GAP-ANALYSIS MARINE BIODIVERSITY SOUTHERN GULF OF MEXICO

Nuno Simoes, Diana Ugalde, Nancy Suarez, Isaac Chacon, Raúl Castillo

Unidad Multidisciplinaria de Docencia e Investigación de Sisal, UNAM

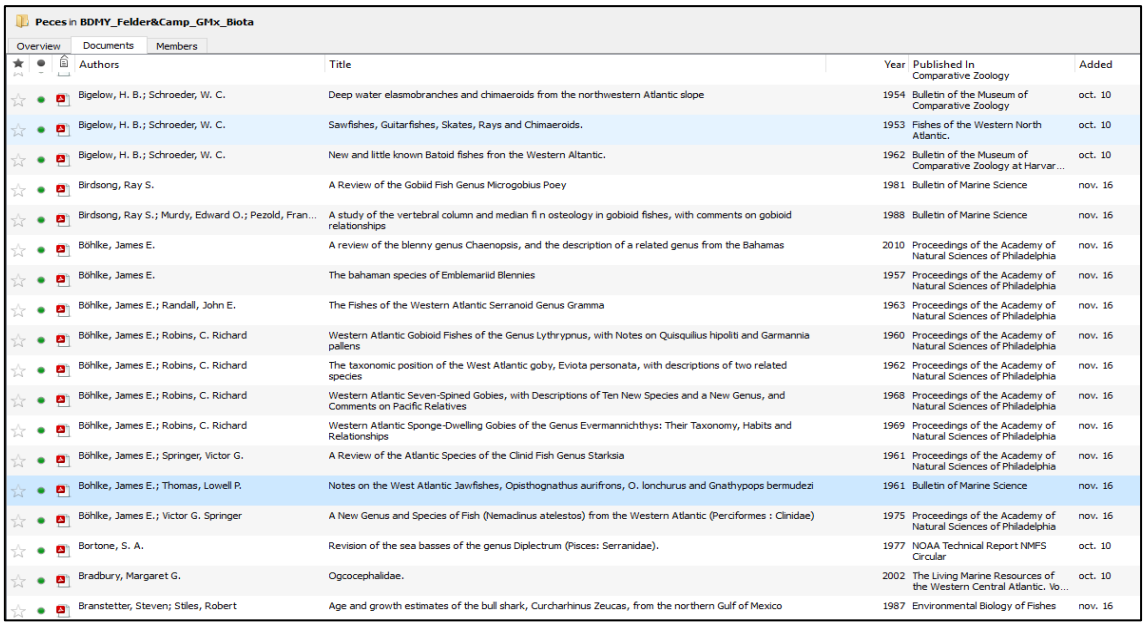
BDMY
BioDiversidad Marina de Yucatán

TABLA DE CONTENIDO

EXPECTED RESULTS

Availability in pdf format of bibliographic references for information search.

- Taxonomic description of species.
- Taxonomic revisions.
- Distribution maps.
- Geographic coordinates.
- The dynamic reports on bibliographic references.
- The relationship between bibliographic references and species cited.
- List of 15 or more references that cite the largest number of species.
- Bibliographical references available at Mendeley.
- Insert appointments in Word.
- Create a list of references cited.
- Distribution of species in the Gulf of Mexico.
- Octacts of the Gulf of Mexico.
- Bathymetric profile of the Gulf of Mexico.
- Dynamic bathymetric reports with maximum and minimum depth limits.
- Presented by class, orders, and families.
- Dynamic habitat reports.
- Identification of habitats with major and minor richness.



Peces in **BDMY_Felder&Camp_GMx_Biota**

Overview | Documents | Members

Authors	Title	Year	Published In	Added
Bigelow, H. B.; Schroeder, W. C.	Deep water elasmobranches and chimaeroids from the northwestern Atlantic slope	1954	Bulletin of the Museum of Comparative Zoology	oct. 10
Bigelow, H. B.; Schroeder, W. C.	Sawfishes, Guitarfishes, Skates, Rays and Chimaeroids.	1953	Fishes of the Western North Atlantic.	oct. 10
Bigelow, H. B.; Schroeder, W. C.	New and little known Batoid fishes fron the Western Altantic.	1962	Bulletin of the Museum of Comparative Zoology at Harvar...	oct. 10
Birdsong, Ray S.	A Review of the Gobiid Fish Genus Microgobius Poey	1981	Bulletin of Marine Science	nov. 16
Birdsong, Ray S.; Murdy, Edward O.; Pezold, Fran...	A study of the vertebral column and median fi n osteology in gobioid fishes, with comments on gobioid relationships	1988	Bulletin of Marine Science	nov. 16
Böhlke, James E.	A review of the blenny genus Chaenopsis, and the description of a related genus from the Bahamas	2010	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.	The bahaman species of Emblemariid Blennies	1957	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Randall, John E.	The Fishes of the Western Atlantic Serranoid Genus Gramma	1963	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Robins, C. Richard	Western Atlantic Gobioid Fishes of the Genus Lythrypnus, with Notes on Quisquilius hipoliti and Garmannia pallens	1960	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Robins, C. Richard	The taxonomic position of the West Atlantic goby, Eviota personata, with descriptions of two related species	1962	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Robins, C. Richard	Western Atlantic Seven-Spined Gobies, with Descriptions of Ten New Species and a New Genus, and Comments on Pacific Relatives	1968	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Robins, C. Richard	Western Atlantic Sponge-Dwelling Gobies of the Genus Evermannichthys: Their Taxonomy, Habits and Relationships	1969	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Böhlke, James E.; Springer, Victor G.	A Review of the Atlantic Species of the Clinid Fish Genus Starksia	1961	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Bohlke, James E.; Thomas, Lowell P.	Notes on the West Atlantic Jawfishes, Opisthognathus aurifrons, O. lonchurus and Gnathypops bermudezi	1961	Bulletin of Marine Science	nov. 16
Böhlke, James E.; Victor G. Springer	A New Genus and Species of Fish (Nemaclinus atelestos) from the Western Atlantic (Perciformes : Clinidae)	1975	Proceedings of the Academy of Natural Sciences of Philadelphia	nov. 16
Bortone, S. A.	Revision of the sea basses of the genus Diplectrum (Pisces: Serranidae).	1977	NOAA Technical Report NMFS Circular	oct. 10
Bradbury, Margaret G.	Ogcocephalidae.	2002	The Living Marine Resources of the Western Central Atlantic. Vo...	oct. 10
Branstetter, Steven; Stiles, Robert	Age and growth estimates of the bull shark, Curcharhinus Zeucas, from the northern Gulf of Mexico	1987	Environmental Biology of Fishes	nov. 16

Captura de pantalla del programa Mendeley, ilustrando parte de las referencias disponibles del grupo de los peces.

1. METADATA

The results presented here come from Felder & Camp's book, Gulf of Mexico Origin, waters, and Biota: Biodiversity, and the Biodiversity of the Gulf of Mexico Database for the following taxa: Molluscs, fish, decapods, Cnidarians, echinoderms, porifer, tunicates, and bryozoans. These databases were downloaded in October 2016, from Gulfbase.org (http://www.gulfbase.org/biogomx/).

A. LITERATURE

The literature of the different taxa was extracted from the bibliographic listing of the book Felder & Camp, 2009 and compared with that of the databases of Gulfbase.org for each taxon.

From the original database, a 1 to 1 relationship was generated between the species and each of the literature that cited it. This 1: 1 ratio allows the creation of PivotTables. Which, facilitate the specialized search of information. For example report of the 10 references that cite more species; Besides knowing what these species are.

At the same time, a checklist was created for the general list of references. This list served as a basis for marking those references, of which: your .pdf was obtained and information was added to Mendeley.

The main specialized search websites have been:

WEB SOURCE	***URL***
Word Porifera DataBase	*http://www.marinespecies.org/porifera/index.php*
Sci-hub	*http://sci-hub.cc/*
Texas A&M Theses & Dissertations	*http://oaktrust.library.tamu.edu/handle/1969.1/1*
NARCIS - National Academic Research and Collaborations Information System	*http://www.narcis.nl*
The Digital Academic Repository of Naturalis Biodiversity Center	*http://www.repository.naturalis.nl/*
Flanders Marine Institute. Plataform for Marine Research	*http://www.vliz.be/en/imis*
The Museum of Comparative Zoology (MCZ) at Harvard University	*http://www.mcz.harvard.edu/Publications/search_pubs.html*
Bulletin of the Florida State Museum, Biological Sciences	*https://www.flmnh.ufl.edu/bulletin/publications/*
The Biodiversity Heritage Library	*http://www.biodiversitylibrary.org/*
Jstor	*http://www.jstor.org/*
Blibliotecas UNAM	*http://dgb.unam.mx/*
Assembling the Tree of Life: Decapoda	*https://decapoda.nhm.org/*
World Register of Marine Species: WoRMS	*http://www.marinespecies.org/*
HathiTrust's digital library	*https://www.hathitrust.org/*
Molluscabase	*http://www.molluscabase.org/aphia.php?p=sources*
Internet Archive	*https://archive.org*

The references that are harder to find correspond to books, thesis, and dissertations of degree, as well as those references before the 50's and those with restricted access to the magazine that published them and requires an acquisition cost.

The Pdf that included a complete book or scientific journal, were extracted only the chapter or specific article. This helps to maintain a light weight of .pdf's.

All PDFs have been backed up in the BDMY Dropbox and Mendeley account.

B. GEOGRAPHIC DISTRIBUTION

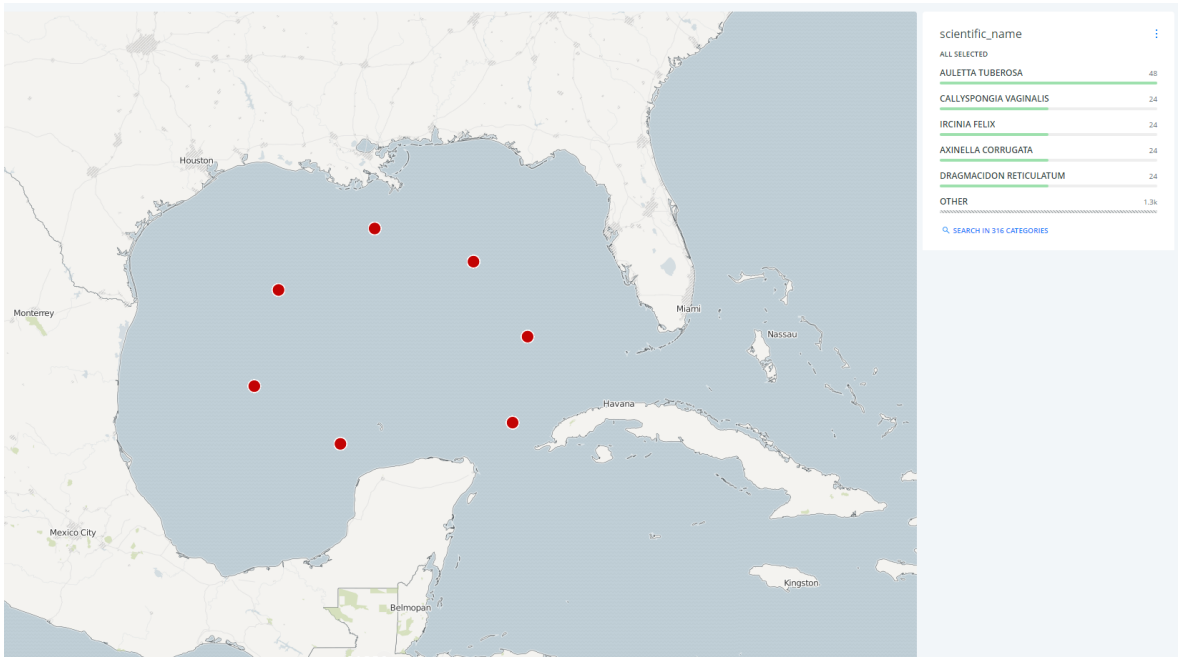
The Biodiversity of the Gulf of Mexico database; Downloaded from gulfbase.org, does not provide geographic distribution coordinates of the species. However, if it provides the polygons of its distribution over the Gulf of Mexico, through eight cardinal octants; From A to H. Likewise, it provides a simple bathymetric profile for each octant, divided into six levels.

However, in order to obtain this information in a more representative way, the codes of the polygons and species were arranged in relation 1 to 1. Subsequently, the correspondence of these codes was added with cardinal octants: NNE, ENE, ESE, SSE , SSW, WSW, WNW, and NNW. This was repeated for the cardinal quadrants NE, SE, NW and SW; As well as their respective levels of depth.

Species number	Scientific name	Class	Order	Family	Genus	Reg_Geo Octa	Reg_Geo Qua	Octante GMx	Octa Perfil
Spp-13-0002	Carijoa operculata	Anthozoa	Alcyonacea	Clavulariidae	Carijoa	ESE	SE	C	C3
Spp-13-0002	Carijoa operculata	Anthozoa	Alcyonacea	Clavulariidae	Carijoa	ESE	SE	C	C4
Spp-13-0002	Carijoa operculata	Anthozoa	Alcyonacea	Clavulariidae	Carijoa	SSE	SE	D	D3
Spp-13-0002	Carijoa operculata	Anthozoa	Alcyonacea	Clavulariidae	Carijoa	SSE	SE	D	D4

The new data tables generated, allows generating dynamic reports in Excel; Such as tables and dynamic charts. With which specific information can be obtained by octant or cardinal quadrant, by species, gender, family, order or by class.

At the same time, these tables are the basis for generating dynamic maps in the online platform: Carto.com (https://carto.com/). For this reason, given the lack of coordinated by species, these will be assigned arbitrarily in the geographical points of the Gulf of Mexico That allow representing the midpoint of each octant or cardinal quadrant.


Houston
Monterrey
Miami
Nassau
Havana
Mexico City
Belmopan
Kingston
scientific_name
ALL SELECTED
AULETTA TUBEROSA 48
CALLYSPONGIA VAGINALIS 24
IRCINIA FELIX 24
AXINELLA CORRUGATA 24
DRAGMACIDON RETICULATUM 24
OTHER 1.3k
SEARCH IN 316 CATEGORIES

C. PERFIRL BATIMETRICO

MAXIMUN AND MINIMUN DEPTH

A dynamic table was generated from the Biodiversity of the Gulf of Mexico database; In which one could work with the maximum and minimum depths of each species, genus, family, order or class.

