

New Records for GASTROPODA Class of Species Found in the Rocky Intertidal Zone of the Marine Priority Region 32, Guerrero, Mexico

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Abstract

The GASTROPODA class, one of the best known marine environments, is formed by a large number of species and the shape of their shell structure varies greatly. These mollusks are distributed from the intertidal zone all the way to the abyssal zone, and there are also swimming and floating species. This research was conducted at seven sites, located in the Marina Priority Region 32 (MPR 32), located in the State of Guerrero, Mexico. The aim of this report is to document the scope of the geographic distribution of the 34 species of GASTROPODA class. 11,263 total specimens were analyzed. 108 species were identified, of which four species are new records for Mexico, 15 for the Transitional Mexican Pacific, 11 for the State of Guerrero and four for the MPR 32. Here we report a significant number of new records of species of class GASTROPODA found on the rocky intertidal zone of the MPR 32. The reporting of these new records, demonstrates the need to focus research efforts on the study of marine diversity, since knowledge in this respect is quite incomplete, especially regarding marine mollusks, a fact that has been reported by the National Commission for the Management and Use of Biodiversity.

Keywords

GASTROPODA, Biodiversity, New Records, Intertidal Zone and Guerrero

1. Introduction

Mexico has seven of the 24 marine ecoregions into which North America is divided. Region 17, also called the Mexican Pacific Transitional includes the coastal waters of the states of Jalisco, Colima, Michoacán, Guerrero and Oaxaca and the southern tip of Baja California Sur. The physiography of this region is characterized by a narrow continental shelf with an amplitude of 10 - 15 km and a slope of less than 1°30', with a deep ocean trench and complex abyssal plains [1].

For the State of Guerrero the National Commission for the Knowledge and Use of Biodiversity (Comisión Nacional Para el Uso y Conocimiento de la Biodiversidad; CONABIO) stated that there are four marine priority areas for the conservation of coastal and ocean biodiversity; about these regions CONABIO has highlighted the lack of knowledge about the diversity of marine species.

The Marine Priority Region No. 32 (MPR 32) is located in the state of Guerrero and is known by the name Coyuca-Tres Palos, has an area of 829 km². This region is identified as an area of high biodiversity and that presents problems as reported by CONABIO due to the modification of the environment by discharges of fresh water, chemicals and fertilizers, live stock waste, damage to the environment by tourism, the use of its resources such as endangered bird species, the introduction of exotic species such as tilapia and coconut palm, and the lack of current regulations for the use of natural resources [2].

As part of the marine fauna that make up the MPR 32 are mollusks, and within this taxon is the GASTROPODA class, which are known as the best of the marine environment, being numerous and varied as to the form of their shells

These organisms have a muscular foot retractor having the function of moving the head and foot of the mollusk in the shell. They are distributed from the intertidal zone to the deep or abyssal zone, but there are also swimming and floating species [3].

For organisms that belong to the class GASTROPODA, there are reports concerning global taxonomic and geographical aspects [4] [5]. There are also reports of this type exclusive to the American Pacific as [6]-[8].

In the Mexican Pacific research has been conducted involving taxonomic aspects, composition and structure of communities; others include diversity, abundances, zonation, variation over time and geographical distribution of species, such as [9]-[24].

In particular for the coasts of Guerrero where there are reports of the class GASTROPODA analyzed as part of the set of classes studied, among which are those of [25]-[37], however, the class GASTROPODA in the coast of Guerrero, there are still many outstanding issues, regarding the knowledge of biodiversity. It is important to have an inventory of species, to study communities and composition, and to manage and maintain biodiversity of highly diverse regions such as the state of Guerrero in rational and responsible manner.

The aim of this contribution is to report the scope of geographical distribution for 34 species of the class GASTROPODA found in MPR 32.

2. Materials and Methods

Study Area

The coast of Guerrero is located in the 17th Marine Ecoregion of North America. As part of the coast of Guerrero is the MPR 32, (Coyuca-Tres Palos area) is located at latitude 16°35'24" to 17°28'12" and longitude 99°25'12" to 100°33' (Figure 1).

The climate is warm sub-humid, has an average annual temperature over 26°C, tropical storms and hurricanes occur from May to November. It belongs to the North American plate, is constituted by metamorphic rocks and a narrow platform. It is bathed by Costa Rica Coastal and North Equatorial Currents, receives fresh-water input from rivers, some areas are hit by harsh high surf waves, el Niño, red tide and other processes of turbulence occurs. It is an area with a rich and abundant biodiversity: mollusks, polychaetes, echinoderms, crustaceans, turtles, fish, birds, marine mammals, endemic fish and mangrove, and is an important bird feeding area. There are also regulatory issues; ignorance of current regulations for the use of resources and illegal fishing is frequent. This region is particularly important because it represents an area for several zoological groups with respect to conservation, especially birds and their diversified habitat, and the potential impact by tourism and the lack of information on this issue [2].

