater (Holsinger, 1994; Biernbaum, 1996), in both cases leading to speciation by isolation.

Caprellidea are a much less diverse taxon with 451 species worldwide and 25 species (4.72%) within 12 genera in the Caribbean (Table 1). Of these, more than 30% could be considered endemic for the region (*Pseudaeginella colombiensis, Deutella caribensis, D. margaritae, D. mayeri, Mayerella redunca, Metaprotella hummelincki, Tritella chibcha*, and *Cubadeutella cavernicola*), while about 40% of the species have an eurytopic distribution either in the tropical and the temperate marine ecosystems (*Caprella andreae, C. danilevskii, C. equilibra, C. penantis, C. scaura, Pseudaeginella biscaynensis, Hemiaegina minuta, Paracaprella pusilla* and *Phtisica marina*; McCain & Steinberg, 1970). In the case of *D. californica* and *Hemiproto wigleyi*, these species are distributed also in the East Pacific (Guerra-García, 2003a; Díaz, Guerra-García & Martín, 2005), while *D. incerta* is distributed along the East coast of the United States and Canada, and *Paracaprella digitimanus* has been also found on the Brazilian coast (Díaz et al., 2005). The Caribbean caprellid diversity could be considered high when

TABLE 4
Species number of amphipods in common between countries in the Caribbean Sea

CUADRO 4
Número de especies de anfípodos communes entre cada uno de los países del Mar Caribe

	México	Puerto Rico	Hispaniola	Jamaica	Belize	Honduras	Guatemala	Nicaragua	Costa Rica	Panamá	Colombia	Venezuela	ABC*	Lesser Antilles	Trinidad & Tobago	Cayman Islands
Cuba	99	6	2	3	8	0	0	0	13	6	38	87	5	16	2	1
México		13	3	4	21	2	1	0	17	10	41	119	6	35	3	1
Puerto Rico			2	0	2	1	0	0	3	1	5	8	2	9	1	0
Hispaniola				1	0	0	0	0	0	0	2	3	2	3	0	0
Jamaica					0	0	0	0	0	0	0	5	0	2	0	0
Belize						1	0	0	7	7	7	16	0	3	2	0
Honduras							0	0	1	1	1	1	0	0	0	0
Guatemala								0	1	1	1	0	0	0	0	0
Nicaragua									0	0	0	0	0	0	0	0
Costa Rica										7	12	13	3	4	2	0
Panamá											5	7	2	0	0	0
Colombia												45	7	6	2	1
Venezuela													8	27	3	3
ABC*														4	1	1
Lesser Antilles															3	2
Trinidad & Tobago																0

(ABC*=Aruba, Bonaire and Curacao).

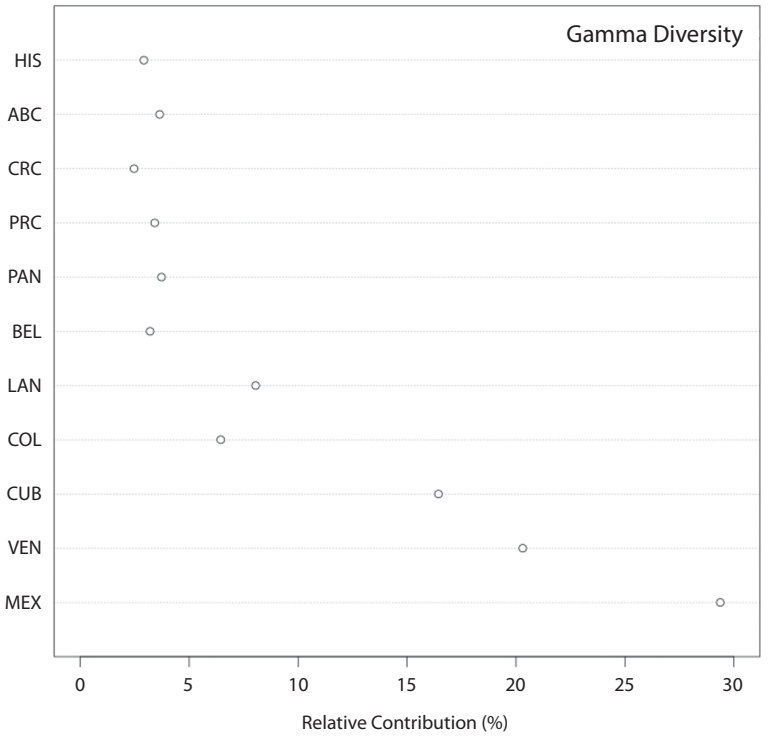

Fig. 4. Contributions to the Amphipoda Caribbean gamma diversity by country. All countries are ordered by their alpha diversity value, from lowest to highest. HIS Hispaniola, PAN Panama, ABC Aruba, Bonaire and Curacao, BEL Belize, CRC Costa Rica, PRC Puerto Rico, LAN Lesser Antilles, COL Colombia, CUB Cuba, MEX Mexico, VEN Venezuela.

compared to other tropical areas [Brazil: 12 species (Wakabara, Tararam, Valério-Berardo, Duleba & Pereira-Leite, 1991; Guerra-García, 2003b); Tanzania: 13 species (Guerra-García, 2001); Mauritius: seven species (Guerra-García, 2003c); India: 11 species (Guerra-García, Ganesh, Jaikumar & Raman, 2010); Phuket, Thailand: 12 species (Guerra-García, 2004); Indonesia: seven species (Krapp-Schickel & Guerra-García, 2005); Philippines: three species (Guerra-García, 2002); Papua New-Guinea: seven species (Guerra-García, 2003d); Great Barrier Reef: 17 species (Guerra-García & Lowry, 2009), but still significantly lower when compared to temperate waters (Thiel, Guerra-García, Lancellotti & Vásquez, 2003). For example, 105 species have been reported for Japan (Takeuchi, 1999) and 41 species for the Mediterranean (Guerra-García & Takeuchi, 2002; Sturaro & Guerra-García, 2012).

The Hyperiidea have an overall number of valid species of 304 according to the WoRMS. There are 222 species known to occur in the Pacific Ocean and 175 species in the Atlantic (Gasca, 2009a,b). This review recorded 116 species in the Caribbean region, representing 38.16% of the global hyperiid fauna. The few inventories and species lists in the region have been provided not only for shallow water species (Gasca & Shih, 2001, 2003), but also for the deep water masses (Gasca, 2009b). One of the most complete studies on the Western Atlantic Hyperiidea, although restricted to the Southwestern Atlantic, reports 151 species in that region (Vinogradov, 1999). In comparison, the known species richness of hyperiid amphipods from the Caribbean region is larger than in the other adjacent tropical areas, such as the Gulf of Mexico (100 species; LeCroy et al., 2009), the Sargasso Sea (88 species;

Gasca, 2007), and Brazil (90 species; Montu, 1998; Lima & Valentin, 2001). We suggest that the number of hyperiid species inhabiting the Caribbean region is higher, mainly because the hyperiids can be divided roughly into warm-water and cold-water species, and most of the warm-water species are circumtropical (including the tropical and subtropical belts). Most of the hyperiid specimens contained in zooplankton collections have been identified at the suborder level, which leads us to recognize that new species and new records will occur as the taxonomic effort to identify these samples increases.