In the obtained dynamic table, a taxonomic level (Order, Superfamily, Family) of few components was selected to be able to illustrate in a simple and clear way the graphical results of these dynamic tables.

In the values of the PivotTable, the values Max. Of Max depth (m) and Min. Of Min depth (m). Subsequently, the result of the PivotTable was pasted into the SigmaPlot program sheet, making sure that the first cell was unoccupied and populating the columns where the criteria in the first row were zero.

In the program SigmaPlot, the Scatter Plot (Vertical Dot), Add Plot and the format was chosen. In the Data Format option, XManyY was chosen. In the box for Dat for X you choose X: column 1 (the taxonomic criterion), Y1: column 2 (Max Depth), Y2: Column 3, since the three added criteria were placed end.

Afterward, the graph will appear on the sheet, it will appear with dotted lines that are removed for a better visualization. Then, double click on the Y axis and in the window that leaves the Scaling option is placed and in the section of Range the depths that appear are inverted so that the depths go from greater to lesser.

Then, double-click on the X axis, in the Labels option, the Bottom option is removed and selected from the Top, in the box of Major tick labels.

Then, double-click on the X-axis, on the Tick Label option, then click on the Tick label font option, select the Paragraph option and assign it the 45 ° rotation.

Since the graphs are ready, they were filled with bathymetric horizons. The criterion of bathymetric horizons was taken into account from WOODS HOLE OCEANOGRAPHIC INSTITUTION (http://web.whoi.edu/hades/).

MAXIMUN DEPTH

A dynamic table was generated from the Biodiversity of the Gulf of Mexico database; In which one could work with the maximum and minimum depths of each species, gender, family, order or class.

The Excel graphs presented in this report were obtained through the interaction between the maximum depth and the species count.

INTERVALE MAX DEPTH (M)	N° SPECIES
<1 o (en blanco)	*6*
1-201	*100*
201-401	*3*
401-601	*2*
601-801	*4*
801-1001	*6*
1201-1401	*1*
1401-1601	*5*
2801-3001	*3*
5201-5401	*2*
5801-6001	*1*

Example of dynamic table of Max Depth (m)

Once the graph was obtained, a data fragmentation was performed to segment the maximum depths of 0-200 m and 0-500 m intervals and thus generate the graph of these levels. These types of graphs can also be made for minimum depth and for the interval between the maximum and minimum depth.

D. HABITAT

As in the previous sections, the habitat data were worked from the database of Biodiversity of the Gulf of Mexico; Downloaded from gulfbase.org.

The data of each taxon were placed 1: 1 in the relation of the species with the different habitats where it is reported.

SPECIES NUMBER	*SCIENTIFIC NAME*	*CLASS*	*ORDER*	*FAMILY*	*GENUS*	*HABITAT-BIOLOGY*
Spp-71-0478	*Actinopyga agassizii*	*Holothuroidea*	*Aspidochirotida*	*Holothuriidae*	*Actinopyga*	*Coral reef*
Spp-71-0478	*Actinopyga agassizii*	*Holothuroidea*	*Aspidochirotida*	*Holothuriidae*	*Actinopyga*	*rubble*
Spp-71-0478	*Actinopyga agassizii*	*Holothuroidea*	*Aspidochirotida*	*Holothuriidae*	*Actinopyga*	*Sea grass*
Spp-71-0478	*Actinopyga agassizii*	*Holothuroidea*	*Aspidochirotida*	*Holothuriidae*	*Actinopyga*	*sand*
Spp-71-0442	*Agassizia excentrica*	*Echinoidea*	*Spatangoida*	*Schizasteridae*	*Agassizia*	*infaunal*

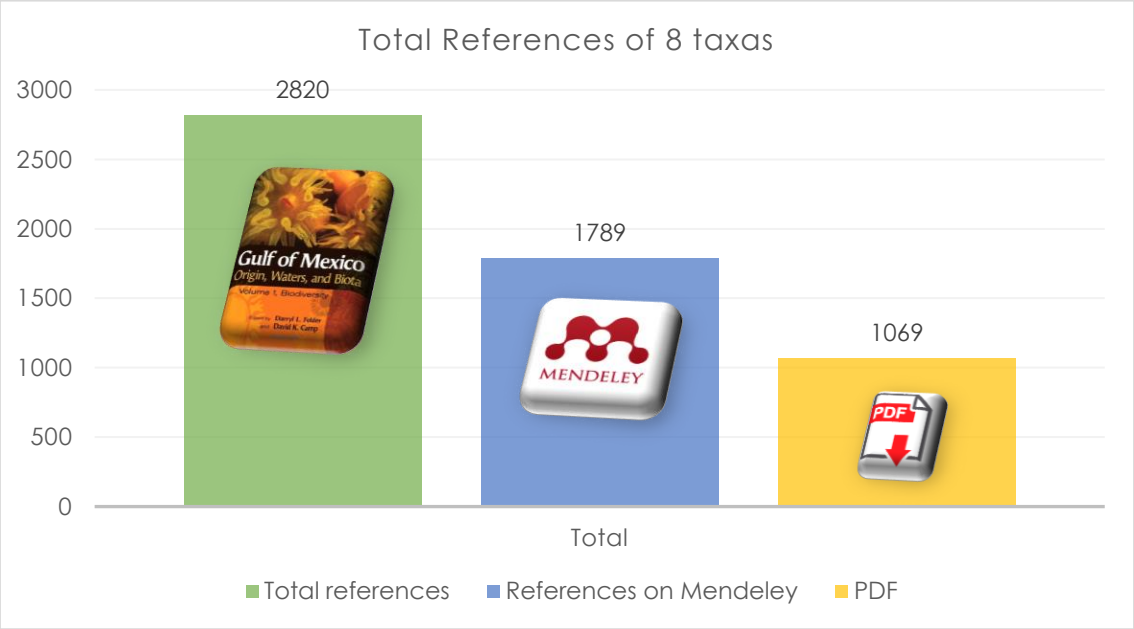
When are 1: 1 according to the fishbase.org page it was categorized in four ways: uses, habitat, occurrence, trophic ecology (also assigned the category of distribution and biology when required).

Already categorized was made a dynamic table where the "scientific name" was made and on the x-axis was placed the category "Habitat-Biology"

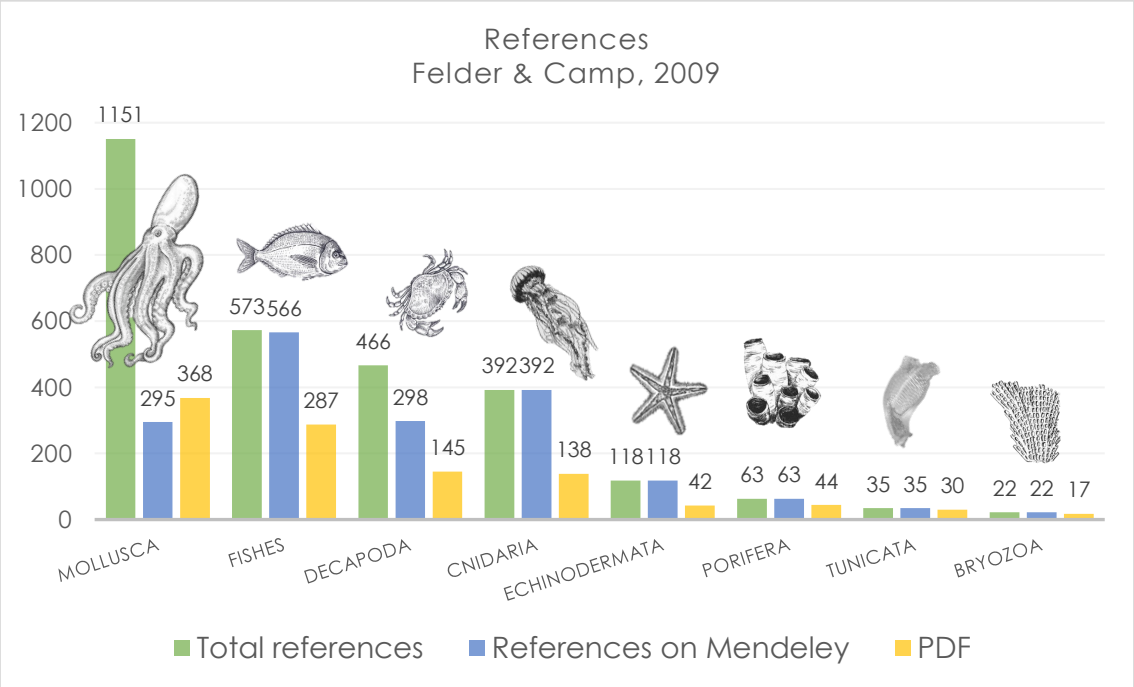
The graph was leaked only by Habitat and are those that are presented in this report.

2. LITERATURE

Actually, 38% of the PDFs are from the total literature of Felder & Camp, 2009; Of the 8 taxa worked. Of these, 63%, their appointments are already available in Mendeley.



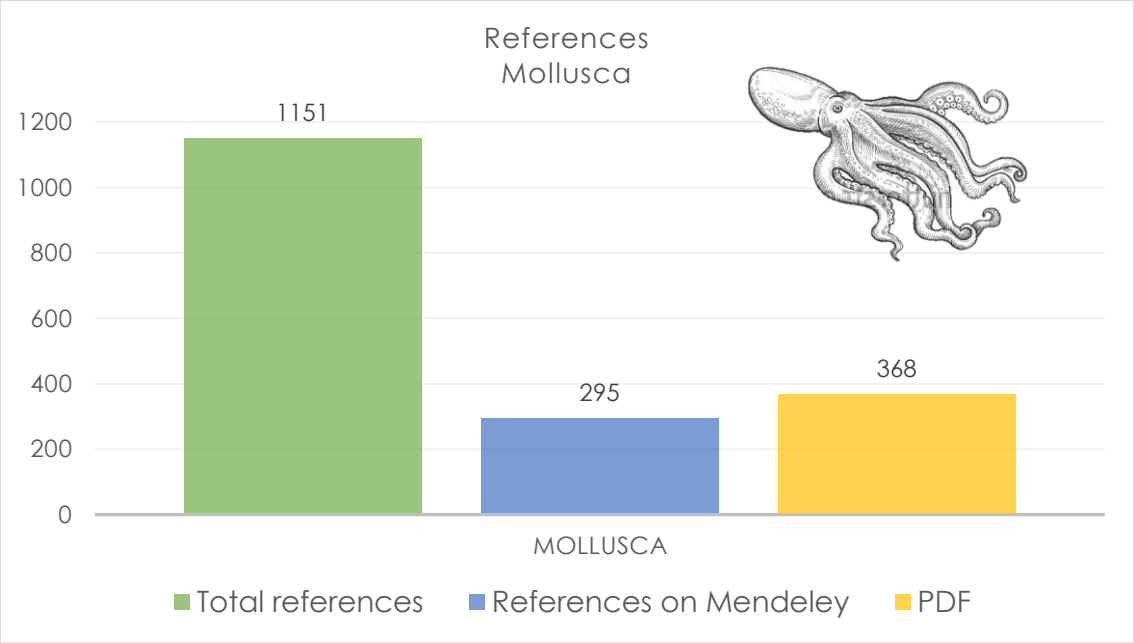
The references that have been more difficult to access, are books, reports, and thesis. Mainly because they are for sale, are restricted access or are not digitized



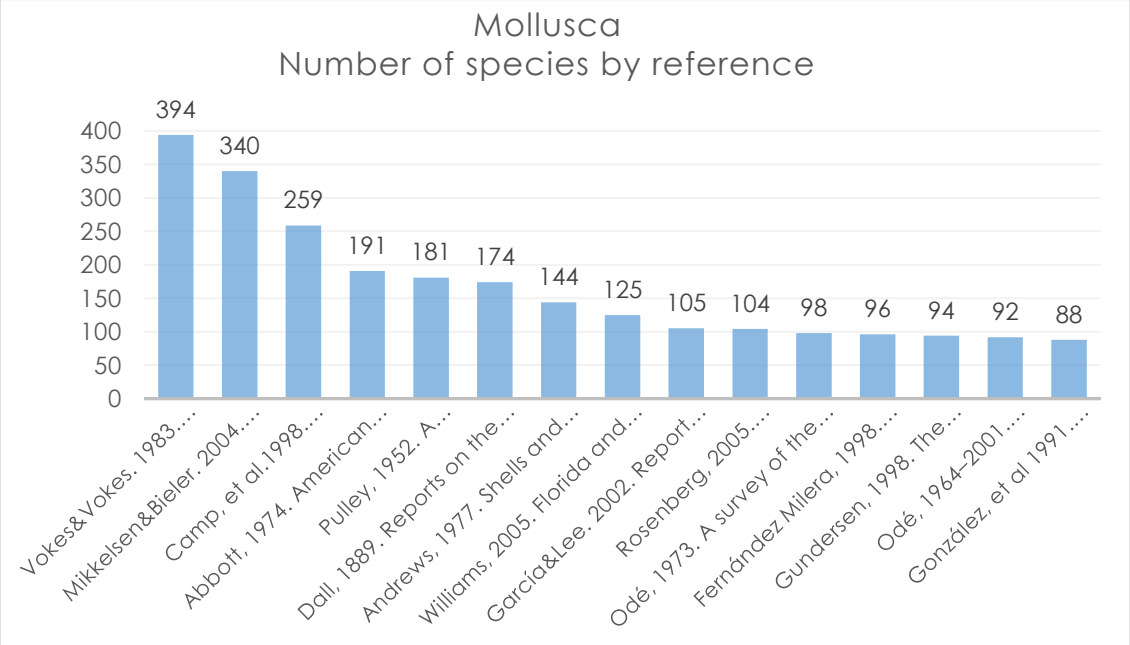
Total references. - Total number of references on Felder&Camp, 2009.
PDF. – Number of references with PDF available.
Mendeley Reference. – Number of references of Felder&Camp, 2009 available on Mendeley.