Sampling was conducted from 2009 to 2012 at seven sites: Parque de la Reina, Tlacopanocha, Majahua,

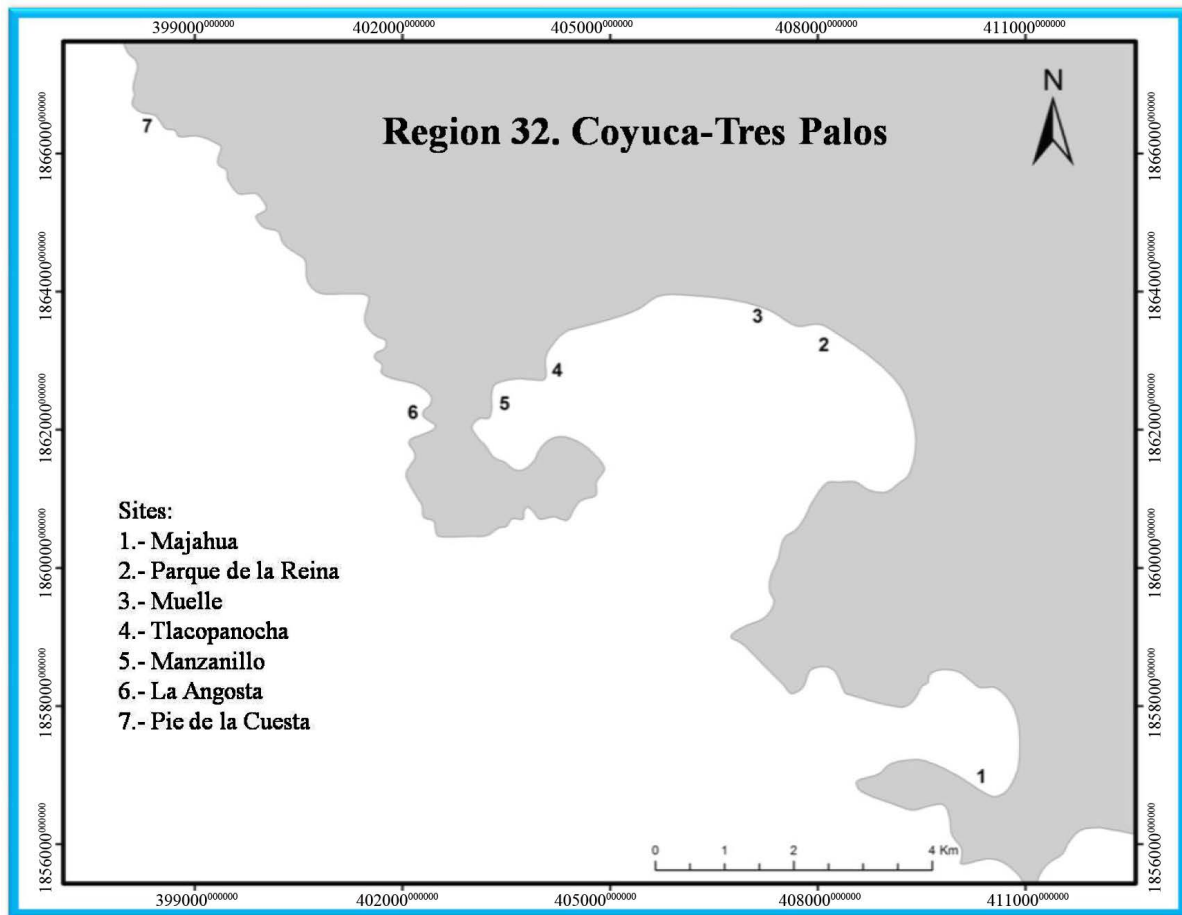


Figure 1. Marine Priority Regions in the state of Guerrero, Mexico and sampling sites. Source: National Commission for the Knowledge and Use of Biodiversity (CONABIO) Authors: C. Torreblanca-Ramírez, R. Flores-Garza and L. Galiana-Rebolledo.

Muelle, Manzanillo, La Angosta and Pie de la Cuesta. Geographical coordinates were registered for each site and described according to the following criteria: approximate length of the sampling area, the substrate structure and stability, rock type, and wave exposure of the substrate. Descriptions of the collection sites were based on [38], geological maps of the National Institute of Statistics, Geography and Informatics “Instituto Nacional de Estadística, Geografía e Informática” INEGI (Acapulco maps E14-11, 1:50,000), and complemented with field observations (Table 1).

The sites may change with the type of substrate, its stability and exposure to wave impact; and were classified as substrate Type: 1) Rock masses: fixed structures such as walls, cliffs, terraces, and alike. 2) Large boulders: unattached rocks larger than 50 cm, immovable or difficult to move by the waves impact. 3) Rolled boulders: loose rock smaller than 50 cm and greater than 8 cm. that can easily be moved by the impact of the waves. 4) Gravel: loose rocks or pebbles no larger than 8 cm. The substrate stability was classified as: 1) High: when the substrate remains practically unchanged by the impact of waves, 2) Middle: when the configuration of the substrate is basically not changed by the waves impact but there is some rock displacement, 3) Low: when the site configuration is changed by the impact of waves, most of the rocks are moved. Wave exposure was classified as: 1) High: when waves hits the unprotected substrate directly, 2) Middle: when the wave impact on the substrate is softened or hampered by barriers and 3) Low: when the wave does not hit directly, since the sites are protected by different types of barriers [39].