The ingolfiellidean amphipods are not very diverse in the Caribbean Sea (seven species), but they still represent an important percentage (15.91%) of the global total of 44 valid species. Such biodiversity is low, considering the wide range of ecological conditions in which they occur, which varies from deep sea soft muds, to high altitude freshwater rivers in the continents, to subterranean fresh, brackish and marine interstitial waters (Vonk & Schram, 2003), but comparable to other families of amphipods with partly overlapping habitat requirements such as hadziids (30 species) and bogidiellids (seven species). Seven ingolfiellidean amphipods are recorded for the Caribbean region, six of them are endemic and one, *Ingolfiella fuscina* is also recorded for the Gulf of Mexico and Florida (Felder & Camp, 2009). More exploration and collecting efforts within anchialine cave systems in the Caribbean islands will very likely lead to the discovering of a larger number of species in this suborder.

In general terms, Mexico, Venezuela and Cuba exhibit the highest species diversity, due in part to the higher intensity of research in these areas. In relation to species descriptions and taxonomic publications, Cuba has taken the lead, particularly in coastal and shallow waters. The least studied coasts in the Caribbean are those of Guatemala, Honduras, Nicaragua, Trinidad and Tobago, Jamaica and the Cayman Islands. The lack of knowledge in these countries is probably due to limitations in funding, research institutions, and/or taxonomic expertise. Also, countries having a low reported biodiversity are probably undersampled, especially if they are in close proximity to highly diverse countries. For example, it is likely that the biodiversity of Belize, Colombia, Aruba, Bonaire, Curaçao and Trinidad and Tobago would resemble the biodiversity of their neighbouring countries Mexico and Venezuela. Another important aspect to consider is that a low number of species could also be related to a small size of the coastal zone, to the lack of habitat diversity, and/or to the level of degradation of the coast due to natural or anthropogenic disturbances (Dauvin & Ruellet, 2009; De la Ossa-Carretero, Del-Pilar-Ruso, Giménez-Casalduero, Sánchez-Lizaso & Dauvin, 2012). In addition, the number of species can be also related to the extent of the shelf area, the hydrographic isolation of bays, coves, among others.

In conclusion, available information on amphipod taxonomy in the Caribbean region is heterogeneous, restricted for the most part to Cuba, Mexico and Venezuela, and in these countries, mainly focused on Gammaridea and Caprellidea. Given this heterogeneity in the data, knowledge on the distributions of the species is also limited. There is a need to compare between habitats throughout the region, i.e. compare seagrass habitat diversity along a latitudinal gradient, or between depth zones, i.e. shelf, slope and abyssal marine ecosystems. This would lead us to understand distribution patterns and recognize hotspots that will allow for recommendations on management plans for each of them. On the other hand, knowledge of ecology and behaviour is virtually non existent for the majority of the species. More significantly, at this time of rapidly vanishing natural habitats, we have not yet estimated how many species are relatively conserved within the boundaries of national parks and other protected areas. In addition to climate change which is related to higher temperatures, sealevel rise, erosion of the coastal habitats and the acidification and disappearance of important habitats, many intertidal zones are currently subject to disturbance from

industrialization and infrastructure development from the increasingly growing tourism industry. The fauna and flora of the intertidal zone are likely to be affected by such anthropogenic changes in environmental conditions; therefore there is a need for monitoring programmes, which could help document such environmental changes. Thomas (1993) stressed that gammaridean amphipods are ideal candidates for monitoring studies because they are ecologically and trophically important, numerically dominant, and have relative low dispersal capabilities. However, the use of these organisms as biomonitors in the tropics is only possible if their taxonomic and ecological information is available.

Besides increasing sampling efforts in coastal zones of poorly sampled countries in Central America and the Lesser Antilles, several ecosystems require additional sampling efforts like the anchialine cave systems, the continental margins, and the deep sea, inlcuding the escarpments, canyons, slopes, seamounts and diapirs, the abyssal plains, and geologically active ecosystems such as vents and seeps. These collecting initiatives should be combined with an increase in taxonomic efforts, both in classical taxonomy and in the use of molecular tools like barcoding, for which regional capacity building is required. All of these efforts should be carried out through regional coordinated collaboration.

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RESUMEN

El orden Amphipoda es uno de los más diversos dentro de los Peracáridos. Las investigaciones sobre este orden en el Mar Caribe se iniciaron a finales de los años 1800, incrementándose significativamente a partir de 1980. En este estudio se analizó la biodiversidad de los anfípodos (Caprellidea, Gammaridea, Hyperiidea e Ingolfiellidea) en el Mar Caribe, compilándose los registros de especies citadas en las diversas ecorregiones del área, tanto en publicaciones como a través de bases de datos (WoRMS y OBIS). Se listan un total de 535 especies pertenecientes a 236 géneros y 73 familias. La ecorregión del Caribe Occidental presentó la mayor riqueza específica (282), mientras que el Caribe Oriental presentó el menor valor (73). México y Venezuela presentaron el mayor número de especies registradas (266 y 206, respectivamente), mientras que doce países presentaron menos de 50. Los Gammaridea fueron el grupo más diverso con 387 especies, seguido de los Hyperiidea (116 especies). Hasta el presente, se han descrito 218 especies nuevas en aguas del Caribe, de las cuales 132 son endémicas. Las áreas con mayor diversidad de anfípodos se concentraron a lo largo del caribe Mexicano, Cuba y la costa norte de Sur-América (Venezuela-Colombia); sin embargo, este patron refleja más bien un mayor esfuerzo en la recoleccion de estos organismos y una mayor experticia taxonómica, que un patron específico de distribución del grupo. En general, el conocimiento del grupo se limita a las aguas someras, con muy poca información sobre zonas profundas. En este sentido, las prioridades de investigación regional en este grupo, debe enfocar un mayor esfuerzo en la costa de Centro América y las Antillas Mayores y Menores. Así mismo, es necesario aumentar las recolecciones en aguas profundas y otros ecosistemas particulares como los anquialinos. Por último, es importante aumentar las investigaciones taxonómicas y ecológicas de los taxones que presentan mayor diversidad.

Palabras clave: Amphipoda, diversidad, riqueza específica, Mar Caribe, endemismo.