E. MOLLUSCA

In the book by Felder & Camp (2009), the Phylum Mollusca comprises 2458 species; Cited in 1151 bibliographical references. Currently, there are 32% of references in PDF and 26% of citations are already available in Mendeley.



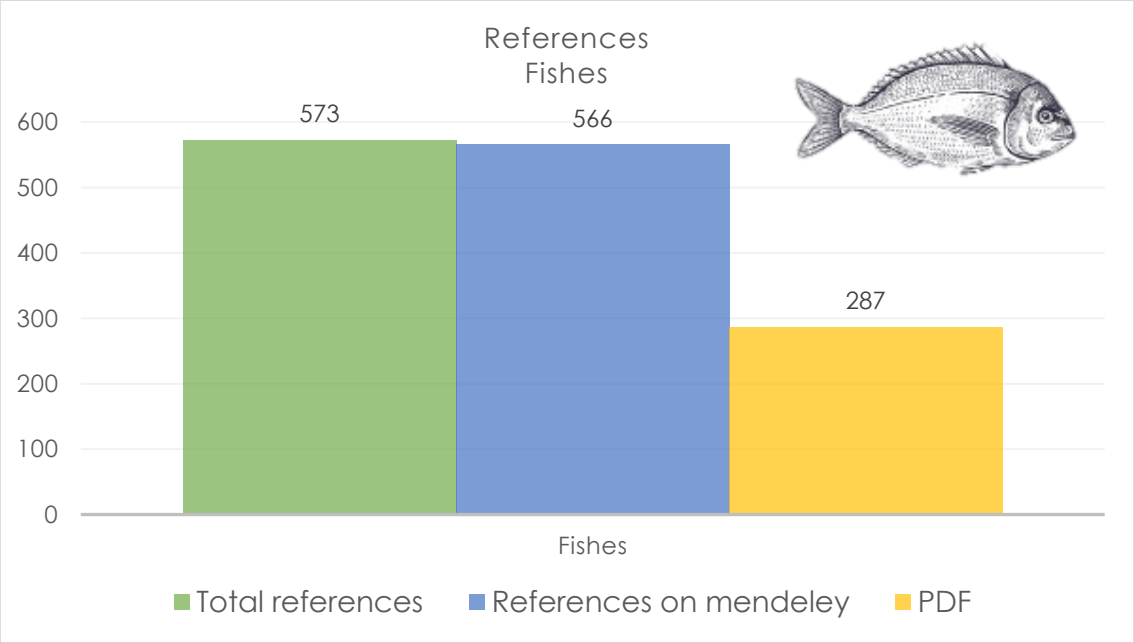
The 15 references that cite the largest number of species, cite 1369 species (56% of total species). Of these, we have 8 of 15 references in PDF.



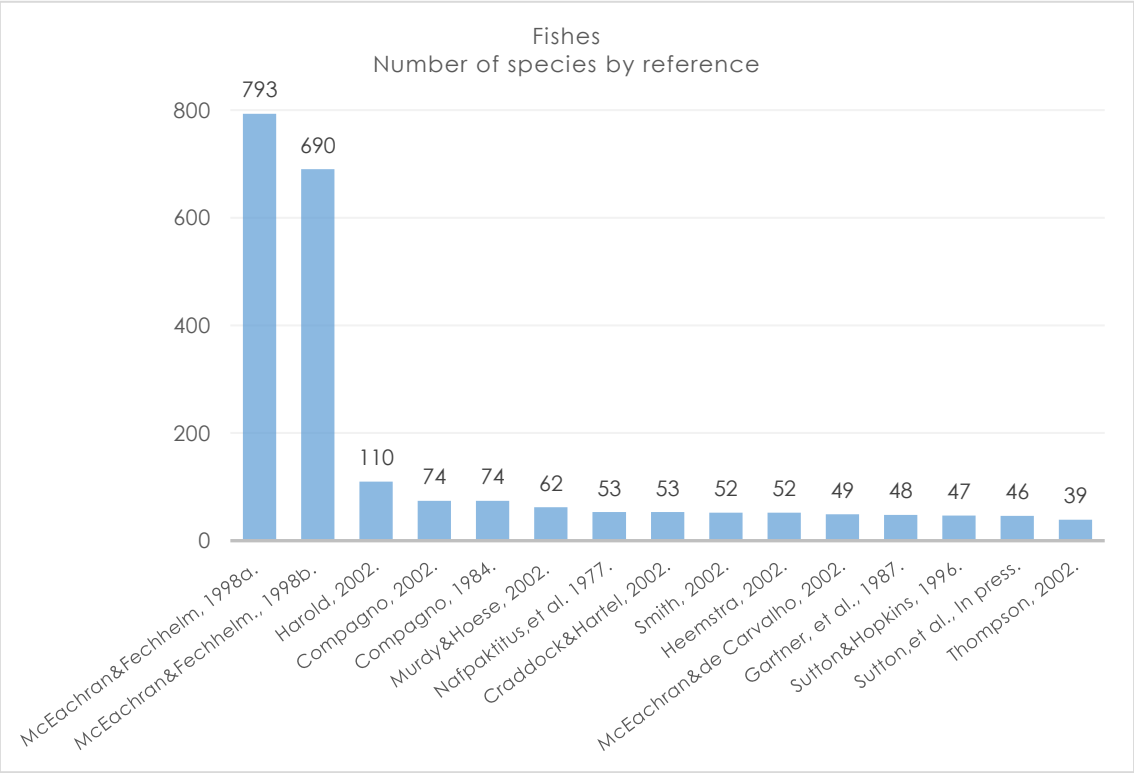
REFERENCES	***N° SP***	***PDF***
Vokes&Vokes. 1983. Distribution Mollusca, Yucatan	*394*	*0*
Mikkelsen&Bieler. 2004. Critical catalog of bivalve Florida	*340*	*1*
Camp, et al.1998. Checklists of marine invertebrates of Florida.	*259*	*1*
Abbott, 1974. American Seashells: The Marine Mollusca	*191*	*1*
Pulley, 1952. A zoogeographic study on bivalves GMx [PhD dissertation].	*181*	*0*
Dall, 1889. Reports on the results of dredgings of Alexander Agassiz, GMx	*174*	*1*
Andrews, 1977. Shells and Shores of Texas. University of Texas Press	*144*	*1*
Williams, 2005. Florida and Caribbean Turridae	*125*	*0*
García&Lee. 2002. Report on molluscan species of Louisiana	*105*	*1*
Rosenberg, 2005. Malacolog 4.0: A database of Mollusca.	*104*	*0*
Odé, 1973. A survey of the molluscan fauna of GMx	*98*	*1*
Fernández Milera, 1998. Joyas de Cuba.	*96*	*0*
Gundersen, 1998. The Seashells of Sanibel and Captiva Islands.	*94*	*0*
Odé, 1964–2001. Distribution and records of the marine Mollusca in GMx	*92*	*1*
González, et al 1991. Distribution patterns of gastropods and bivalves Yucatan	*88*	*0*
Total number of species no replicated	***1369***	
Total number of species in Felder&Camp, 2009	*2458*	

F. PECES

Felder & Camp (2009) cites 1542 species of fish in 573 references. 50% of PDF references are available and 99% of citations are now available in Mendeley.



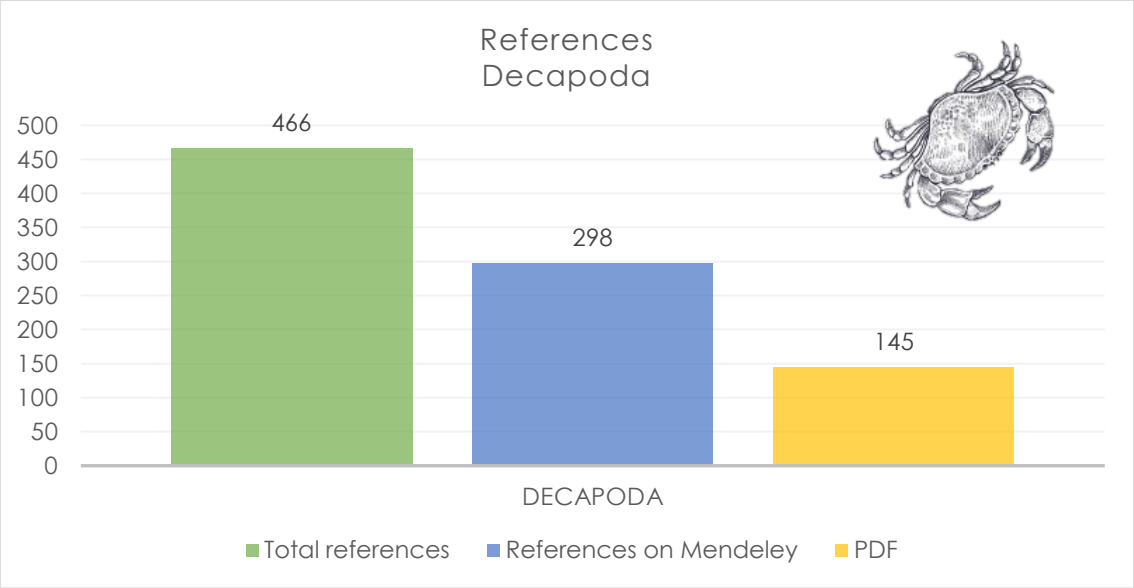
The 15 references cite 1509 species (97% of total species). Of these, we have 9 of 15 references in PDF.



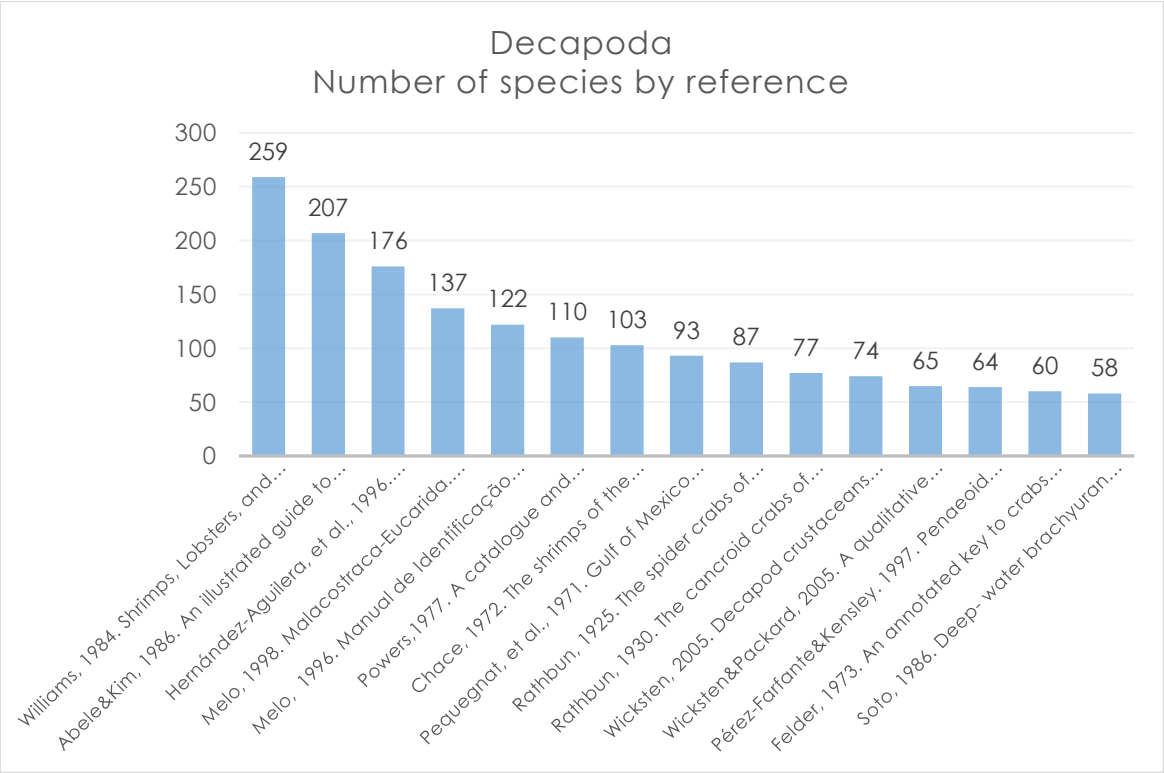
REFERENCES	SP	PDF
McEachran&Fechhelm. 1998. Fishes of the Gulf of Mexico. Vol.1	793	0
McEachran&Fechhelm. 1998. Fishes of the Gulf of Mexico. Vol.2	690	0
Harold.2002. Order Stomiiformes. In: Carpenter. The Living Marine R.	110	1
Compagno. 2002.Sharks. In: Carpenter. The Living Marine Resources	74	1
Compagno. 1984. Sharks of the world. In: FAO Species Catalogue. Vol. 4.	74	1
Murdy&Hoese. 2002. Gobiidae. In: Carpenter. The Living Marine Resources	62	0
Nafpaktitus, et al. 1977. Family Myctophidae. In Gibbs et al. Fishes of the Western	53	0
Craddock&Hartel. 2002. Myctophidae. In: Carpenter. The Living Marine R.	53	1
Smith.2002. Order Anguilliformes. In: Carpenter. The Living Marine R.	52	1
Heemstra. 2002. Serranidae. In: Carpenter. The Living Marine Resources	52	0
McEachran&de Carvalho. 2002. Batoid fishes. In: Carpenter. The Living Marine Resources	49	1
Gartner, et al. 1987. The lanternfishes of the eastern GMx	48	1
Sutton&Hopkins. 1996. Stomiid fish assemblage of GMx	47	1
Sutton, et al. In press. The bathypelagic fish assemblage of the GMx	46	0
Thompson.2002. Aulopiformes. In: Carpenter. The Living Marine Resources	39	1
Total number of species no replicated	**1509**	
Total number of species in Felder&Camp, 2009	1542	

G. DECAPODA

Felder & Camp (2009), cites 1007 species of decapods in 466 references. 31% of references are available in PDF and 64% of citations are now available in Mendeley.



The 15 main references cite 780 species (77% of the total species). Of these, we have 2 of 15 references in PDF.