3. Collection of Samples

Three samples were conducted per site between 2009. Sampling was performed during the hours of low tide on

Table 1. Sampling sites considered in the study, indicating the location and relevant characteristics of the habitat.

Site	Coordinates		Length of the Site	Type of Substrate	Type of Rock	Substrate Stability	Wave Exposure
	Latitud N	Longitud W					
1	Majahua	16°50'58.27" 99°54'01.85"	600 meters	Large boulders and rolled boulders	Metamorphic	High	Low
2	Parque de la Reina	16°50'58.27" 99°54'01.85"	66.74 meters	Rolled boulders and gravel	Artificial substrate (construction rubble) and igneous rocks	Low	Middle
3	Muelle	16°50'56.86" 99°54'02.39"	60 meters	Large boulders and rolled boulders	Metamorphic rocks and artificial substrate (construction rubble)	Media	Middle
4	Tlacopanocha	16°50'41.53" 99°54'25.02"	200 meters	Large boulders and gravel	Artificial substrate (construction rubble) and igneous rocks	Media	Middle
5	Manzanillo	16°50'27.90" 99°54'38.14"	22.87 meters	Rolled boulders and gravel	Metamorphic and artificial substrate (construction rubble)	Low	Low
6	La Angosta	16°60'29.86" 99°54'55.70"	48.14 meters	Rock masses and rolled boulders	Metamorphic rocks	High	High
7	Pie de la Cuesta	16°52'25.64" 99°56'34.64"	66 meters	Rock masses and rolled boulders	Metamorphic rocks	High	High

new moon days. Sampling was carried out using quadrants and travels in search of organisms that were not found in the quadrants. The quadrants were used for the purpose of carefully reviewing an area and to keep smaller organisms from being excluded from the sample and this was carried out in the following way. The starting point was randomly selected, then a nylon rope 30 m long was placed parallel to the shore on the intertidal zone using a PVC pipe square frame 1 m per side to delimit the sampling unit. Once the starting point was established, the PVC frame was placed at the selected point. All GASTROPODA specimens found alive, even those attached under rocks within the sampling unit, were collected and placed into a plastic container filled with seawater and protected from direct sunlight. After completing the collection, a 2-m section along the rope was measured then the frame was again placed to define the following sampling unit. This procedure was repeated ten times along the length of the nylon rope.

Upon completion of the sampling there was a preservation of the specimens where there was doubt about its identification. The specimens were placed in jars with 96% ethyl alcohol and were transferred to the laboratory.

Laboratory Work and Data Analysis

The collected specimens were identified and quantified, using literature [5] and the nomenclature was updated according to [8]. Literature and specialized websites [40]-[42] were consulted to determine if the organisms identified in the field and returned alive to their habitat and collected were recorded in the Pacific Coast of Mexico and particularly in the MPR 32.

The collected specimens were measured in length and width and the values of descriptive statistics such as maximum, minimum, average and standard deviation were obtained, these values are expressed in millimeters and were obtained using a digital caliper.

Subsequently, the specimens were deposited in the National Collection of Molluscs at the National Institute of Biology, Universidad Nacional Autónoma de México and the Molluscs Collection of the Academic Unit of Marine Ecology of the Universidad Autónoma de Guerrero

4. Results

35 species were identified as new records. Four species are new records for Mexico ([Table 2](#) and [Figure 2](#)), 15

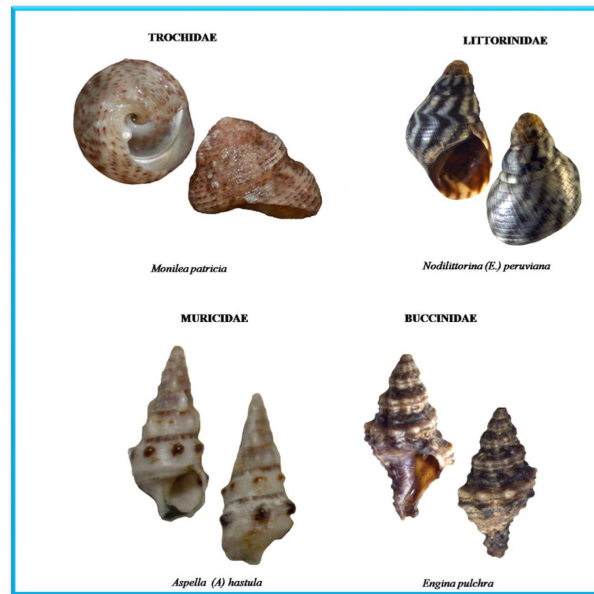


Figure 2. New records for Mexico. Pictures collection of marine invertebrates, Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero. Authors: C. Torreblanca-Ramírez, R. Flores-Garza, L. Galeana-Rebolledo y J.C. Ceros-Cornelio.