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APPENDIX 1

Taxonomic classification of the amphipod fauna from Caribbean countries or subregion.PRC, Puerto Rico, HIS, Hispaniola, JAM, Jamaica, CUB, Cuba, CAY, Cayman Islands, MEX, Mexico, BEL, Belize, GUA, Guatemala, HON, Honduras, NIC, Nicaragua, CRC, Costa Rica, PAN, Panama, COL, Colombia, VEN, Venezuela, ABC, Netherlands Antilles, TYT, Trinidad & Tobago, LAN, Lesser Antilles

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Suborder Caprellidea Leach, 1814																		
Family Caprellidae Leach, 1814	*Aeginella spinosa* Boeck, 1861	X																
	Caprella andreae Mayer, 1890	X	X															
	Caprella danilevskii Czerniavskii, 1868		X										X	X				
	Caprella equilibra Say, 1818		X											X				
	Caprella penantis Leach, 1814		X										X	X				
	Caprella scaura Templeton, 1836		X	X												X		
	Metaprotella hummelincki McCain, 1968	X																
	Paracaprella digitimanus Quitete, 1971													X				
	Paracaprella pusilla Mayer, 1890	X	X										X	X				
	Paracaprella tenuis Mayer, 1903		X															
Family Caprellinoididae Laubitz, 1993	*Pseudaeginella antiguae* Barnard, 1932															X		
	Pseudaeginella biscaynensis (McCain, 1968)	X	X											X				
	Pseudaeginella columbiensis Guerra-García, Krapp-Schickel & Müller, 2006												X					
Family Pariambidae Laubitz, 1993	*Cubadeutella cavernicola* Ortiz, Guerra-García & Lalana, 2009	X																
	Deutella californica Mayer, 1890		X															
	Deutella caribensis Guerra-García, Krapp-Schickel & Müller, 2006												X					
	Deutella incerta (Mayer, 1903)	X	X										X	X				
	Deutella margaritae Guerra-García, 2003													X				
	Deutella mayeri Stebbing, 1895	X											X					
	Hemiaegina minuta Mayer, 1890	X	X										X	X				
Family Phtiscidae Vassilenko, 1968	*Hemiproto wigleyi* McCain, 1968		X											X				
	Phtisica antillensis Mayer, 1903															X		
	Phtisica marina Slabber, 1769	X	X											X				
Family Protellidae McCain, 1970	*Mayerella redunca* McCain, 1968													X				
	Tritella chibcha Guerra-García, Krapp-Schickel & Müller, 2006												X					

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Suborder Gammaridea Latreille, 1802																		
Family Ampeliscidae Costa, 1857	*Ampelisca abdita* Mills, 1964		X															
	Ampelisca abyssicola Stebbing, 1888			X														
	Ampelisca agassizi (Judd, 1896)		X						X		X	X	X					
	Ampelisca bicarinata Goeke & Heard, 1983		X											X				
	Ampelisca brevisimulata J.L. Barnard, 1954		X										X	X				
	Ampelisca burkei J. L. Barnard & Thomas, 1989	X	X											X				
	Ampelisca cristata cristata Holmes, 1908	X	X								X		X					
	Ampelisca cristata microdentata J.L. Barnard, 1954	X									X		X	X	X			
	Ampelisca cristoides J.L. Barnard, 1954												X	X				
	Ampelisca holmesi Pearse, 1908	X	X										X	X				
	Ampelisca lobata Holmes, 1908	X	X								X	X	X	X	X			
	Ampelisca mexicana J.L. Barnard, 1954										X	X						
	Ampelisca pacifica Holmes, 1908	X										X						
	Ampelisca parapacifica Goeke & Heard, 1984		X											X				
	Ampelisca parapanamensis J.L. Barnard, 1954												X	X				
	Ampelisca paria Barnard & Agard, 1986													X			X	
	Ampelisca pugetica Stimpson, 1864												X	X	X			
	Ampelisca romigi J.L. Barnard, 1954											X	X		X			
	Ampelisca schellenbergi Shoemaker, 1933	X	X									X	X	X				
Family Ampeliscidae Costa, 1857	*Ampelisca spinipes* Boeck, 1861										X							
	Ampelisca vadorum Mills, 1963		X															
	Ampelisca venetiensis Shoemaker, 1916										X		X					
	Ampelisca verrilli Mills, 1967		X															
	Byblis cubensis (Ortiz & Gómez, 1979)	X																
	Byblisoides blasensis J.L. Barnard, 1964											X						
Family Amphilochidae Boeck, 1871	*Amphilochus ascidicola* Martin, Ortiz & Atienza, 2001													X				
	Apolochus casahoya (McKinney, 1978)		X											X				
	Apolochus delacaya (McKinney, 1978)		X															
	Apolochus neapolitanus (Della Valle, 1893)	X	X										X	X				
	Apolochus pillaii (J. L. Barnard & Thomas, 1983)						X											

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Amphilochidae Boeck, 1871	*Gitana dominica* Thomas & Barnard, 1990		X											X				
	Gitanopsis templadoi Ortiz & Lalana, 1995	X												X				
	Hourstonius laguna (McKinney, 1978)	X	X										X	X				
	Hourstonius tortugae (Shoemaker, 1933)	X	X										X	X				
Family Ampithoidae Stebbing, 1899	*Ampithoe hirsutimanus* Ortiz & Lemaitre, 1997												X					
	Ampithoe longimana Smith, 1873													X				
	Ampithoe marcuzzii Ruffo, 1954	X	X	X			X				X		X	X				
	Ampithoe pollex Kunkel, 1910													X				
	Ampithoe ramondi Audouin, 1826	X	X										X	X				
	Ampithoe valida Smith, 1873		X											X				
	Cymadusa compta (Smith, 1873)	X	X															
	Cymadusa filosa Savigny, 1816	X	X											X				
	Pseudamphithoides bacescui Ortiz, 1976	X											X	X				
	Pseudamphithoides incurvaria (Just, 1977)										X					X		
	Sunamphitoe pelagica (Milne-Edwards, 1830)		X											X				
Family Aoridae Walker, 1908	*Amphideutopus dolichocephalus* Myers, 1968													X				
	Bemlos barnardi (Ortiz & Nazábal, 1988)	X																
	Bemlos brunneomaculatus Myers, 1977													X				
	Bemlos dentischium (A. A. Myers, 1977)	X												X				
	Bemlos foresti (Mateus & Mateus, 1966)												X	X				
	Bemlos intermedius (Schellenberg, 1938)	X																
	Bemlos kunkelae (A. A. Myers, 1977)	X	X											X				
	Bemlos longicornis (A. A. Myers, 1978)		X	X									X					
	Bemlos rolani Ortiz & Lalana, 2002	X																
	Bemlos sanmartini Ortiz, Lalana & López, 1992	X																
	Bemlos scolosternum Ortiz & Lemaitre, 1997												X					
	Bemlos spinicarpus inermis (A. A. Myers, 1979)	X	X															
	Bemlos spinicarpus spinicarpus (Pearse, 1912)	X	X	X										X				
	Bemlos unicornis (Bynum & Fox, 1977)	X	X											X				
	Globosolembos francanni (Reid, 1951)													X				
	Globosolembos smithi (Holmes, 1905)	X	X											X				