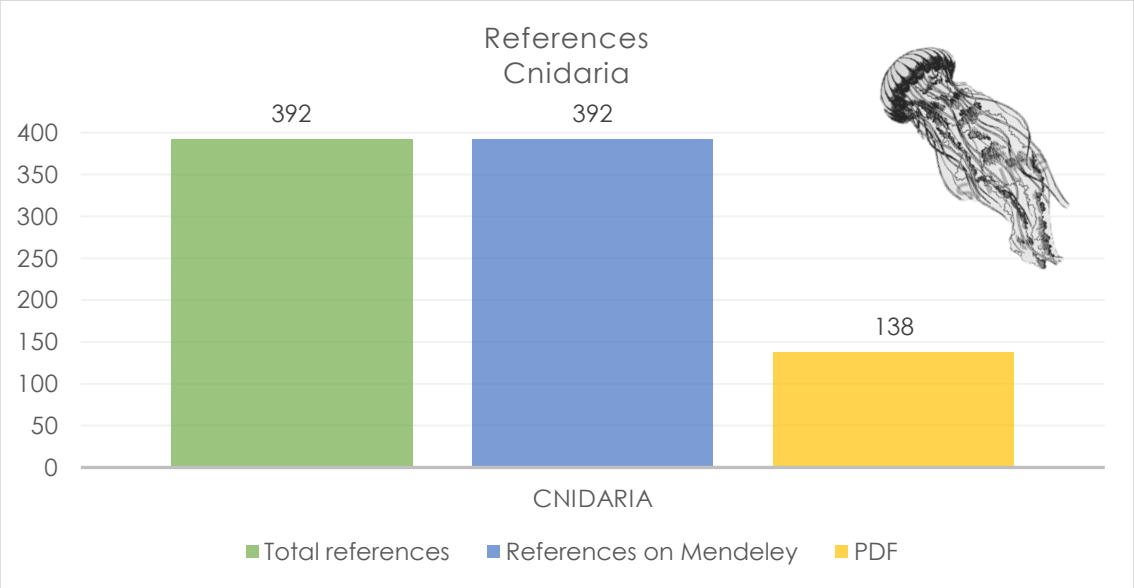


SP ***PDF***

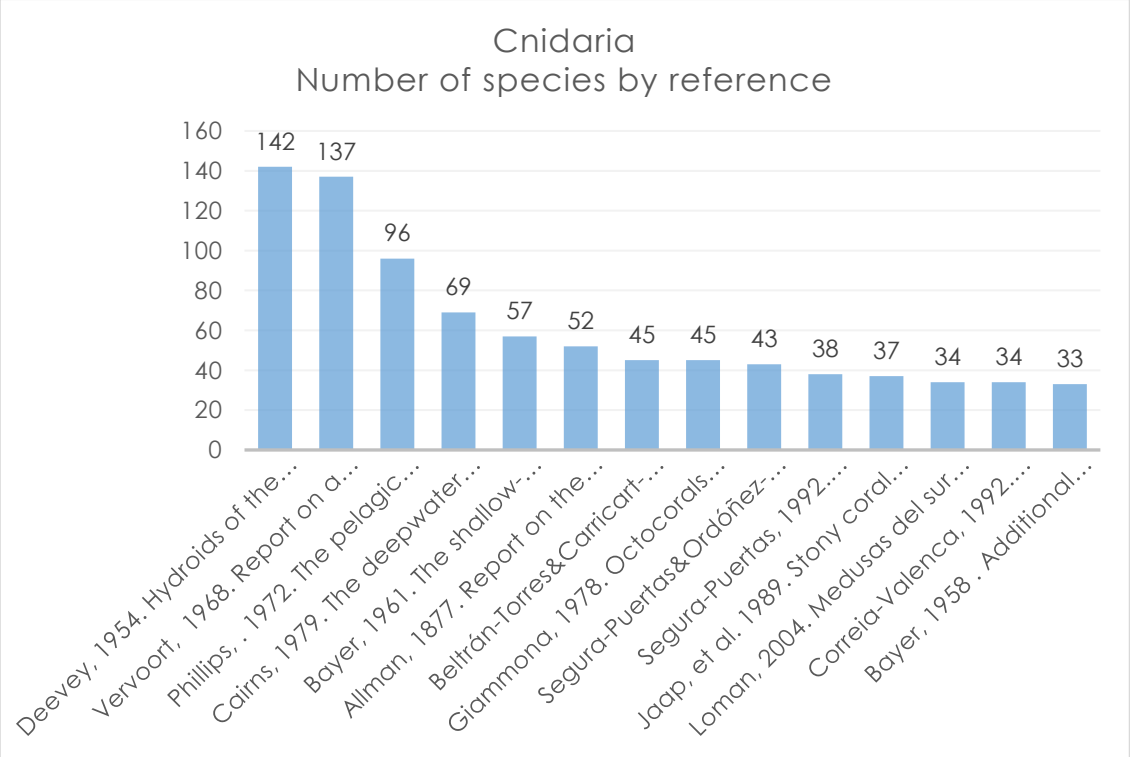
Williams, 1984. Shrimps, Lobsters, and Crabs United States, Maine to Florida	*259*	*1*
Abele&Kim, 1986. Illustrated guide to the marine decapod crustaceans of Florida	*207*	*0*
Hernández-Aguilera, et al., 1996. Especies catalogadas de crustaceos estomatopodos y decapodos para el GMx	*176*	*0*
Melo, 1998. Malacostraca-Eucarida. Brachyura. Oxyrhyncha and Brachyrhyncha	*137*	*0*
Melo, 1996. Manual de Identificação dos Brachyura do Litoral Brasileiro	*122*	*0*
Powers,1977. A catalogue and bibliography to the crabs (Brachyura) of Gmx	*110*	*0*
Chace, 1972. The shrimps of the Smithsonian-Bredin Caribbean Expeditions	*103*	*1*
Pequegnat, et al., 1971. GMx Deep- Sea Fauna, Decapoda and Euphausiacea	*93*	*0*
Rathbun, 1925. The spider crabs of America	*87*	*0*
Rathbun, 1930. The cancroid crabs of America of the families	*77*	*0*
Wicksten, 2005. Decapod of the Flower Garden Banks National Marine Sanctuary	*74*	*0*
Wicksten&Packard, 2005. A qualitative zoogeographic analysis decapod GMx	*65*	*0*
Pérez-Farfante&Kensley. 1997. Penaeoid and Sergestoid Shrimps and Prawns	*64*	*0*
Felder, 1973. An annotated key to crabs and lobsters from coastal waters GMx	*60*	*0*
Soto, 1986. Deep- water brachyuran crabs of the Straits of Florida Decapoda	*58*	*0*
Total number of species no replicated		
Total number of species in Felder&Camp, 2009	*1007*	

H. CNIDARIA

Felder & Camp (2009) cites 762 species of Phylum Cnidaria in 392 references. 35% of references are available in PDF and 100% of citations are now available in Mendeley.



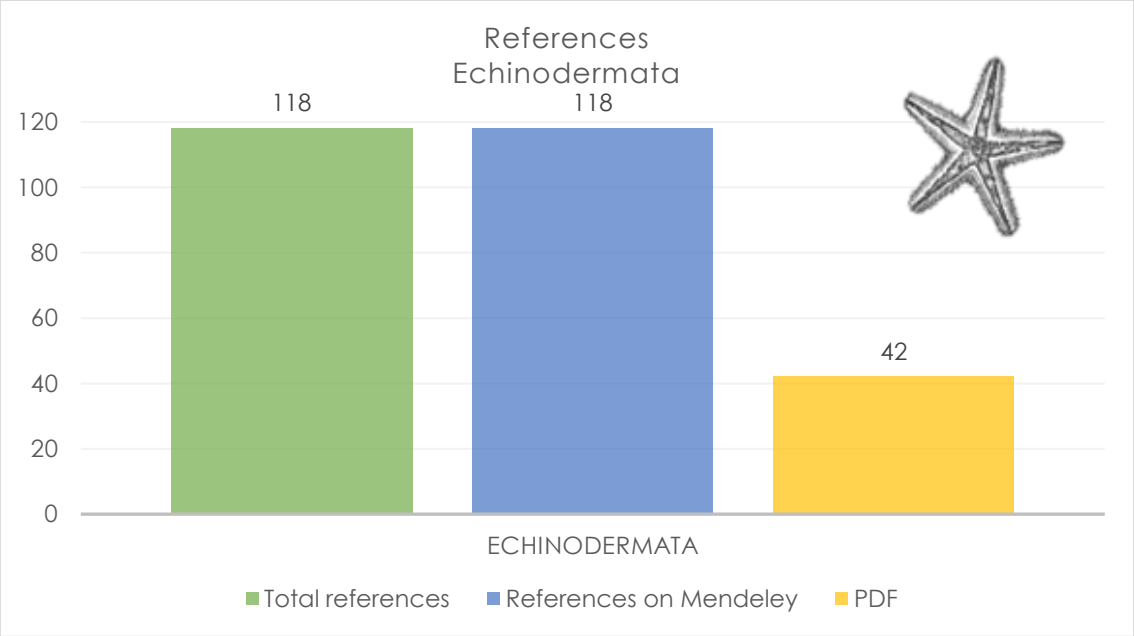
The 15 main references cite 511 species (67% of the total species). Of these, we have 9 of 14 references in PDF.



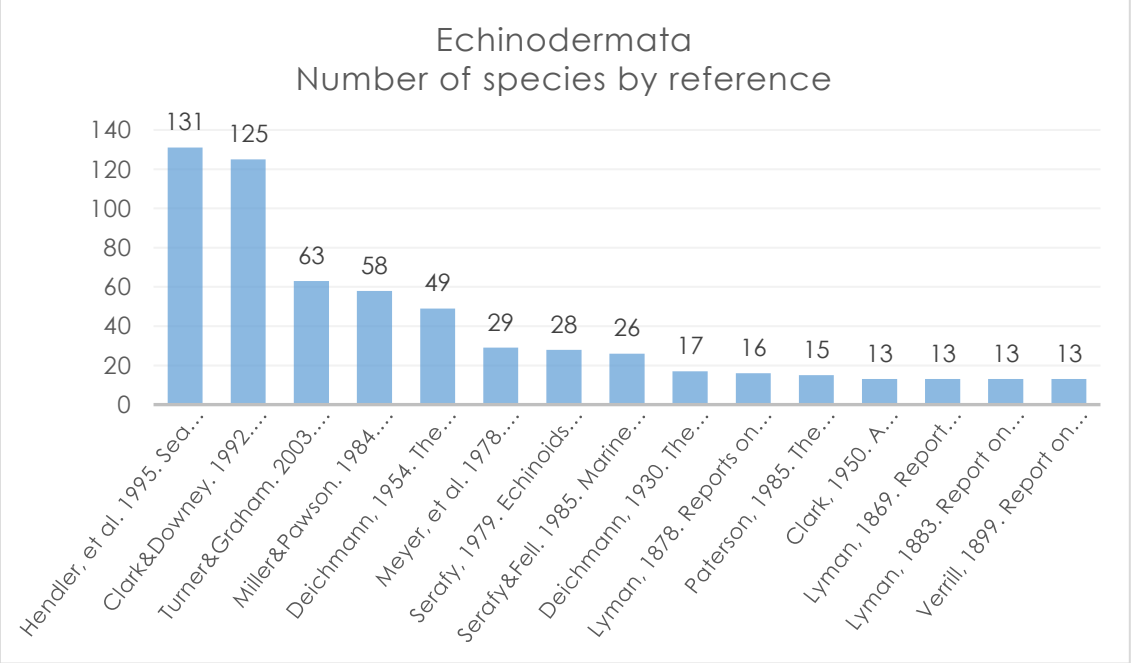
REFERENCES	SP	PDF
Deevey, 1954. Hydroids of the GmX	*142*	*1*
Vervoort, 1968. Report on a collection of Hydroida from the Caribbean	*137*	*1*
Phillips, 1972. The pelagic Cnidaria of the GmX	*96*	*0*
Cairns, 1979. The deepwater Scleractinia of the Caribbean	*69*	*1*
Bayer, 1961. The shallow- water Octocorallia of the West Indian Region.	*57*	*1*
Allman, 1877. Report on the Hydroida collected exploration of the Gulf Stream	*52*	*1*
Beltrán-Torres&Carricart-Ganivet. 1999. Lista revisada y clave de determinación de los corales pétreos zooxantelados	*45*	*1*
Giammona, 1978. Octocorals in the GmX	*45*	*0*
Segura-Puertas&Ordóñez-López. 1994. Análisis medusas Campeche y Caribe	*43*	*0*
Segura-Puertas, 1992. Medusae (Cnidaria) from the Yucatan shelf	*38*	*1*
Jaap, et al. 1989. Stony coral (Scleractinia and Milleporina) at Bird Key Reef	*37*	*0*
Loman, 2004. Medusas del sur del GMx. M. Sc. Thesis	*34*	*1*
Correia-Valenca, 1992. Medusas del Golfo de México [dissertation] UNAM	*34*	*0*
Bayer, 1958. Additional records of western Atlantic octocorals.	*33*	*1*
Total number of species no replicated	***511***	
Total number of species in Felder&Camp, 2009	*762*	

I. ECHINODERMATA

Felder & Camp (2009) cites 532 species of echinoderms in 118 references. 36% of references are available in PDF and 10% of citations are now available in Mendeley.