Table 2. New records for Mexico, examined material, sizes and distributions prior to this contribution.

Family/species	Revised number of specimens	Long sizes (mm)	Known distribution	New distribution
TROCHIDAE				
Rafinesque, 1815.				
		Mx. Min. A. Sd.		
<i>Monilea patricia</i> (Philippi, 1851).	12	10.33 4.21 7.05 1.98	West America to Nicaragua (Corintos) and Colombia. (A. Myra Keen 1971, WoRMS: World Register of Marine Species 2013 and WMSDB: Worldwide Mollusc Species Data Base 2013.)	Majahua 16°47'39.62"N y 99°50'29.02"W Tlacopanocha 16°50'41.53"N y 99°54'25.02"W
LITTORINIDAE				
Children, 1834.				
<i>Nodilittorina (Echinolittorina) peruviana</i> (Lamarck, 1822).	3	6.41 6.1 6.290.16	Central America, Costa Rica, Panama (Western Panama, Chiriqui Bay), Ecuador (Galapagos Islands), Peru (north of Punta Peña Negra, Talara) and Chile (Isla Serrano). (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013 and WMSDB: Worldwide Mollusc Species Data Base 2013.)	Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
MURICIDAE				
Follows Vokes, 1996.				
<i>Aspella (Aspella) hastula</i> (Reeve, 1844).	1		Costa Rica (Cocos Island), Panama (Gulf of Chiriqui), Ecuador (Galapagos Islands) and Colombia (Malpelo Island). (A. Myra Keen 1971, Carol Skoglund 2002, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013.)	Tlacopanocha 16°50'41.53"N y 99°54'25.02"W
BUCCINIDAE				
Rafinesque, 1815.				
<i>Engina pulchra</i> (Reeve, 1846).	1	6.45 6.45 6.45	North of El Salvador, Panama (Fortkobbe beach), Colombia (Gorgona Island) and Ecuador (Galapagos Islands) (A. MyraKeen 1971, Carol Skoglund 2002 and Discover Life 2013.)	Muelle 16°50'58.27"N y 99°54'01.85"W

Mx.: Maximum, Min.: Minimum, A.: Average and Sd.: Standard deviation.

are new records for the Transitional Mexican Pacific (Table 3 and Figure 3), 11 are new records for the state of Guerrero (Table 4 and Figure 4) and seven are new records for the Marine Priority Region 32 (Table 5 and Figure 5).



Figure 3. New records for Transitional Mexican Pacific. 1 A) *Hemitoma* (H.) *natlandi*, 2 B) *Tegula* (A.) *panamensis*, 3 C) *Arene* (A.) *hindsiana*, 4 D) *Rhinoclavis* (O.) *gemmata*, 5 D) *Seila* *assimolata*, 6 E) *Epitonium* (L.) *cookeanum*, 7 F) *Crucibulum* (D.) *subactum*, 8 G) *Coralliophila* (P.) *parva*, 9 H) *Parvanachis* *dalli*, 10 H) *Decipifus* *lyrta*, 11 I) *Melongena* *patula*, 12 J) *Mitra* *lignaria*, 13 K) *Cancellaria* (S.) *buccinoides* and 14 L) *Williamia* *peltoide*. Pictures collection of marine invertebrates, Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero. Authors: C. Torreblanca-Ramírez, R. Flores-Garza, L. Galeana-Rebolledo y J.C. Cerros-Cornelio.

Table 3. New records for Transitional Mexican Pacific, examined material, sizes and distributions prior to this contribution.