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Aoridae Walker, 1908	*Grandidierella bonnieroides* Stephensen, 1947	X	X										X	X	X		X	
	Lembos mayensis Ortiz & Nazábal, 1984	X																
	Lembos unifasciatus reductus Myers, 1979			X									X					
	Lembos unifasciatus unifasciatus Myers, 1977		X	X										X				
	Paramicrodeutopus myersi (Bynum & Fox, 1977)													X				
	Pedicorophium laminosum (Pearse, 1912)		X										X	X				
	Plesiolembos ovalipes (A. A. Myers, 1979)													X				
	Plesiolembos rectangulatus (A. A. Myers, 1977)	X											X					
	Rudilemboides heardi Ortiz & Lalana, 1996	X												X				
	Rudilemboides naglei Bousfield, 1973		X											X				
Family Argissidae Walker, 1904	*Argissa hamatipes* (Norman, 1869)		X															
Family Aristiidae Lowry & Stoddart, 1997	*Aristias bicornuta* Ortiz, Lalana & Varela, 2007	X																
	Aristias captiva Lowry & Stoddart, 1997													X				
	Boca campi Lowry & Stoddart, 1997													X				
	Miramarassa sanchezi Ortiz, Lalana & Lio, 1999	X																
Family Bateidae Stebbing, 1906	*Batea aldebaranae* Coleman, 2011						X											
	Batea bousfieldi (Ortiz, 1991)	X																
	Batea campi (Ortiz, 1991)	X												X				
	Batea carinata (Shoemaker, 1926)	X	X				X						X	X				
	Batea catharinensis Müller, 1865	X	X															
	Batea cuspidata (Shoemaker, 1926)	X	X				X						X	X		X		
	Batea schotti Ortiz & Lemaitre, 1997												X					
	Batea transversa Shoemaker, 1926	X	X															
Family Biancolinidae Barnard, 1972	*Biancolina lowryi* Ortiz & Lalana, 1996	X																
	Actogidiella cultrifera Stock, 1981															X		
	Antillogidiella martini (Stock, 1978)															X		
	Bogidiella hamatula Stock, 1985				X													
	Bogidiella perla Stock, 1981													X				
	Bogidiella prionura Stock, 1985				X													
	Bogidiella virginalis Stock, 1981															X		
	Marigidiella crassipes Stock, 1981															X		

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Calliopiidae Sars, 1893	*Stenopleura atlantica* Stebbing, 1888	X																
Family Cebocaridae Lowry & Stoddart, 2011	*Cebocaris grutesca* J.L. Barnard, 1964			X														
Family Cheluridae Allman, 1847	*Tropichelura gomezi* Ortiz, 1976	X	X	X			X							X				
	Tropichelura insulae (Calman, 1910)			X							X						X	
Family Colomastigidae Stebbing, 1899	*Colomastix bousfieldi* LeCroy, 1995	X	X											X				
	Colomastix camura LeCroy, 1995		X											X				
	Colomastix falcirama LeCroy, 1995		X									X						
	Colomastix gibbosa LeCroy, 1995		X													X		
	Colomastix halichondriae Bousfield, 1973	X	X								X				X			
	Colomastix heardi LeCroy, 1995	X												X				
	Colomastix irciniae LeCroy, 1995		X															
	Colomastix janiceae Heard & Perlmutter, 1977	X	X										X					
	Colomastix tridentata LeCroy, 1995	X	X											X				
Family Corophiidae Leach, 1814	*Americorophium rioplatense* (Giambiagi, 1926)													X				
	Apocorophium acutum (Chevreux, 1908)	X	X											X				
	Apocorophium lacustre (Vanhöffen, 1911)													X				
	Apocorophium louisianum (Shoemaker, 1934)		X											X				
	Apocorophium simile (Shoemaker, 1934)		X											X				
	Caribboecetes barbadensis Just, 1983			X												X		
	Caribboecetes crassicornis Just, 1984			X												X		
	Caribboecetes intermedius Just, 1984													X		X		
	Caribboecetes justi Ortiz & Lemaitre, 1997												X					
	Caribboecetes pterycornis Just, 1984			X										X		X		
	Crassicorophium bonellii (Milne Edwards, 1830)	X																
	Laticorophium baconi (Shoemaker, 1934)		X															
	Leptocheirus rhizophorae Ortiz & Lalana, 1980	X	X											X				
	Monocorophium acherusicum (Costa, 1853)	X	X											X		X		
	Monocorophium insidiosum (Crawford, 1937)	X	X															
Family Cyphocarididae Lowry & Stoddart, 1997	*Cyphocaris anonyx* Boeck, 1871	X																
	Cyphocaris johnsoni Shoemaker, 1934			X														

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Cyproideidae Barnard, 1974	*Hoplopheonoides obesa* Shoemaker, 1956		X				X				X							
	Hoplopheonoides shoemakeri Ortiz, Lalana & Sanchez-Diaz, 2000	X																
Family Dexaminidae Leach, 1814	*Aberratylus aberrantis* (J.L. Barnard, 1962)			X														
	Atylus urocarinatus McKinney, 1980		X															
	Lepechinella raua J.L. Barnard, 1973											X						
	Nototropis minikoi (A.O. Walker, 1905)	X	X								X		X	X				
Family Endevouridae Lowry & Stoddart, 1997	*Ensayara jumane* Barnard & Thomas, 1990		X				X											
Family Eurytheneidae Stoddart & Lowry, 2004	*Eurythenes obesus* (Chevreux, 1905)		X															
Family Eusiridae Stebbing, 1888	*Eusirogenes adad* J.L. Barnard, 1964											X						
	Eusiroides monoculoides (Haswell, 1880)													X				
	Eusiroides yucatanensis McKinney et al., 1980													X				
	Nasageneia bacescui Ortiz & Lalana, 1994	X											X					
	Nasageneia comisariensis Ortiz & Lemaitre, 1997												X					
	Nasageneia yucatanensis Ledoyer, 1986		X										X	X				
	Pleusiroides alcoladoi Ortiz, Lalana & Varela, 2007	X																
	Pontogeneia bartschi Shoemaker, 1948	X												X				
	Rhachotropis lobata Shoemaker, 1934			X														
	Rhachotropis portoricana J.L. Barnard, 1964			X														
	Rhachotropis wimvaderi Ortiz, Lalana & Varela, 2007	X																
	Sennaia bidactyla Bellan-Santini, 1997															X		
	Tethygeneia longleyi (Shoemaker, 1933)	X												X				
Family Gammaridae Latreille, 1802	*Gammarus mucronatus* Say, 1818		X															
	Gammarus tigrinus Sexton, 1939													X				
Family Hadziidae Karaman, 1943	*Alloweckelia gurneei* Holsinger & Peck, 1968			X														
	Apoweckelia serrata Stock, 1985				X													
	Bahadzia bozonici Holsinger, 1992		X															
	Bahadzia jaraguensis Jaume & Wagner, 1998				X													
	Bahadzia latipalpus Stock, 1985				X													
	Bahadzia setodactylus Holsinger, 1992		X															
	Bahadzia yagerae Ortiz & Perez, 1995	X																