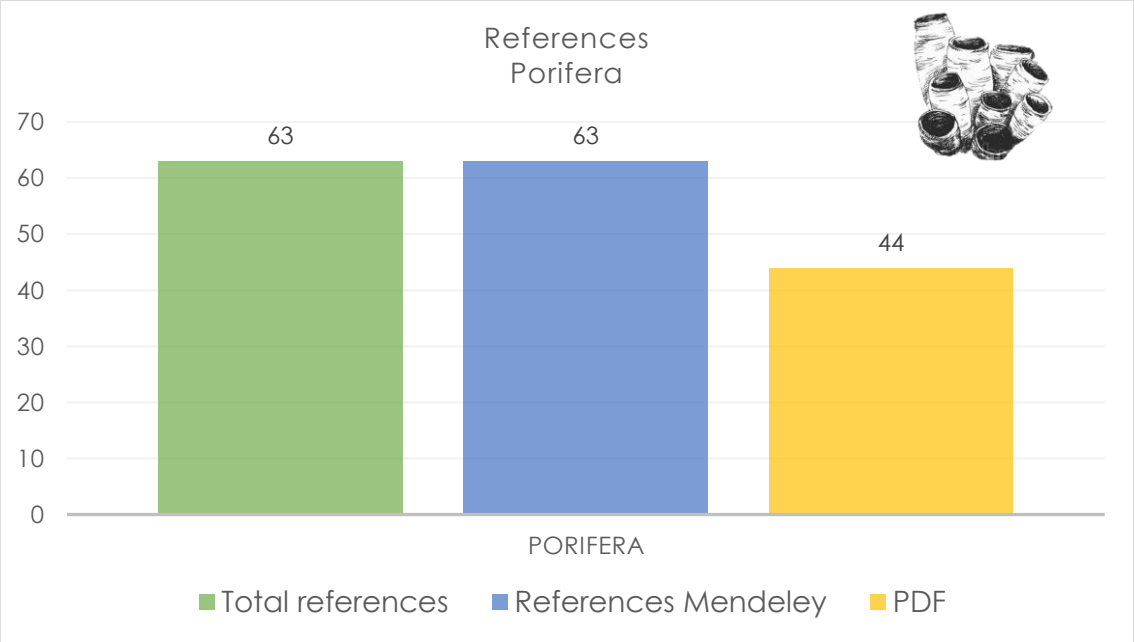
The 15 main references cite 532 species (81% of the total species). Of these, we have 3 of 15 references in PDF.



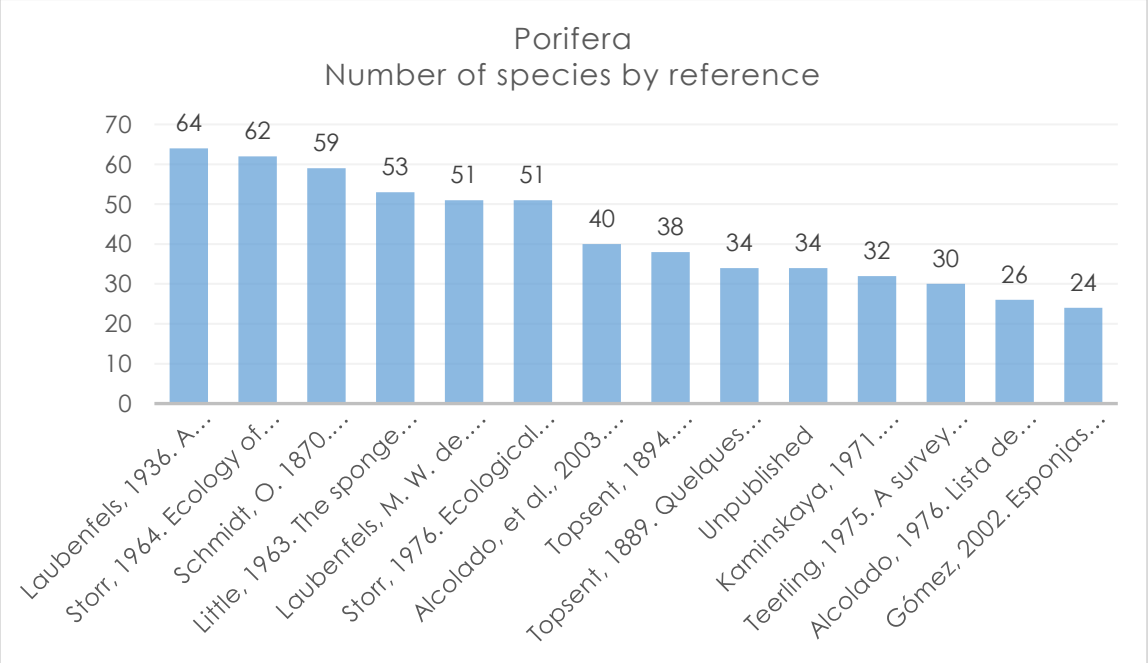
REFERENCES	SP	PDF
Hendler, et al. 1995. Sea Stars, Sea Urchins.Echinoderms of Florida&Caribbean.	*131*	*0*
Clark&Downey. 1992. Starfishes of the Atlantic.	*125*	*0*
Turner&Graham. 2003. Calocidaris micans and Pseudoboletia maculata	*63*	*0*
Miller&Pawson. 1984. Holothurians (Echinodermata: Holothuroidea)	*58*	*1*
Deichmann, 1954. The holothurians of the GMx.	*49*	*1*
Meyer, et al. 1978. Zoogeography of tropical western Atlantic Crinoidea.	*29*	*0*
Serafy, 1979. Echinoids (Echinodermata: Echinoidea).	*28*	*0*
Serafy&Fell. 1985. Marine flora & fauna of the NE USA. Echinodermata. NOAA Technical Report	*26*	*1*
Deichmann, 1930. The holothurians of the western part of the Atlantic Ocean.	*17*	*0*
Lyman, 1878. Reports on the dredging of the U.S. Coast Survey steamer Blake. II.	*16*	*0*
Paterson, 1985. The deep-sea Ophiuroidea of the North Atlantic Ocean.	*15*	*0*
Clark, 1950. A monograph of the existing crinoids Volume I.	*13*	*0*
Lyman, 1869. Report Ophiuridae and Astrophytidae dredged between Cuba & Florida Reef	*13*	*0*
Lyman, 1883. Report on the Ophiuroidea (of the Blake).	*13*	*0*
Verrill, 1899. Report on the Ophiuroidea collected by the Bahama Expedition	*13*	*0*
Total number of species no replicated	***436***	
Total number of species in Felder&Camp, 2009	*532*	

J. PORIFERA

Felder & Camp (2009), cites 317 species of Phylum Porifera in 63 references. 70% of the PDF references are available and 100% of the quotes are now available in Mendeley.



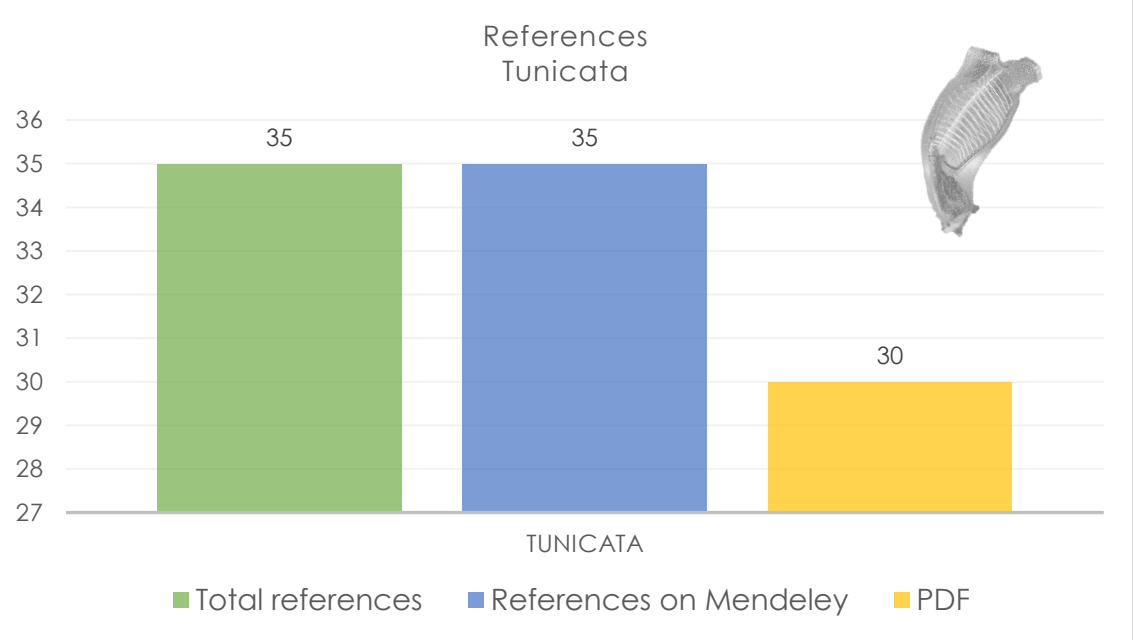
The 15 main references cite 248 species (78% of the total species). Of these, we have 7 of 15 references in PDF.



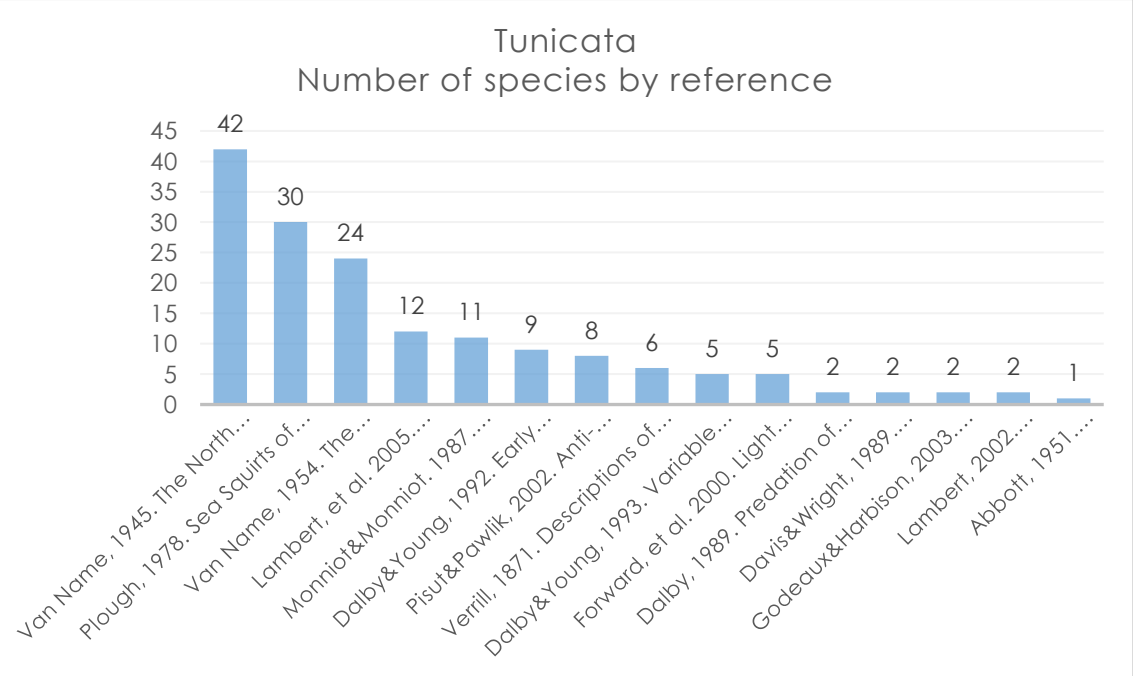
REFERENCES	SP	PDF
Laubenfels, 1936. A discussion of the sponge fauna of the Dry Tortugas	*64*	*0*
Storr, 1964. Ecology of the GMx commercial sponges and its relation to the fishery	*62*	*1*
Schmidt, O. 1870. Grundzüge einer Spongien- Fauna des Atlantischen	*59*	*1*
Little, 1963. The sponge fauna of the St. George's Sound, Apalachee Bay	*53*	*0*
Laubenfels, M. W. de. 1953. Sponges from the Gulf of Mexico.	*51*	*0*
Storr, 1976. Ecological factors controlling sponge distribution in the GMx	*51*	*0*
Alcolado, et al., 2003. species inventory, fisheries, culture of the Porifera in Cuba	*40*	*0*
Topsent, 1894. Application de la taxonomie actuelle a une collection de spongiaires du Banc de Campêche	*38*	*1*
Topsent, 1889. Quelques spongiaires du Banc de Campêche	*34*	*1*
Unpublished	*34*	*1*
Kaminskaya, 1971. Sponges of sublittoral of the NW part of the Cuban platform.	*32*	*0*
Teerling, 1975. A survey of sponges from the northwestern GMx [PhD dissertation]	*30*	*0*
Alcolado, 1976. Lista de nuevos registros de poríferos para Cuba	*26*	*1*
Gómez, 2002. Esponjas Marinas del Golfo de México y el Caribe	*24*	*1*
Adams, 1996. Species composition, abundance and depth zonation of sponges	*20*	*0*
Total number of species no replicated	***248***	
Total number of species in Felder&Camp, 2009	*317*	

K. TUNICATA

Felder & Camp (2009), cites 103 species of the Subphylum Tunicata in 35 references. 86% of references are available in PDF and 100% of citations are now available in Mendeley.



The 15 main references cite 95 species (92% of the total species). Of these, we have 13 of 15 references in PDF.