Family/species	Revised number of specimens	Long sizes (mm)				Known distribution	New distribution
		Mx.	Min.	A.	Sd.		
FISSURELLIDAE							
Fleming, C.A., 1822.							
<i>Hemitoma</i> (<i>Hemitoma</i>) <i>natlandi</i> Durham, 1950.	1	15.17	15.17	15.17		Mexico (Barra de Navidad, Jalisco), Panama (Panama Bay) and Colombia (Puerto Utria and Gorgona Island) (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013 and Discover Life 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W
TROCHIDAE							
<i>Tegula</i> (<i>Agathistoma</i>) <i>panamensis</i> (Philippi, 1849).	3	9.38	4.37	6.87	3.54	Mexico (Sonora), El Salvador (Playa La Libertad), Costa Rica (Del Coco and Jaco beaches), Panama (Venado Island), Ecuador, Colombia (north of the island of Gorgona) and Peru (south of Paita) (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W Manzanillo 16°50'27.90"N y 9°54'38.14"W
TURBINIDAE							
Rafinesque, 1815.							
<i>Arene</i> (<i>Arene</i>) <i>hindsiana</i> Pilsbry & Lowe, 1932.	3	6.67	5.47	6.07	0.84	American West, Mexico (Baja California Sur, Colima Manzanillo, Tres Marias Islands, Mazatlan and Manzanillo.) (A. Myra Keen 1971, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W Tlacopanocha 16°50'41.53"N y 99°54'25.02"W
CERITHIIDAE							
Fleming, 1822.							
<i>Rhinoclavis</i> (<i>Ochetoclava</i>) <i>gemmata</i> (Hinds, 1844).	6	9.93	6.98	8.45	2.08	Mexico (Magdalena Bay to the Gulf of California, Baja California Sur, Revillagigedo Island, Manzanillo, Colima;) Colombia (Gorgona Island) and Ecuador (Galapagos Islands) (A. Myra Keen 1971 and Carol Skoglund 2002).	Majahua 16°47'39.62"N y 99°50'29.02"W Parque de la Reina 16°50'58.27"N y 99°54'01.85"W Muelle 16°50'58.27"N y 99°54'01.85"W
<i>Seila assimilata</i> (C. B. Adams, 1852).	10	7.51	4.28	5.27	1.13	EE. UU. (Todas Santos Bay, California), Mexico (Puertecitos Baja California, Gulf of California, Todas Santos Bay, Bahia Magdalena and San Felipe, Baja California Sur and La Cruz, Nayarit), Costa Rica (Cocos Island) Panama (Panama Bay), Colombia (Malpelo Island and Gorgona Island) Ecuador (Galapagos Islands) and Peru (south of Tumbes). (A. Myra Keen 1971, WoRMS: World Register of Marine Species 2013 and Discover Life 2013).	Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
EPITONIIDAE							
Berry 1910.							
<i>Epitonium</i> (<i>Labeoscala</i>) <i>cookeanum</i> Dall, 1917.	2	8.0 7	7.2 8	7.6 7	0.55	EE. UU. (San Diego, California), Mexico (California Gulf, La Paz, Cabo San Lucas, Isla de Espiritu Santo, Baja California Sur. Peñasco Bay, Guaymas Sonora) west of Panama (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013 and Discover Life 2013).	Parque de la Reina 16°50'58.27"N y 99°54'01.85"W

Continued

CALYPTRAEIDAE
Lamarck, 1809.

									Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
									Muelle 16°50'58.27"N y 99°54'01.85"W
<i>Crucibulum</i> (<i>Dispotaea</i>) <i>subactum</i> Berry, 1963.	16	29.24	7.25	11.68	6.86	American West, Mexico (Gulf of California, Santa Rosalia, Baja California Sur, Guaymas, Sonora and Sinaloa) and Ecuador (south of Manabi Province)	(A. Myra Keen 1971, Carol Skoglund 2002, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).		Tlacopanocha 16°50'41.53"N y 99°54'25.02"W
									Pie de la Cuesta 16°52'25.64"N y 99°56'34.64"W

MURICIDAE

<i>Coralliophila</i> (<i>Pseudomurex</i>) <i>parva</i> (E. A. Smith, 1877)	1	9.05	9.05	9.05		Mexico (Puertecitos, Baja California, Gulf of California, La Paz, Baja California Sur, Revillagigedo Island, Bay of Santo Domingo, Manzanillo, Colima); Clipperton Island; Costa Rica (Cocos Island); Panama (Panama Bay and Deer Island); Colombia (Malpelo Island) and Ecuador (Galapagos Islands)	(A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).		Parque de la Reina 16°50'58.27"N y 99°54'01.85"W

COLUMBELLIDAE
Swainson, 1440.

									Majahua 16°47'39.62"N y 99°50'29.02"W
									Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
<i>Parvanachis dalli</i> (Bartsch, 1931)	352	6.96	2.57	5.55	0.59	Mexico (Cuastecomate Bay, Jalisco), Panama (Panama Bay and Tortola Island), Colombia (Malpelo Island), Ecuador (Punta Blanco) and southern Peru (Tumbes);	(A. Myra Keen 1971, Carol Skoglund 2002, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).		Muelle 16°50'58.27"N y 99°54'01.85"W
									Tlacopanocha 16°50'41.53"N y 99°54'25.02"W
									Manzanillo 16°50'27.90"N y 99°54'38.14"W
									Pie de la Cuesta 16°52'25.64"N y 99°56'34.64"W
<i>Decipifus lyrta</i> (Baker, Hanna & Strong, 1938)	9	8.77	7.3 4	7.9 5	0.4 9	West Part of America, Mexico (Northern Gulf of California to San Luis Gonzaga Bay, Port of San Felipe and Isla Angel de la Guarda, Baja California Sur and Mazatlan, Sinaloa)	(A. Myra Keen 1971, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).		Majahua 16°47'39.62"N y 99°50'29.02"W
									Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
									Tlacopanocha 16°50'41.53"N y 99°54'25.02"W