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Hadziidae Karaman, 1943	*Crangoweckelia mixta* Stock, 1985				X													
	Crangoweckelia spinicauda Stock, 1985				X													
	Mayaweckelia cenoticola Holsinger, 1977		X															
	Mayaweckelia yucatanensis Holsinger, 1977		X															
	Metaniphargus anchihalinus Stock, 1983					X												
	Metaniphargus bousfieldi Stock, 1977			X														
	Metaniphargus chaetodactylus Stock, 1985				X													
	Metaniphargus crenatus Stock, 1985				X													
	Metaniphargus curasavicus curasavicus Stephensen, 1933														X			
	Metaniphargus curasavicus orientalis Stock, 1977														X			
	Metaniphargus haitianus Stock, 1985				X													
	Metaniphargus hyporheicus Stock, 1983					X												
	Metaniphargus jamaicae (Holsinger, 1974)					X												
	Metaniphargus juberthiei Stock & Vermeulen, 1985															X		
	Metaniphargus longipalpus Stock, 1985				X													
	Metaniphargus palpator Stock, 1977															X		
	Metaniphargus pedunculatus Stock, 1985				X													
	Metaniphargus plumicauda Stock, 1985				X													
Family Hadziidae Karaman, 1943	*Metaniphargus sabulonis* Vonk, 1991																	X
	Pintaweckelia grandis Stock, 1985				X													
	Protohadzia schoenerae (Fox, 1973)	X	X	X														
	Saliweckelia emarginata Stock, 1977														X			
	Saliweckelia holsingeri Stock, 1977														X			
	Tuluweckelia cernua Holsinger, 1990		X															
Family Haustoriidae Stebbing, 1906	*Haustorius mexicanus* Ortiz, Cházaro-Olvera & Winfield, 2001													X				
Family Hyalellidae Bulycheva, 1957	*Parhyalella nisbetae* Lazo-Wasem & Gable, 2001	X														X		
	Parhyalella whelpleyi (Shoemaker, 1933)	X	X														X	
Family Hyalidae Bulycheva, 1957	*Apohyale media* (Dana, 1853)	X	X										X	X				
	Apohyale perieri (Lucas, 1849)	X	X											X		X		
	Hyale pygmaea Ruffo, 1950													X		X		
	Parargissa galatheae americana J.L. Barnard, 1961											X						

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Hyalidae Bulycheva, 1957	*Parhyale fascigera* Stebbing, 1897		X	X	X								X	X	X	X		
	Parhyale hawaiensis (Dana, 1853)	X	X	X	X								X	X	X	X		
	Parhyale inyacka K.H. Barnard, 1916	X												X				
	Protohyale diplodactyla (Stebbing, 1899)															X		
	Protohyale macrodactyla Stebbing, 1899		X											X		X		
	Audulla chelifera Chevreux, 1901	X	X											X				
	Chevalia aviculae Walker, 1904	X	X										X					
	Chevalia carpenteri Barnard & Thomas, 1987		X				X							X				
	Chevalia mexicana Pearse, 1912	X	X				X							X		X		
	Gammaropsis arawakia Thomas & Barnard, 1989					X								X				
	Latigammaropsis atlantica (Stebbing, 1888)	X	X										X	X				
	Latigammaropsis togoensis (Schellenberg, 1925)		X				X						X	X				
Family Isaeidae Dana, 1853	*Microprotopus raneyi* Wigley, 1966												X	X				
	Microprotopus shoemakeri Lowry, 1972													X				
	Photis dentata Shoemaker, 1945													X				
	Photis lecroyae Ortiz, Varela & Lalana, 2011	X																
	Photis longicaudata (Bate & Westwood, 1862)		X											X				
	Photis macromana McKinney, Kalke & Holland, 1978		X											X				
	Photis melanica McKinney, 1980		X											X				
	Photis pugnator Shoemaker, 1945		X															
	Photis sarae Souza-Filho & Serejo, 2010													X				
	Photis trapherus Thomas & J. L. Barnard, 1991	X	X		X	X								X		X		
Family Ischyroceridae Stebbing, 1899	*Cerapus benthophilus* Thomas & Heard, 1979		X											X				
	Cerapus cudjoe Lowry & Thomas, 1991		X											X				
	Cerapus orteai Ortiz & Thomas, 2007										X							
	Cerapus thomasi Ortiz & Lemaitre, 1997												X	X				
	Corocubanus guitarti Ortiz & Nazábal, 1984	X																
	Ericthonius brasiliensis (Dana, 1853)	X	X								X		X	X		X		
	Ericthonius rubricornis (Stimpson, 1853)		X											X				
	Microjassa tetradonta Conlan, 1995										X							
	Neoischyrocerus vidali Ortiz & Lalana, 2002	X																

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Leucothoidae Dana, 1852	*Anamixis cavatura* Thomas, 1997	X	X									X		X				
	Anamixis hanseni Stebbing, 1897	X					X						X					
	Anamixis vanga Thomas, 1997		X									X		X				
	Leucothoe ashleyae Thomas & Klebba, 2006		X	X				X				X						
	Leucothoe ayrtonia Bellan-Santini, 1997															X		
	Leucothoe barana Thomas & Klebba, 2007						X					X						
Family Leucothoidae Dana, 1852	*Leucothoe flammosa* Thomas & Klebba, 2007						X					X						
	Leucothoe garifunae Thomas & Klebba, 2007						X											
	Leucothoe kensleyi Thomas & Klebba, 2006		X				X					X						
	Leucothoe laurensi Thomas & Ortiz, 1995	X										X		X				
	Leucothoe panpulco J.L. Barnard, 1961											X						
	Leucothoe saron Thomas & Klebba, 2007						X					X						
	Leucothoe spinicarpa (Abildgaard, 1789)	X	X								X		X	X		X		
	Leucothoe ubouhu Thomas & Klebba, 2007						X					X						
	Leucothoe wuriti Thomas & Klebba, 2007						X					X						
	Nepanamixis dianthus Thomas, 1997						X											
Family Liljeborgiidae Stebbing, 1899	*Liljeborgia bousfieldi* McKinney, 1979	X	X															
	Listriella andresi Martin, Ortiz & Atienza, 2000													X				
	Listriella barnardi Wigley, 1966		X				X											
	Listriella carinata McKinney, 1979		X											X				
	Listriella diffusa J.L. Barnard, 1959	X																
	Listriella kensleyi Ortiz & Lalana, 1996	X																
	Listriella quintana McKinney, 1979		X															
Family Lysiannassidae Dana, 1849	*Bonassa bonairensis* (Stephensen, 1933)														X			
	Concarnes concavus (Shoemaker, 1933)		X				X				X	X						
	Eclecticus eclecticus Lowry & Stoddart, 1997											X						
	Lepiduristes lepidus (J.L. Barnard, 1964)			X														
	Lysianassa hummelincki Stephensen, 1933														X			
	Lysianopsis alba Holmes, 1903	X	X											X				
	Orchomene madagascarensis (Shoemaker, 1942)	X																
	Orchomene stocki Bellan-Santini, 1990															X		
	Orenoqueia serrata Bellan-Santini, 1997															X		