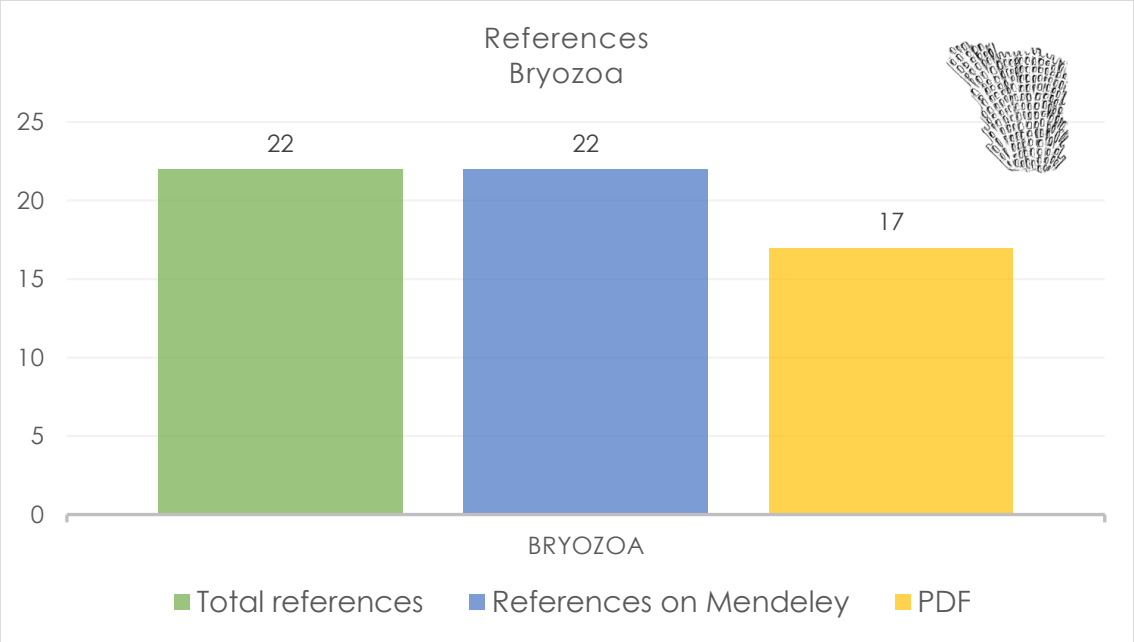


REFERENCES	SP	PDF
Van Name, 1945. The North and South American ascidians	*42*	*1*

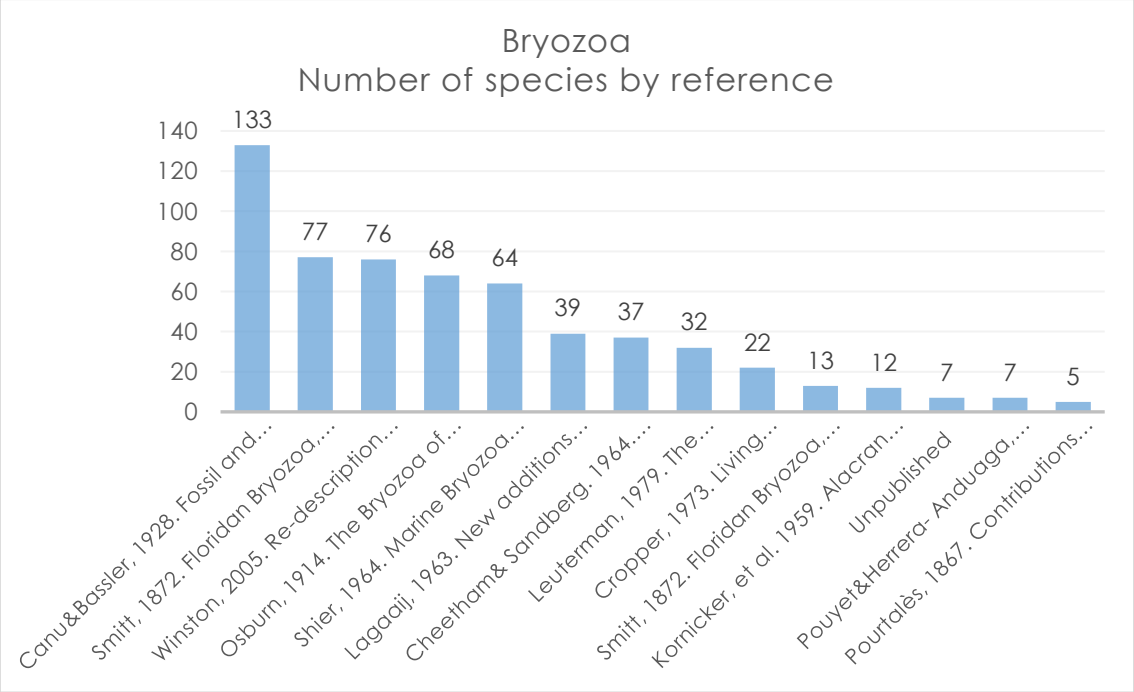
Plough, 1978. Sea Squirts of the Atlantic Continental Shelf from Maine to Texas	*30*	*1*
Van Name, 1954. The tunicata of the Gulf of Mexico	*24*	*1*
Lambert, et al. 2005. Ascidians of South Padre Island, Texas, with a key to species	*12*	*1*
Monniot&Monniot. 1987. Abun. and distr. of tunicates on the GMx	*11*	*1*
Dalby&Young, 1992. Early post- settlement mortality in ascidians in Florida	*9*	*1*
Pisut&Pawlik, 2002. Anti-predatory chemical defenses of ascidians	*8*	*1*
Verrill, 1871. Descriptions of some ascidians from New England	*6*	*1*
Dalby&Young, 1993. Variable effects of ascidian competitors on oysters	*5*	*1*
Forward, et al. 2000. Light induced larval release of a colonial ascidian	*5*	*1*
Dalby, 1989. Predation of ascidians by Melongena corona in the N GMx	*2*	*1*
Davis&Wright, 1989. Interspecific differences in fouling of congeneric ascidians	*2*	*0*
Godeaux&Harbison, 2003. Pelagic doliolid tunicates collected by a submersible	*2*	*1*
Lambert, 2002. Nonindigenous ascidians in tropical waters	*2*	*1*
Abbott, 1951. Bostrichobranchus digonas, a new molgulid ascidian from Florida	*1*	*0*
Total number of species no replicated	***248***	
Total number of species in Felder&Camp, 2009	*317*	

L. BRYOZOA

Felder & Camp (2009), cites 266 species of Phylum Bryozoa in 22 references. 77% of references are available in PDF and 100% of citations are now available in Mendeley.



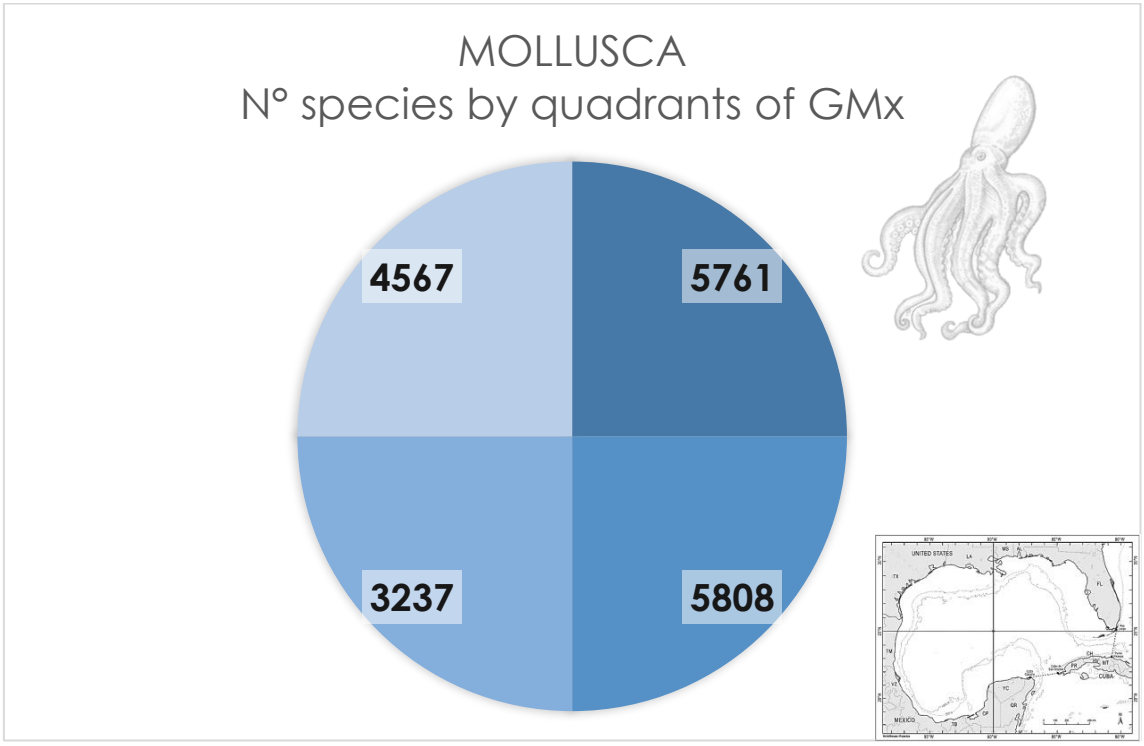
The 14 main references cite 266 species (100% of the total species). Of these, we have 14 of 14 references in PDF.

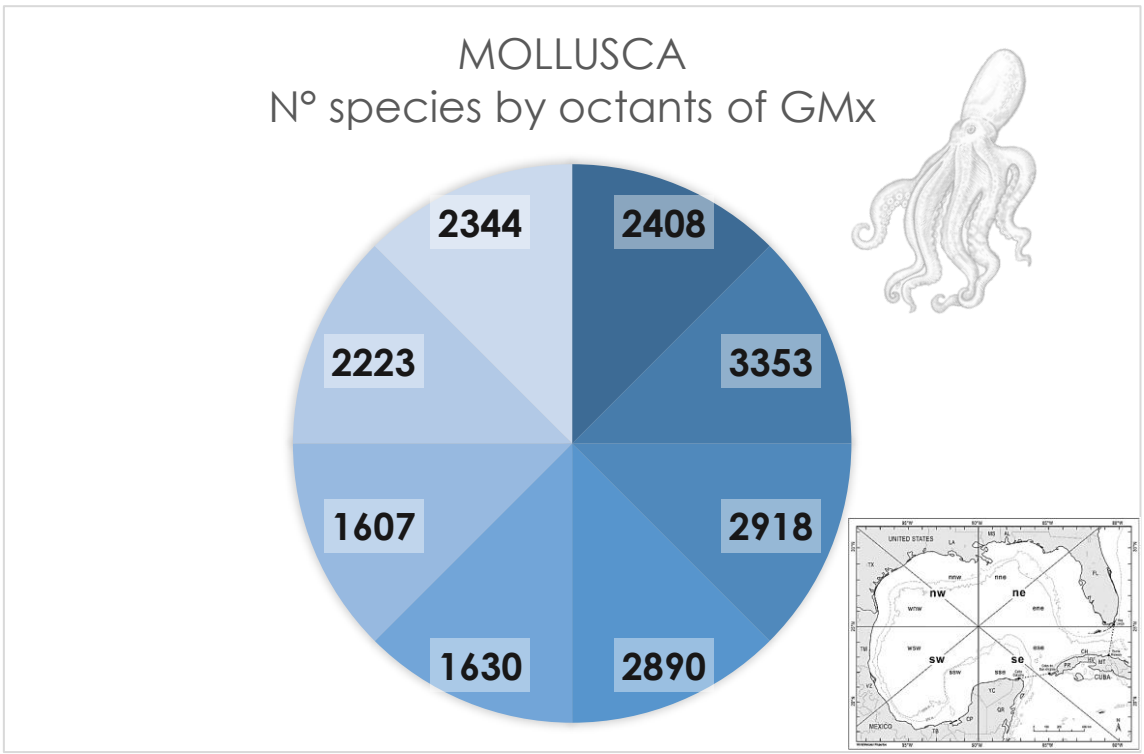


REFERENCIAS	SP	PDF
Canu&Bassler, 1928. Fossil and Recent Bryozoa of the Gulf of Mexico region	133	
Smitt, 1872. Floridan Bryozoa, collected by Count L. F. de Pourtales, Part II	77	1
Winston, 2005. Re-description and revision of Smitt's "Floridan Bryozoa"	76	1
Osburn, 1914. The Bryozoa of the Tortugas Islands, Florida	68	1
Shier, 1964. Marine Bryozoa from northwest Florida	64	1
Lagaaij, 1963. New additions to the bryozoan fauna of the Gulf of Mexico	39	1
Cheetham& Sandberg. 1964. Quaternary Bryozoa from Louisiana mudlumps	37	1
Leuterman, 1979. The taxonomy and systematics of the gymnolaemate and stenolaemate Bryozoa of the northwest Gulf of Mexico [PhD dissertation.]	32	1
Cropper, 1973. Living cheilostome Bryozoa of the West Flower Garden Bank	22	1
Smitt, 1872. Floridan Bryozoa, collected by Count L. F. de Pourtales, Part I	13	1
Kornicker, et al. 1959. Alacran Reef, Campeche Bank, Mexico	12	1
Unpublished	7	1
Pouyet&Herrera- Anduaga, 1986. Systematics and paleogeographical studies of some species of Bryozoa (Cheilostomata) in the Gulf of Mexico	7	1
Pourtalès, 1867. Contributions to the fauna of the Gulf Stream at great depths	5	1
Total number of species no replicated	**248**	
Total number of species in Felder&Camp, 2009	317	