Continued

<i>Steironepion melanosticta</i>	1	4.57	4.57	4.57		Mexico (Gulf of California to Santa Rosalia Baja California Sur and Guaymas, Sonora) to Costa Rica (Coco Island, Guanacaste), Panama, Colombia (Malpelo Island) and Ecuador (South of the Province of Manabí and the Galapagos Islands) (A. Myra Keen 1971, Carol Skoglund 2002, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).	Tlacapanocha 16°50'41.53"N y 99°54'25.02"W
MELONGENIDAE							
Gill, 1871.							
<i>Melongena patula</i>	10	30.11	25.85	27.71	1.481	Mexico (Playa Estero, Ensenada, Baja California, Gulf of California, Mar de Cortez, Guaymas, Sonora and Barra de Navidad, Jalisco) west of Guatemala, Honduras (Balfate), Costa Rica, Panama (West of Panama in San Blas and Venado Island), Ecuador (Esmeralda) and Peru (Tumbes and Puerto Pizarro) (A. Myra Keen 1971, Carol Skoglund 2002, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).	Tlacapanocha 16°50'41.53"N y 99°54'25.02"W Manzanillo 16°50'27.90"N y 99°54'38.14"W Angosta 16°60'29.86"N y 99°54'5.70"W
MITRIDAE							
Swainson, 1829.							
<i>Mitra lignaria</i>	17	30.8	8.27	16.24	7.16	Mexico (Guaymas, Sonora y Mazatlán, Sinaloa) a Panamá; Colombia and Ecuador. (A. Myra Keen 1971, WoRMS: World Register of Marine Species 2013, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W Tlacapanocha 16°50'41.53"N y 99°54'25.02"W Manzanillo 16°50'27.90"N y 99°54'38.14"W
CANCELLARIIDAE							
Forbes & Hanley, 1851.							
<i>Cancellaria (Solatia) buccinoides</i>	1	4.66	4.66	4.66		Mexico (Magdalena Bay, Baja California Sur), Costa Rica (Puntaneras), Nicaragua, Chile, Peru (Pampa de Palo, Moquegua) and Chile (Iglesia Bay and Tongoy) (A. Myra Keen 1971 y Discover Life 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W Muelle 16°50'58.27"N y 99°54'01.85"W
SIPHONARIIDAE							
Gray, 1827.							
<i>Williamia peltoides</i>	1	5.51	5.51	5.51		North of EE. UU. (Crescent, California), Mexico (Southern California to the Gulf of California, Rocas Alijos Island, Revillagigedo Island, Manzanillo, Colima), Costa Rica (Cocos Island), North and South Panamic Province, Colombia (Malpelo Island) and Ecuador (Galapagos Islands). (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013 and WMSDB: Worldwide Mollusc Species Data Base 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W

Mx.: Maximum, Min.: Minimum, A.: Average and Sd.: Standard deviation.

Table 4. New records for the State of Guerrero, México, examined material, sizes and distributions prior to this contribution.

Family/species	Revised number of specimens	Long sizes (mm)				Known distribution	New distribution
		Mx	Min	A	Sd		
FISSURELLIDAE							
<i>Diodora digueti</i> (Mabille, 1895).	1	10.46	10.46	10.46		Mexico (San Ignacio Lagoon along the Gulf of California, Miramar beach Guaymas, Sonora and Baja California Sur, Mazatlan), Ecuador (south of Salinas). (A. Myra Keen 1971, WMSDB: Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Ortiz-Arellano y Flores-Campaña 2008).	Majahua 16°47'39.62"N y 99°50'29.02"W
PHASIANELLIDAE							
Swainson, 1840.							
<i>Eulithidium perforatum</i> (Philippi, 1848).	1	3.12	3.12	3.12		Mexico (La Paz, Baja California Sur, Mazatlan, Sinaloa, Jalisco), Ecuador, Colombia (Gorgona Island) and Chile (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013, WMSDB: Worldwide Mollusc Species Data Base 2013 and González-Villareal 2005).	Parque de la Reina 16°50'58.27"N y 99°54'01.85"W
HIPPONICIDAE							
Troschel, 1861							
<i>Hipponix delicatus</i> Dall, 1908.	19	14.09	6.13	10.02	2.13	America West and Bay of Panama. (A. Myra Keen 1971 and WMSDB: Worldwide Mollusc Species Data Base 2013).	Majahua 16°47'39.62"N y 99°50'29.02"W Muelle 16°50'58.27"N y 99°54'01.85"W Tlacapanocha 16°50'41.53"N y 99°54' 25.02"W Manzanillo 16°50'27.90"N y 99°54'38.14"W
CALYPTRAEIDAE							
<i>Crepidula striolata</i> Menke, 1851.	9	36.53	9.8	23.44	8.50	EE. UU. (San Diego, California), Mexico (Baja California, Gulf of California, Bahia de Kino, Guaymas, Sonora and Jalisco), El Salvador (San Salvador and San Miguel) and Panama (Las Perlas Island and Playa Cuco), Ecuador (the Southern Province of Manabi, Galapagos Islands) and Peru (South of San Bartolo) (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013, WMSDB: Worldwide Mollusc Species Data Base 2013 and Discover Life 2013.)	Majahua 16°47' 39.62"N y 99°50' 29.02"W Tlacapanocha 16°50' 41.53"N y 99°54' 25.02"W Manzanillo 16°50' 27.90"N y 99°54' 38.14"W