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Lysiannassidae Dana, 1849	*Ottenwalderia kymbalion* Jaume & Wagner, 1998				X													
	Paracentromedon carabicus J.L. Barnard, 1964											X						
	Shoemakerella cubensis (Stebbing, 1897)	X	X										X	X				
	Socarnopsis catacumba (Clark & Barnard, 1985)	X																
	Socarnopsis karamani Ortiz, Garcia-Debras & Lalana, 2003	X																
	Tryphosella apalachicola Lowry & Stoddart, 1997													X				
	Tryphosella uristesi Bellan-Santini, 1997															X		
Family Megaluropidae Thomas & Barnard, 1986	*Gibberosus myersi* (McKinney, 1980)		X											X				
	Resupinus spinicaudatus Thomas & Barnard, 1986						X											
Family Melitidae Bousfield, 1973	*Anamaera hixoni* Thomas & J. L. Barnard, 1985													X				
	Anelasmopus kraui Oliveira, 1953													X				
	Ceradocus (Denticeradocus) rubromaculatus (Stimpson, 1855)													X				
	Ceradocus (Denticeradocus) sheardi Shoemaker, 1948	X	X				X				X		X	X				
	Ceradocus shoemakeri Fox, 1973	X	X										X	X				
	Confodiopisa caesicola (Stock, 1980)														X			
	Dulichiella appendiculata (Say, 1818)	X	X								X			X				
	Dumosus atari Thomas & J. L. Barnard, 1985		X				X							X				
	Elasmopus balkomanus Thomas & J. L. Barnard, 1988												X	X				
	Elasmopus bampo J.L. Barnard, 1979													X				
	Elasmopus brasiliensis (Dana, 1853)												X					
	Elasmopus elieri Ortiz, Lalana & Varela, 2004													X				
	Elasmopus lemaitrei Ortiz & Lalana, 1994	X																
	Elasmopus levis (S. I. Smith, 1873)		X											X				
Family Melitidae Bousfield, 1973	*Elasmopus pectenicrus* (Bate, 1862)	X	X											X		X		
	Elasmopus pocillimanus (Bate, 1862)	X	X											X		X		
	Elasmopus rapax Costa, 1853	X	X											X		X		
	Elasmopus spinidactylus Chevreux, 1907	X												X				
	Elasmopus thomasi Ortiz & Lalana, 1994	X											X					
	Eriopisa incisa McKinney, Kalke & Holland, 1978													X				
	Eriopisa mochimae Van der Ham & Vonk, 2003													X				
	Hamimaera hamigera (Haswell, 1879)	X																

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Melitidae Bousfield, 1973	*Jerbarnia americana* Watling, 1981		X															
	Maera jerrica Krapp-Schickel & Jarrett, 2000		X															
	Maeracoota galani Krapp-Schickel & Ruffo, 2001													X				
	Maeropsis rathbunae (Pearse, 1908)	X												X				
	Mallacoota carausui Ortiz, 1976	X																
	Melita guanaense Ortiz, Garcia-Debras & Lalana, 2002	X																
	Melita leiotelson Vonk, 1989														X			
	Melita longisetosa Sheridan, 1980	X	X															
	Melita nitida Smith, 1873	X	X										X					
	Melita palmata (Montagu, 1804)												X					
	Melita persona G. Karaman, 1987													X				
	Melita planaterga Kunkel, 1910		X															
	Meximaera diffidentia J.L. Barnard, 1969												X					
	Netamelita barnardi McKinney, Kalke & Holland, 1978													X				
	Netamelita tabaci Thomas & Barnard, 1991						X											
	Nuuanu curvata Vonk, 1989														X			
	Nuuanu muelleri Ortiz, 1976	X	X											X				
Family Melitidae Bousfield, 1973	*Psammogammarus bluefieldensis* Ortiz, Lalana & Beltran, 1993									X								
	Psammogammarus longidactylus Vonk & Stock, 1987														X			
	Psammogammarus scopulorum Stock, 1983													X				
	Psammomelita uncinata Vonk, 1988														X			
	Quadrimaera cristianae Krapp-Schickel & Ruffo, 2000													X	X	X		X
	Quadrimaera inaequipes (A. Costa, 1851)	X												X				
	Quadrimaera miranda (Ruffo, Krapp & Gable, 2000)		X											X	X	X		
	Quadrimaera pacifica (Schellenberg, 1938)	X	X										X	X				X
	Quadrimaera pieteri Krapp-Schickel & Ruffo, 2000															X		
	Quadrimaera prope pacifica (Schellenberg, 1938)													X		X		X
	Quadrimaera quadrimana (Dana, 1852)	X	X											X				
	Quadrimaera sarae (Krapp-Schickel & Ruffo, 2000)	X	X											X				
	Quadrimaera serrata (Schellenberg, 1938)	X																
	Quadrivisio lutzi (Shoemaker, 1933)													X				

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Melitidae Bousfield, 1973	*Ruffomaera williamsi* (Bynum & Fox, 1977)	X																
	Spathiopus cojimarensis Ortiz & Lalana, 2002	X																
	Thalassostygius exiguus Vonk, 1990														X			
	Victoriopisa guanarocana Ortiz & Lalana, 1989	X																
Family Melphidippidae Stebbing, 1899	*Hornellia (Metaceradocus) atlantica* Thomas & Barnard, 1986						X											
	Hornellia (Metaceradocus) habanensis Ortiz, Lalana & Varela, 2008	X																
	Hornellia (Metaceradocus) tequestae Thomas & Barnard, 1986													X				
Family Neomegamphopidae Myers, 1981	*Neomegamphopus heardi* Barnard & Thomas, 1987													X				
Family Neomegamphopidae Myers, 1981	*Neomegamphopus hiatus* J. L. Barnard & Thomas, 1987		X											X				
	Neomegamphopus kalanii J. L. Barnard & Thomas, 1987													X				
	Pseudomegamphopus barnardi Myers, 1968										X							
	Pseudomegamphopus excavatus Myers, 1968													X				
Family Ochlesidae Stebbing, 1910	*Curidia monicae* Ortiz, Lalana & Varela, 2007	X																
	Curidia debrogania Thomas, 1983		X				X											
Family Oedicerotidae Liljeborg, 1865	*Aceroides (Patoides) synparis* (J.L. Barnard, 1964)											X						
	Americhelidium americanum (Bousfield, 1973)		X				X						X	X				
	Hartmanodes nyei (Shoemaker, 1933)		X				X							X				
	Monoculodes cf. carinatus (Bate, 1857)	X																
	Perioculodes cerasinus Thomas & J. L. Barnard, 1985		X				X				X						X	
	Westwoodilla longimana Shoemaker, 1934			X														
Family Phliantidae Stebbing, 1899	*Pariphinotus seclusus* (Shoemaker, 1933)	X	X				X				X			X				
	Pariphinotus seticoxa (Ortiz, 1976)	X																
Family Pardaliscidae Boeck, 1871	*Parpano cebus* J.L. Barnard, 1964												X					
	Parpano composturus J.L. Barnard, 1964			X														
Family Phoxocephalidae Sars, 1891	*Eobrolgus spinosus* Holmes, 1905	X	X											X				
	Harpinia excavata Chevreux, 1888											X						
	Harpinia intermedia Bellan-Santini, 1997															X		
	Heterophoxus oculatus (Holmes, 1908)	X												X				
	Metharpinia floridana (Shoemaker, 1933)	X	X								X	X	X	X				
	Metharpinia oripacifica J.L. Barnard, 1980										X							
	Microphoxus minimus J.L. Barnard, 1960										X							