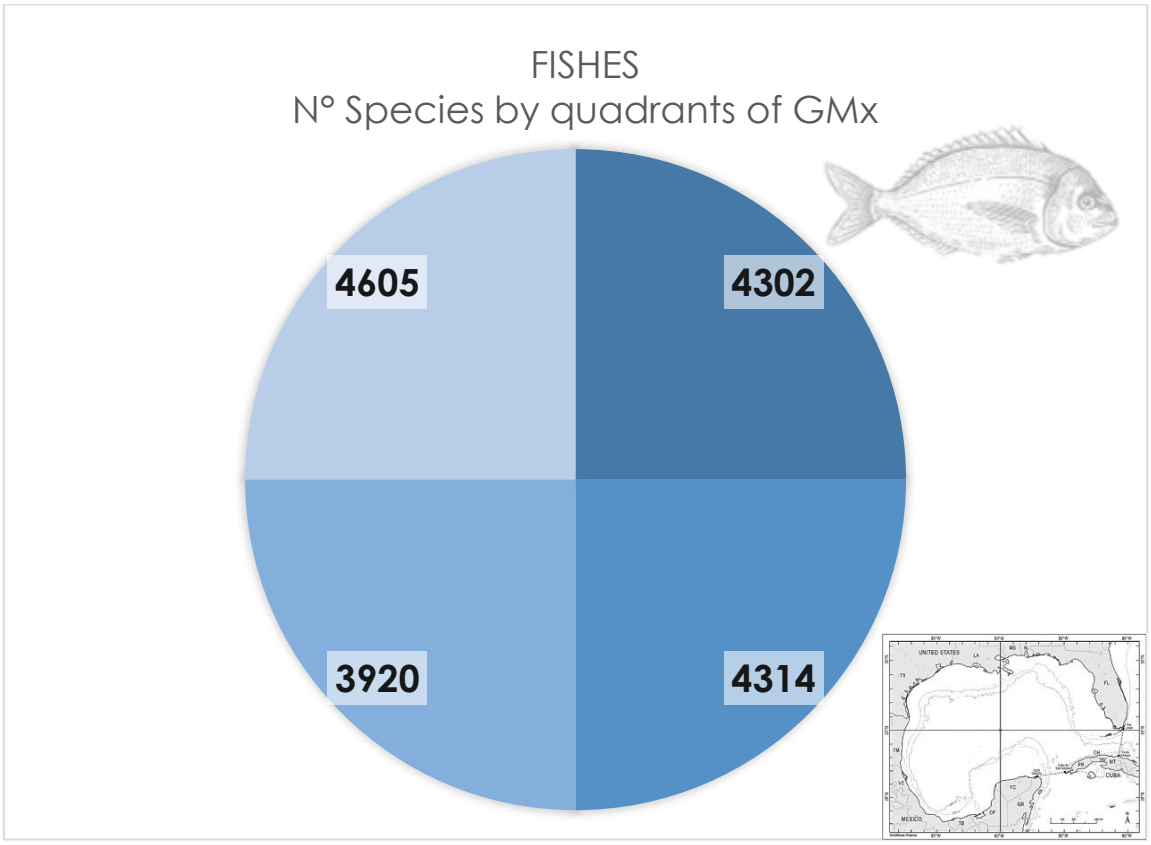
3. GEOGRAPHIC DISTRIBUTION

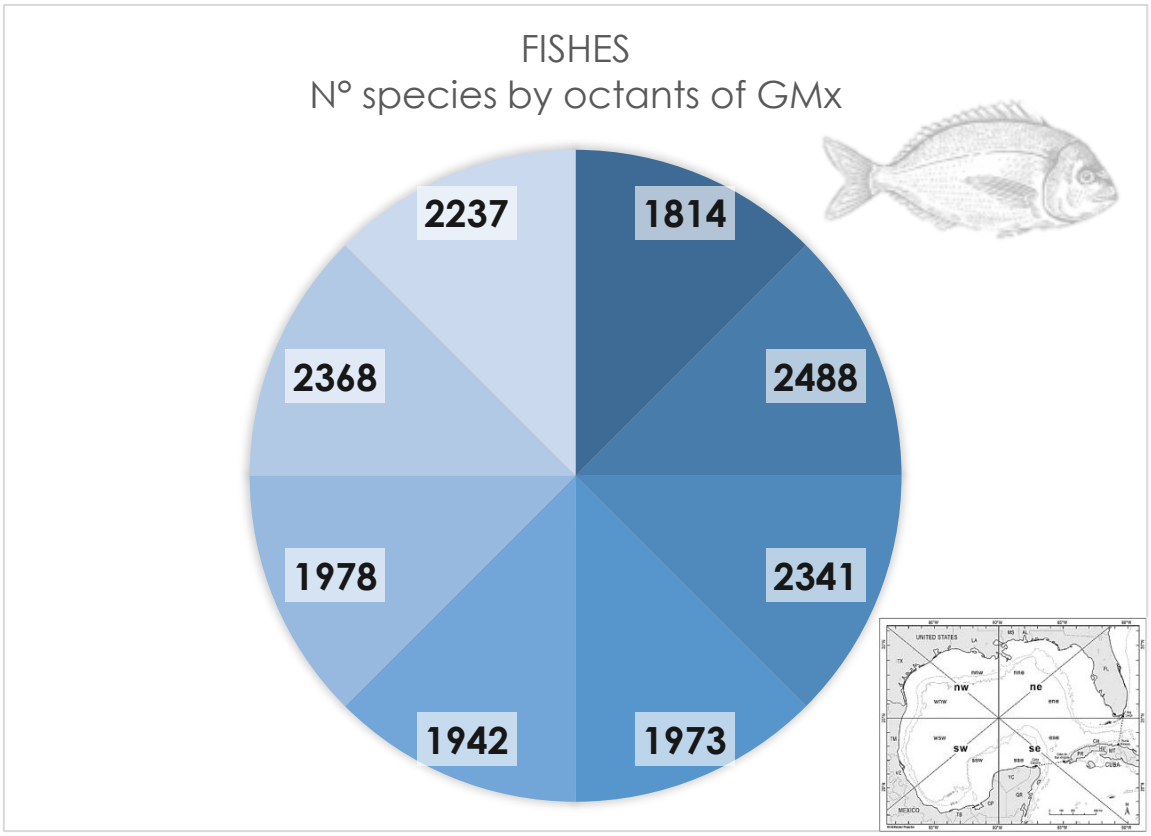
A. MOLLUSCA





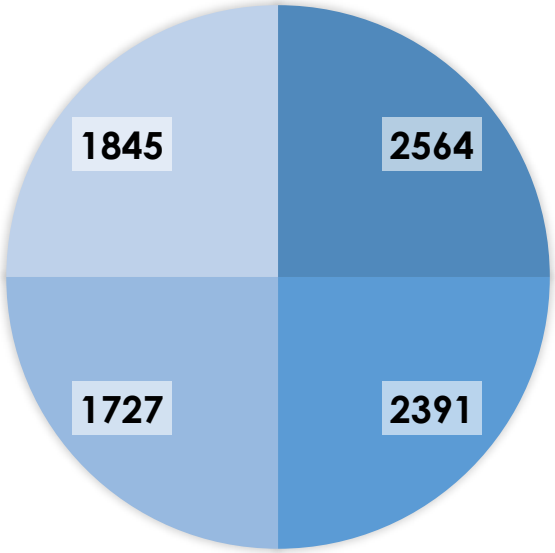
B. PECES

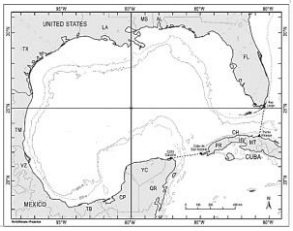

FISHES
N° Species by quadrants of GMx
4605
4302
3920
4314


FISHES
N° species by octants of GMx
2237
1814
2368
2488
1978
2341
1942
1973

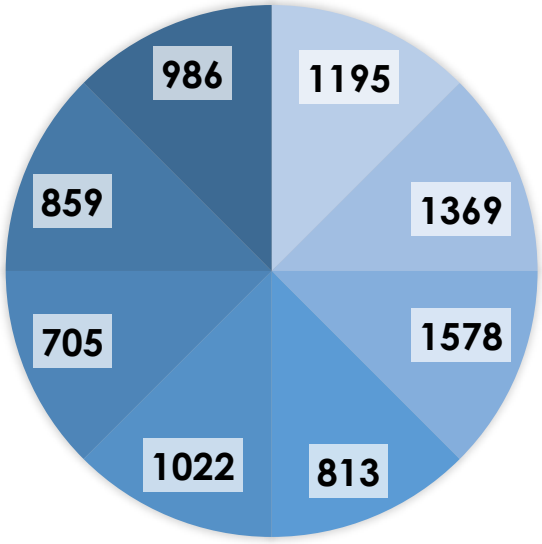
C. DECAPODA

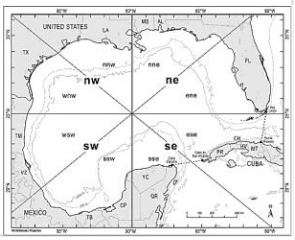
DECAPODA
N° Species by quadrants of GMx