Continued

COLUMBELLIDAE

<i>Columbella aureomexicana</i> (Howard, 1963).	5	14.92	5.82	10.85	4.62	Mexico (Isla Cedros and Puertecitos Baja California, Northern Gulf of California to Topolobampo, Sinaloa, Cholla Bay and Miramar Beach, Sonora, Melaque, Jalisco and Manzanillo, Colima) (A. Myra Keen 1971, Carol Skoglund 2002, WMSDB-Worldwide Mollusc Species Data Base 2013 and Discover Life, 2013.)	Majahua 16°47' 39.62"N y 99°50' 29.02"W Parque de la Reina 16°50' 58.27"N y 99°54' 01.85"W Muelle 16°50' 58.27"N y 99°54' 01.85"W Tlacopanocha 16°50' 41.53"N y 99°54' 25.02"W
<i>Mitrella xenia</i> (Dall, 1919).	413	12.51	4.25	8.39	1.35	Mexico (Cabo San Lucas, Baja California Sur and south of Colima), Costa Rica and Panama Province (A. Myra Keen 1971, Carol Skoglund 2002, WMSDB-Worldwide Mollusc Species Data Base 2013 and Discover Life 2013.	Parque de la Reina 16° 50' 58.27" N y 99° 54' 01.85" W Muelle 16°50' 58.27" N y 99°54' 01.85" W Tlacopanocha 16°50' 41.53" N y 99°54' 25.02" W Manzanillo 16°50' 27.90" N y 99°54' 38.14"W La Angosta 16°60' 29.86" N y 99° 54' 55.70"W Pie de la Cuesta 16°52' 25.64"N y 99° 56' 34.64"W
<i>Costoanachis hilli</i> (Pilsbry & Lowe, 1932).	1	7.18	7.18	7.18		Mexico (North of California, Baja California Sur, Puerto Peñasco, Sonora and Mazatlán, Sinaloa;) to Nicaragua and Costa Rica. (A. Myra Keen 1971, WMSDB-Worldwide Mollusc Species Data Base 2013 and Discover Life 2013)	Tlacopanocha 16°50' 41.53"N y 99°54' 25.02"W
<i>Parvanachis gaskoini</i> (Carpenter, 1857).	7	7.32	7.32	7.32		Mexico (San Luis Gonzaga Bay, Baja California, Puerto Abreojos, Baja California Sur, Sonora Puerto Peñasco, Manzanillo, Colima) and Peru (Callo) (A. Myra Keen 1971, WMSDB-Worldwide Mollusc Species Data Base 2013 and Discover Life 2013)	Parque de la Reina 16°50'58.27"N y 99°54'01.85"W Muelle 16°50' 58.27"N y 99° 54' 01.85"W
<i>Nassarina (Cigclirina) helenae</i> Keen, 1971.	1					Mexico (Puertecitos, Ensenada, Baja California, Puerto Peñasco Guaymas, Sonora, Bahía Bandera, Nayarit, Colima Manzanillo and Puerto Huatulco, Oaxaca.) To Ecuador (south of Manabi Province) (A. Myra Keen 1971, Carol Skoglund 2002)	Majahua 16°47' 39.62"N y 99°50' 29.02"W

Continued

OLIVELLIDAE

Troschel, 1969.

Olivella
(*Olivella*) *dama* 1 7.37 7.37 7.37
(Wood, 1828)

Mexico (San Felipe Baja California, Gulf of California, Bahía Magdalena and La Paz, Baja California Sur, Padre Kino and Punta Colorada, Guaymas, Sonora, South Mazatlan, Sinaloa, Jalisco, Revillagigedo Island, Manzanillo, Colima, Oaxaca).

(A. Myra Keen 1971, Carol Skoglund 2002, WoRMS: World Register of Marine Species 2013, WMSDB-Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Zamorano *et al.*, 2008).

Parque de la Reina
16°50' 58.27"N y 99°54' 01.85"W

TURRIDAE

H. Adams & A. Adams, 1853.

Crassispira
(*Dallspira*)
cerithioidea 1 9.26 9.26 9.26
(Carpenter, 1857).

Mexico (Bahía de los Angeles, Baja California, Mazatlan, Sinaloa and Barra de Navidad, Jalisco, Oaxaca), Costa Rica (Cocos Island and Punta Arena) and Panama. (A. Myra Keen 1971; Carol Skoglund 2002; WMSDB-Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Zamorano *et al.* 2008).