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Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Phoxocephalidae Sars, 1891	*Proharpinia barbada* Bellan-Santini, 1997															X		
	Rhepoxynius epistomus (Shoemaker, 1938)	X																
Family Platyischnopidae Barnard & Drummond, 1979	*Eudevenopus honduranus* Thomas & J. L. Barnard, 1983		X				X	X			X		X	X				
	Eudevenopus metagracilis (J.L. Barnard, 1964)										X	X		X				
	Tiburonella morrocoyensis Ortiz, Martin & Atienza, 2000													X				
	Tiburonella viscana (J.L. Barnard, 1964)						X						X	X		X	X	
Family Podoceridae Leach, 1814	*Podocerus brasiliensis* (Dana, 1853)	X	X	X										X				
	Podocerus cristatus Thomson, 1879													X				
	Podocerus fissipes Serejo, 1995															X		
	Podocerus jareckii Baldinger & Gable, 2002															X		
	Podocerus kleidus Thomas & J. L. Barnard, 1992	X												X				
	Podocerus lazowasemi Baldinger & Gable, 1994													X				
Family Scopelocheiridae Lowry & Stoddart, 1997	*Aroui americana* Lowry & Stoddart, 1997		X															
Family Sebidae Walker, 1908	*Seba robusta* Ortiz & Lemaitre, 1997												X					
	Seba tropica McKinney, 1980		X				X							X				
Family Stegocephalidae Dana, 1853	*Stegocephaloides calypsonis* Verge, Vader & Galan, 2001													X				
Family Stenothoidae Boeck, 1871	*Parametopella texensis* McKinney, Kalke & Holland, 1978		X															
	Stenothoe gallensis Walker, 1904	X	X								X			X				
	Stenothoe valida Dana, 1852	X											X					
Family Synopiidae Dana, 1853	*Bruzelia pericu* J.L. Barnard, 1972											X						
	Bruzeliopsis turba J.L. Barnard, 1964											X						
	Garosyrrhoe bigarra (J.L. Barnard, 1962)						X							X				
	Garosyrrhoe luquei Ortiz & Veledo, 1988	X												X				
	Ileraustroe torpens (J.L. Barnard, 1962)			X														
	Latacunga comanita J.L. Barnard, 1972												X					
Family Synopiidae Dana, 1853	*Metatiron bellairsi* (Just, 1981)						X							X		X		
	Metatiron tropakis (J. L. Barnard, 1972)		X											X				
	Synopia scheeleana Bovallius, 1886															X		
	Synopia ultramarina Dana, 1853	X	X										X	X				
	Syrrhoe papyracea Stebbing, 1888															X		
	Tiron biocellata J.L. Barnard, 1962	X																

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Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Talitridae Rafinesque, 1815	*Chelorchestia costaricana* (Stebbing, 1906)			X							X					X		
	Floresorchestia guadalupensis Ciavatti, 1989															X	X	
	Orchestia grillus (Bosc, 1802)												X					
	Platorchestia platensis (Krøyer, 1845)		X	X												X		
	Pseudorchestoidea biolleyi (Stebbing, 1908)										X	X						
	Talorchestia fritzi Stebbing, 1903	X												X				
	Talorchestia marcuzzi Ruffo, 1950													X				
	Talorchestia margaritae Stephensen, 1948													X				
	Talorchestia sulensoni (Stebbing, 1899)															X	X	
	Tethorchestia antillensis Bousfield, 1984	X	X											X		X		
	Tethorchestia karukarae Ciavatti, 1989															X		
	Uhlorchestia uhleri (Shoemaker, 1930)		X															
Family Uristidae Hurley, 1963	*Stephonyx biscayensis* (Chevreux, 1908)		X	X												X		
	Stephonyx carinatus Bellan-Santini, 1997															X		
	Stephonyx incertus Bellan-Santini, 1997															X		
Family Vitjazianidae Birstein & Vinogradov, 1955	*Vemana compressa* J.L. Barnard, 1964											X						
	Vemana lizata J.L. Barnard, 1964												X					
Suborder Hyperiidea Milne Edwards, 1830																		
Family Brachyscelidae Stephensen, 1923	*Brachyscelus crusculum* Bate, 1861	X	X			X								X				
Family Brachyscelidae Stephensen, 1923	*Brachyscelus globiceps* (Claus, 1879)	X	X															
	Brachyscelus macrocephalus Stephensen, 1925	X																
	Brachyscelus rapacoides Stephensen, 1925		X															
	Thamneus rostratus Bovallius, 1887		X															
Family Cystisomatidae Willemoes-Suhm, 1875	*Cystisoma latipes* (Stephensen, 1918)		X															
	Cystisoma longipes (Bovallius, 1886)		X															
Family Dairellidae Bovallius, 1887	*Dairella californica* (Bovallius, 1885)		X															
Family Lycaeidae Claus, 1879	*Tryphana malmii* Boeck, 1871		X															
Family Iulopididae Zeidler, 2004	*Iulopis loveni* Bovallius, 1887		X															
Family Lanceolidae Bovallius, 1887	*Lanceola sayana* Bovallius, 1885		X															