Majahua
16°47' 39.62"N y 99°50' 29.02"W

Mx.: Maximum, Min.: Minimum, A.: Average and Sd.: Standard deviation.



Figure 4. New records for the State of Guerrero. Pictures collection of marine invertebrates, Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero. Authors: C. Torreblanca-Ramírez, R. Flores-Garza, L. Galeana-Rebolledo y J.C. Cerros-Cornelio.



Figure 5. New records for the Marine Priority Region 32. Pictures collection of marine invertebrates, Unidad Académica de Ecología Marina, Universidad Autónoma de Guerrero. Autores: C. Torreblanca-Ramírez, R. Flores-Garza, L. Galeana-Rebolledo y J.C. Cerros-Cornelio.

4. Conclusions

CONABIO reports that molluscs are a group about which little is known and further research is required in all of Mexico [2]. This contribution reports a significant number of new records for species of class GASTROPODA found on the rocky intertidal zone of the MPR 32, of which several of these records are for Mexico, others for Transitional Mexican Pacific, the state of Guerrero and the MPR 32. With these new records report, we demon-

Table 5. New records for the Marine Priority Region 32, Guerrero, Mexico, examined material, sizes and distributions prior to this contribution.

Family/species	Revised number of specimens	Long sizes (mm)				Known distribution	New distribution
		Mx	Min	A	Sd		
CALYPTRAEIIDAE							
<i>Crepidula aculeate</i> (Gmelin, 1791).	115	27.99	7.98	19.24	4.175	EE. UU. (Hawaii, California), Mexico (La Paz, Gulf of California, Baja California Sur, Pacific Coast, Jalisco and Revillagigedo Islands, Manzanillo, Colima, Zihuatanejo), Nicaragua, Costa Rica, Panama (Panama Canal), Colombia (Malpelo Island), Ecuador (Guayas Province and Galapagos Islands), Peru (Paita) and Chile (Valparaiso) (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS-World Register of Marine Species 2013, Discover Life 2013 and Salcedo <i>et al.</i> 1988)	Majahua 16°47' 39.62"N y 99°50' 29.02"W Parque de la Reina 16°50'58, 27"N y 99°54'01, 85"W Muelle 16°50' 58.27"N y 99°54' 01.85"W Tlacopanocha 16°50' 41.53"N y 99°54' 25.02"W Manzanillo 16°50' 27.90"N y 99°54' 38.14"W
CYMANTIIDAE							
Iredale, 1913.							
<i>Cymatium</i> (<i>Monoplex</i>) <i>vestitum</i> (Hinds, 1844).	1	49.63	49.63	49.63		Mexico (Baja California, Gulf of California; Revillagigedo Island Manzanillo, Colima, Zihuatanejo), Clipperton Island, Costa Rica (Cocos, Bahía Culebra), Panama (Venado Island), Colombia (Gorgona Island), Ecuador (Galapagos Islands) and Peru (Paita). (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS-World Register of Marine Species 2013, WMSDB-Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Salcedo <i>et al.</i> 1988).	Majahua 16°47' 39.62"N y 99°50' 29.02"W
MURICIDAE							
<i>Vitularia salebrosa</i> (King & Broderip, 1832).	4	19.99	15.65	18.13	2.49	Mexico (Isla Cedros, Baja California, La Paz, Gulf of California, Baja California Sur, Topolobampo, San Carlos, Guaymas, Sonora and Mazatlán, Sinaloa, Roca Partida and Isla Revillagigedo Manzanillo, Colima, Zihuatanejo), Costa Rica (Cocos) Panama (Coiba Island, East and West of Panama, Gobernadora Island and Montijo Bay) Colombia (Gorgona Island, Malpelo) Ecuador (Manabi Province, Bay Urvina and Galapagos Islands) and Peru (South Talara, Piura) (A. Myra Keen 1971, Carol Skoglund 2002, WoRMS-World Register of Marine Species 2013, WMSDB-Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Salcedo <i>et al.</i> 1988).	Ploaya Majahua 16°47' 39.62" N y 99°50' 29.02" W
COLUMBELLIDAE							
<i>Anachis</i> (<i>Anachis</i>) <i>scalarina</i> (Sowerby, 1832)	2	6.15	5.18	5.66	0.68	Mexico (Guaymas, Sonora and Mazatlán, Sinaloa, Zihuatanejo), Panama (Venado Island) (A. Myra Keen 1971, WMSDB-Worldwide Mollusc Species Data Base 2013, Discover Life 2013 and Salcedo <i>et al.</i> 1988.)	Playa Manzanillo 16°50' 27.90"N y 99°54' 38.14"W

Mx.: Maximum, Min.: Minimum, A.: Average and Sd.: Standard deviation.

strate the need to focus research efforts on the study of marine diversity. This has been noted by CONABIO, especially in regions that have been identified as priorities for conservation and use of biodiversity in Mexico.

This report increases the biodiversity information for malacological fauna on the local and regional scales and establishes a basis for future investigations of marine molluscs.

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