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Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Lestrigonidae Zeidler, 2004	*Hyperietta luzoni* (Stebbing, 1888)		X															
	Hyperietta parviceps Bowman, 1973													X				
	Hyperietta stebbingi Bowman, 1973		X															
	Hyperietta stephenseni Bowman, 1973		X															
	Hyperietta vosseleri (Stebbing, 1904)		X															
	Hyperioides longipes Chevreux, 1900	X	X													X		
	Hyperionyx macrodactylus (Stephensen, 1924)		X															
	Lestrigonus bengalensis Giles, 1887	X	X			X								X		X		
	Lestrigonus crucipes (Bovallius, 1889)		X															
	Lestrigonus latissimus (Bovallius, 1889)		X															
	Lestrigonus macrophthalmus (Vosseler, 1901)	X	X											X		X		
	Lestrigonus schizogeneios (Stebbing, 1888)	X	X											X				
	Phronimopsis spinifera Claus, 1879		X															
	Themistella fusca (Dana, 1853)		X											X				
Family Lycaeidae Claus, 1879	*Lycaea bajensis* Shoemaker, 1925		X															
Family Lycaeidae Claus, 1879	*Lycaea bovallii* Chevreux, 1900		X															
	Lycaea bovallioides Stephensen, 1925		X															
	Lycaea pachypoda (Claus, 1879)	X	X															
	Lycaea pauli Stebbing, 1888		X															
	Lycaea pulex Marion, 1874		X											X				
	Lycaea vincentii Stebbing, 1888		X															
	Simorhynchotus antennarius (Claus, 1871)		X											X		X		
Family Lycaeopsidae Chevreux, 1913	*Lycaeopsis themistoides* Claus, 1879	X	X											X				
	Lycaeopsis zamboangae (Stebbing, 1888)		X															
Family Mimonectidae Bovallius, 1887	*Mimonectes gaussi* (Woltereck, 1904)		X															
Family Oxycephalidae Dana, 1853	*Cranocephalus scleroticus* (Streets, 1878)		X											X				
	Glossocephalus milneedwardsi Bovallius, 1887		X			X								X				
	Leptocotis tenuirostris (Claus, 1871)	X	X															
	Oxycephalus clausi Bovallius, 1887		X															
	Oxycephalus piscator Milne Edwards, 1830		X															
	Rhabdosoma minor Fage, 1954		X															

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Oxycephalidae Dana, 1853	*Rhabdosoma whitei* Bate, 1862	X	X															
	Streetsia challengeri Stebbing, 1888		X															
	Streetsia mindanaonis (Stebbing, 1888)		X															
	Streetsia porcella (Claus, 1879)	X	X															
	Streetsia steenstrupi (Bovallius, 1887)		X													X		
Family Paraphronimidae Bovallius, 1887	*Paraphronima crassipes* Claus, 1879		X															
	Paraphronima gracilis Claus, 1879		X													X		
Family Parascelidae Bate, 1862	*Parascelus edwardsi* Claus, 1879		X													X		
	Parascelus typhoides Claus, 1879		X															
	Schizoscelus ornatus Claus, 1879		X															
Family Parascelidae Bate, 1862	*Thyropus sphaeroma* (Claus, 1879)	X	X											X				
Family Phronimidae Rafinesque, 1815	*Phronima colletti* Bovallius, 1887	X	X															
	Phronima curvipes Vosseler, 1901		X															
	Phronima pacifica Streets, 1887		X															
	Phronima sedentaria (Forskal, 1775)		X											X		X		
	Phronima solitaria Guérin-Méneville, 1836		X															
	Phronima stebbingi Vosseler, 1901	X	X															
	Phronimella elongata (Claus, 1862)		X															
Family Phrosinidae Dana, 1853	*Anchylomera blossevillei* Milne Edwards, 1830		X													X		
	Phrosina semilunata Risso, 1882		X											X		X		
	Primno abyssalis Bowman, 1968		X															
	Primno brevidens Bowman, 1978		X															
	Primno evansi Sheader, 1986		X															
	Primno johnsoni Bowman, 1978		X															
	Primno latreillei Stebbing, 1888		X											X				
	Primno macropa Guérin-Méneville, 1836													X				
Family Platyscelidae Bate, 1862	*Amphithyrus bispinosus* Claus, 1879		X													X		
	Amphithyrus glaber Spandl, 1924		X															
	Amphithyrus muratus Volkov, 1982		X											X				
	Amphithyrus sculpturatus Claus, 1879		X															
	Hemityphis tenuimanus Claus, 1879	X	X															

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Platyscelidae Bate, 1862	*Paratyphis maculatus* Claus, 1879	X	X															
	Paratyphis parvus Claus, 1887		X															
	Paratyphis promontori Stebbing, 1888	X	X															
	Paratyphis spinosus Spandl, 1924		X															
	Platyscelus armatus (Claus, 1879)													X				
Family Platyscelidae Bate, 1862	*Platyscelus crustulatus* (Claus, 1879)		X													X		
	Platyscelus ovoides (Risso, 1816)	X	X											X				
	Platyscelus serratulus Stebbing, 1888	X	X															
	Tetrathyrus forcipatus Claus, 1879	X	X											X				
Family Pronoidae Dana, 1853	*Eupronoe intermedia* Stebbing, 1888		X															
	Eupronoe laticarpa Stephensen, 1925		X															
	Eupronoe maculata Claus, 1879	X	X											X				
	Eupronoe minuta Claus, 1879		X															
	Paralycaea gracilis Claus, 1879		X											X				
	Paralycaea hoylei Stebbing, 1888		X															
	Parapronoe crustulum Claus, 1879	X	X											X				
	Parapronoe parva Claus, 1879		X													X		
	Pronoe capito Guérin-Méneville, 1836		X															
Family Scinidae Stebbing, 1888	*Acanthoscina acanthodes* (Stebbing, 1895)		X															
	Scina borealis (Sars, 1882)		X													X		
	Scina crassicornis (Fabricius, 1775)		X															
	Scina curvidactyla Chevreux, 1914		X													X		
	Scina damasi Pirlot, 1929		X															
	Scina hurleyi australis Zeidler, 1998		X															
	Scina indica M. Vinogradov, 1964		X															
	Scina langhansi Wagler, 1926		X															
	Scina marginata (Bovallius, 1885)		X															
	Scina nana Wagler, 1926		X															
	Scina pacifica (Bovallius, 1887)		X															
	Scina similis Stebbing, 1895		X															
	Scina stenopus Stebbing, 1895		X															

APPENDIX 1 (Continued)

Suborder / Family	Species	CUB	MEX	PRC	HIS	JAM	BEL	HON	GUA	NIC	CRC	PAN	COL	VEN	ABC	LAN	TYT	CAY
Family Scinidae Stebbing, 1888	*Scina submarginata* Tattersall, 1906		X															
	Scina tullbergi (Bovallius, 1885)		X															
	Scina vosseleri Tattersall, 1906		X															
	Scina wagleri atlantis Thurston, 1976		X															
Family Vibiliidae Dana, 1853	*Vibilia armata* Bovallius, 1887	X	X															
	Vibilia australis Stebbing, 1888	X	X											X				
	Vibilia chuni Behning & Woltereck, 1912		X															
	Vibilia gibbosa Bovallius, 1887		X															
	Vibilia jeangerardi Lucas, 1845	X	X															
	Vibilia propinqua Stebbing, 1888	X	X															
	Vibilia stebbingi Behning & Woltereck, 1912		X															
	Vibilia viatrix Bovallius, 1887		X													X		
Suborder Ingolfiellidea Hansen, 1903																		
Family Ingolfiellidae Hansen, 1903	*Ingolfiella fontinalis* Stock, 1977														X			
	Ingolfiella fuscina Dojiri & Sieg, 1987		X															
	Ingolfiella grandispina Stock, 1979														X			
	Ingolfiella margaritae Stock, 1979													X				
	Ingolfiella putealis Stock, 1976														X			
	Ingolfiella quadridentata Stock, 1979														X			
	Ingolfiella tabularis Stock, 1977														X			