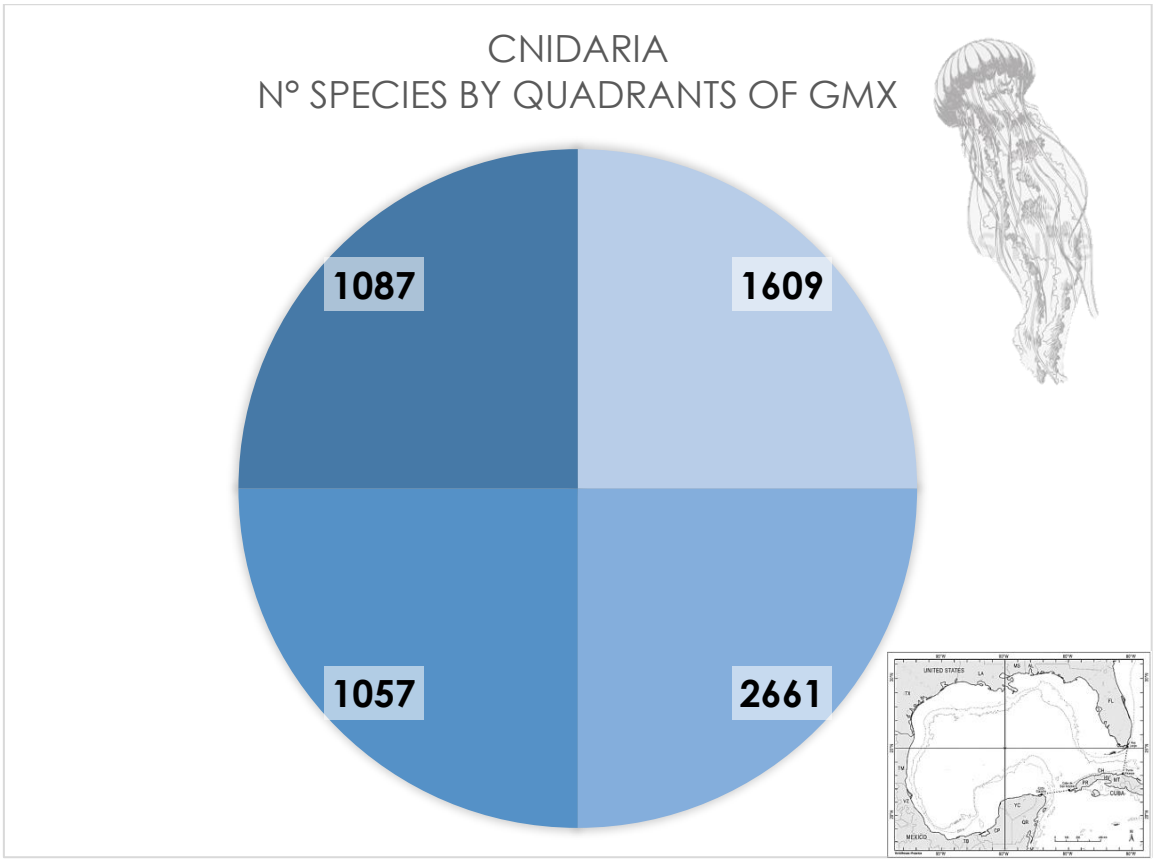


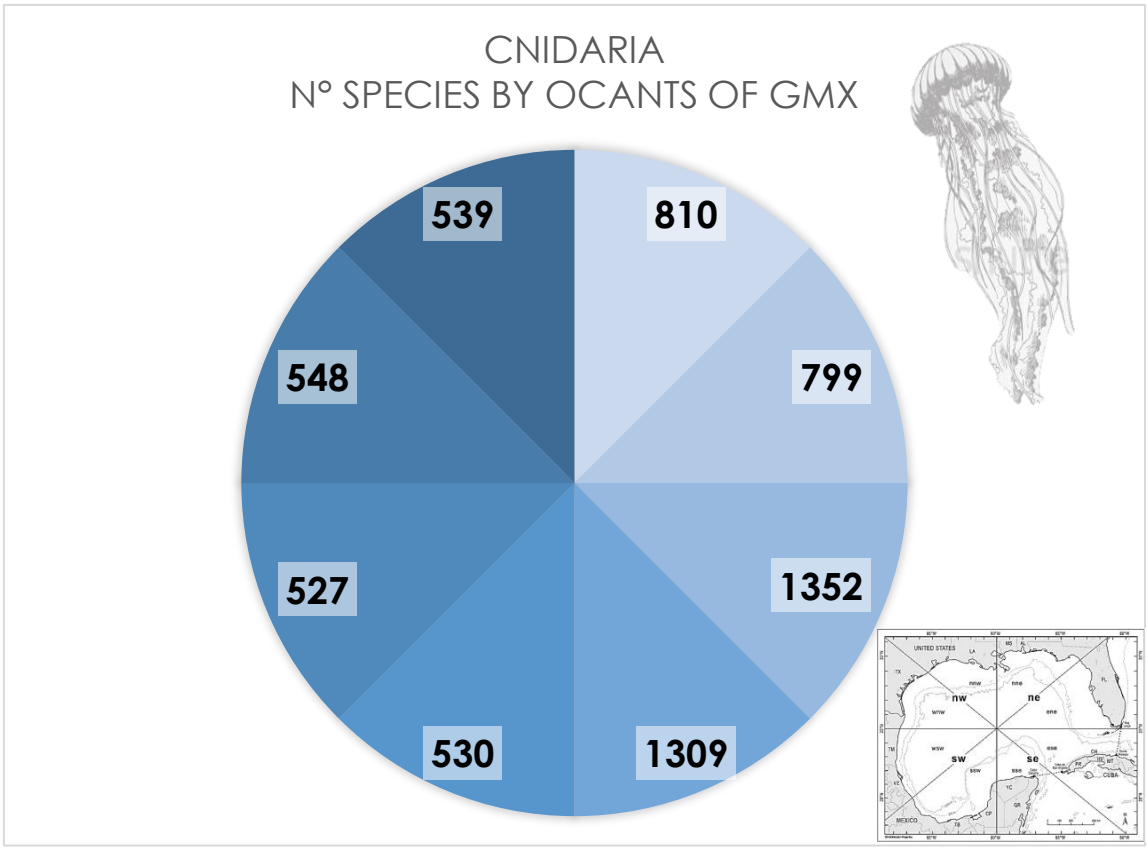
DECAPODA
N° species by octants of GMx



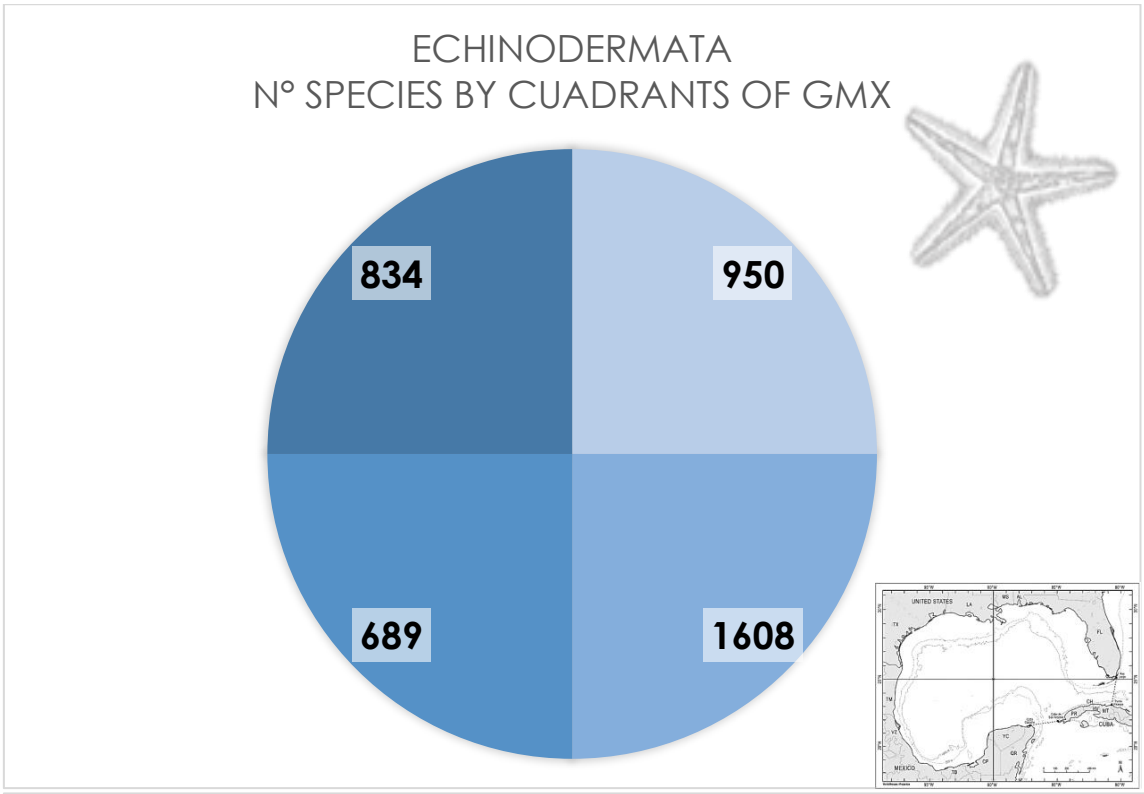


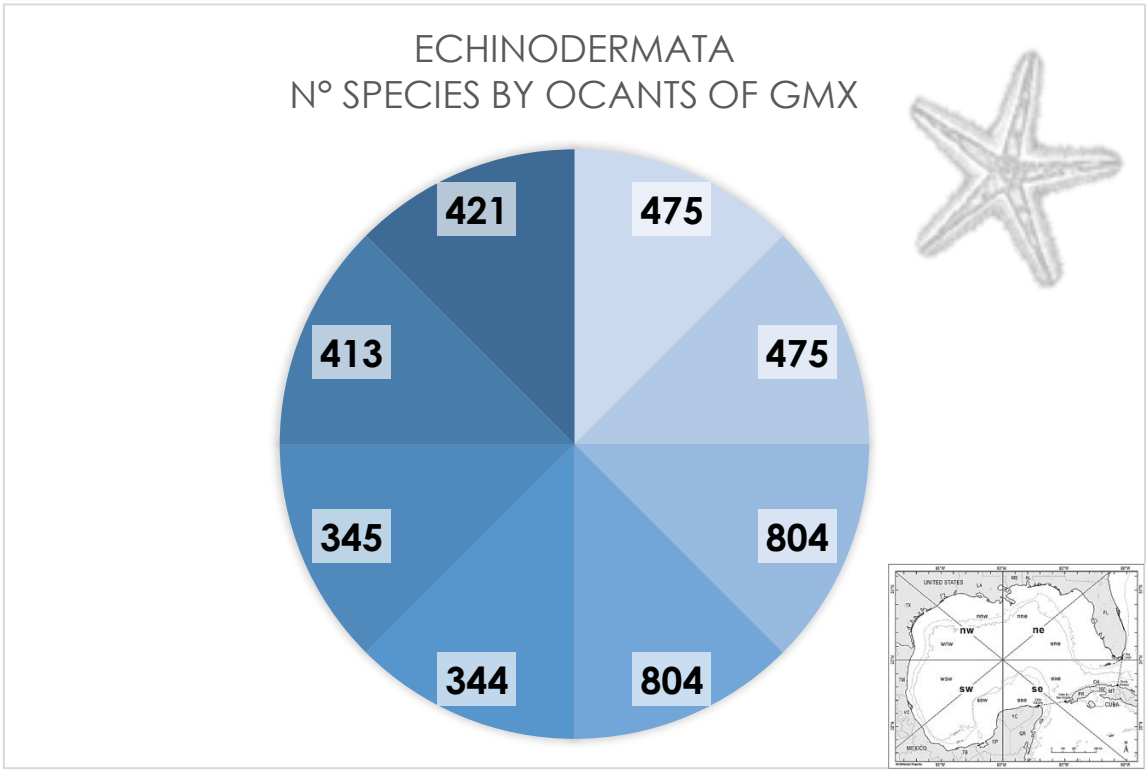
D. CNIDARIA


CNIDARIA
N° SPECIES BY QUADRANTS OF GMX
1087
1609
1057
2661

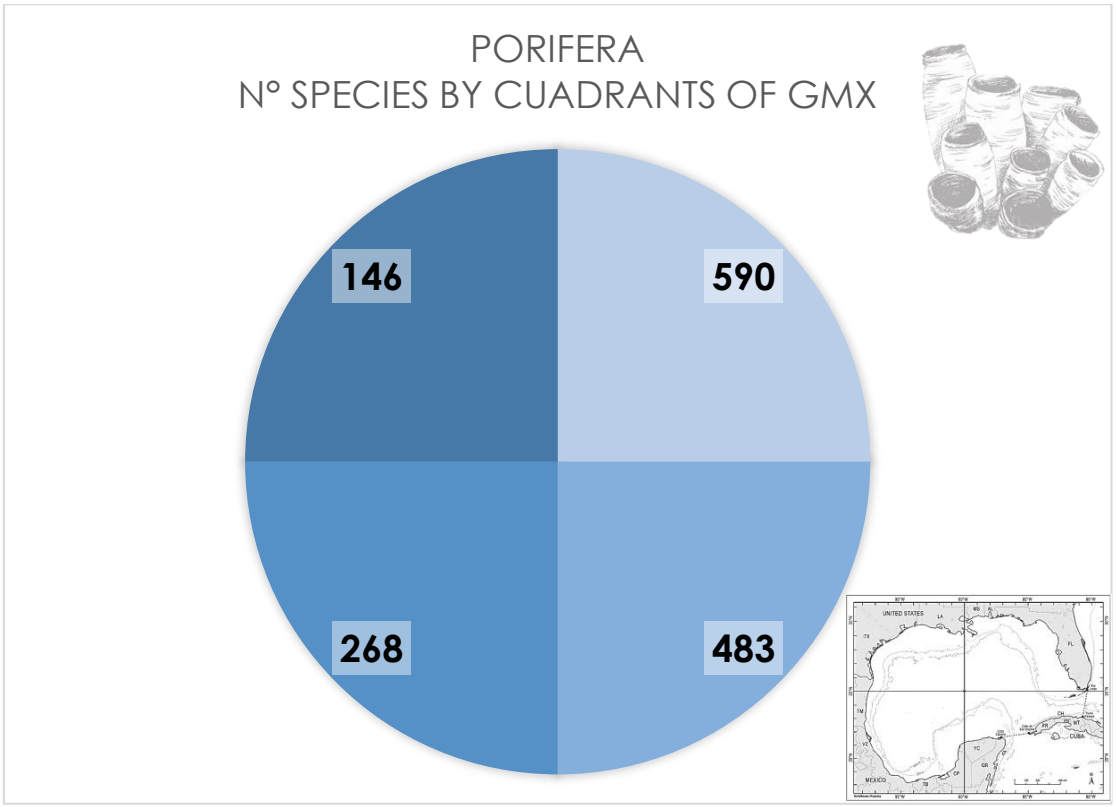

CNIDARIA
N° SPECIES BY OCANTS OF GMX
539
810
548
799
527
1352
530
1309

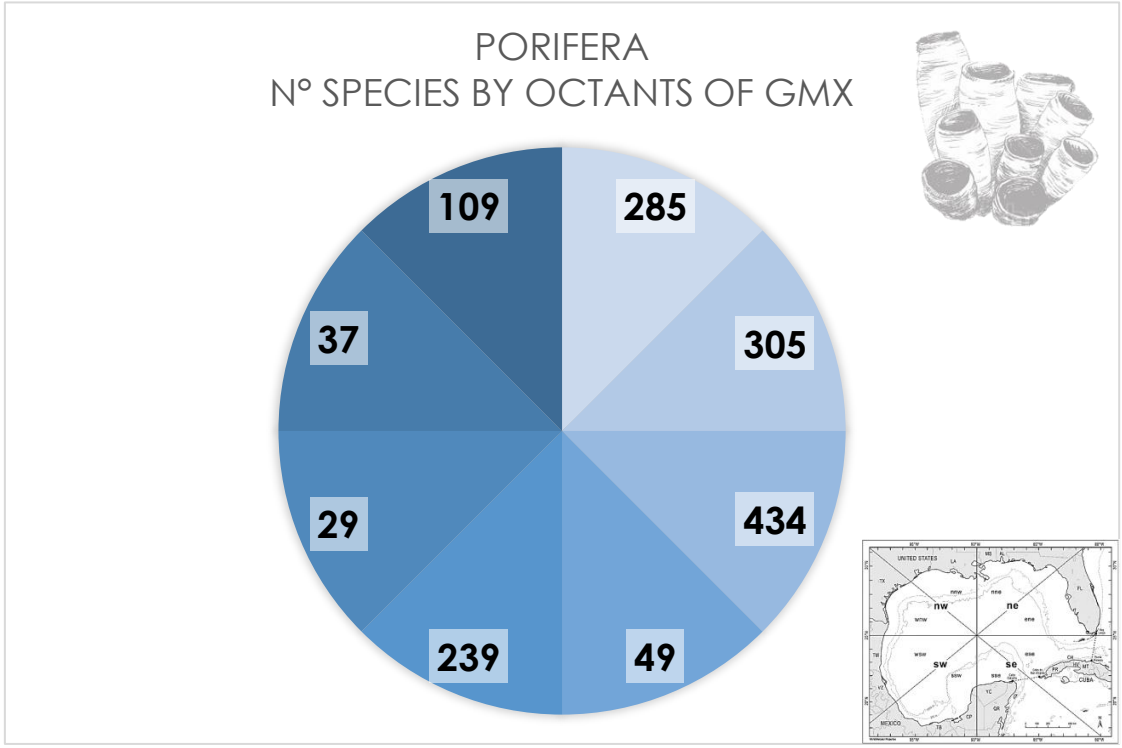
E. ECHINODERMATA



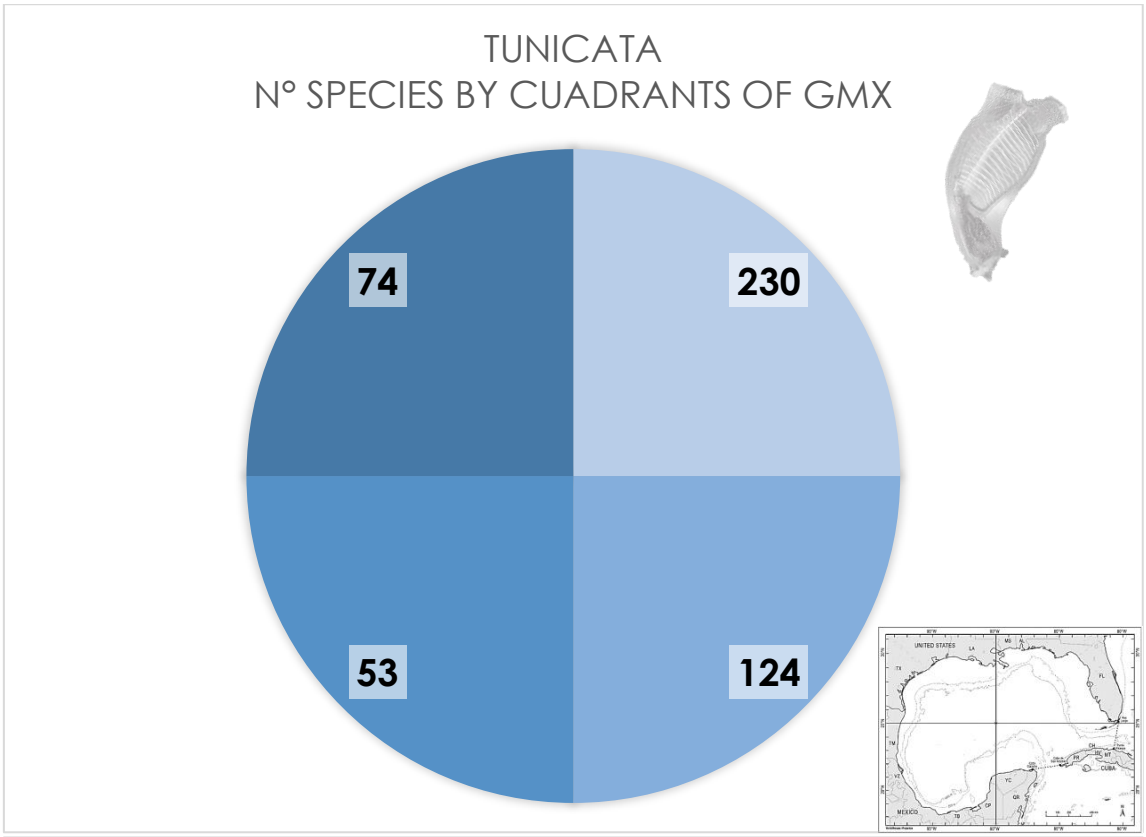


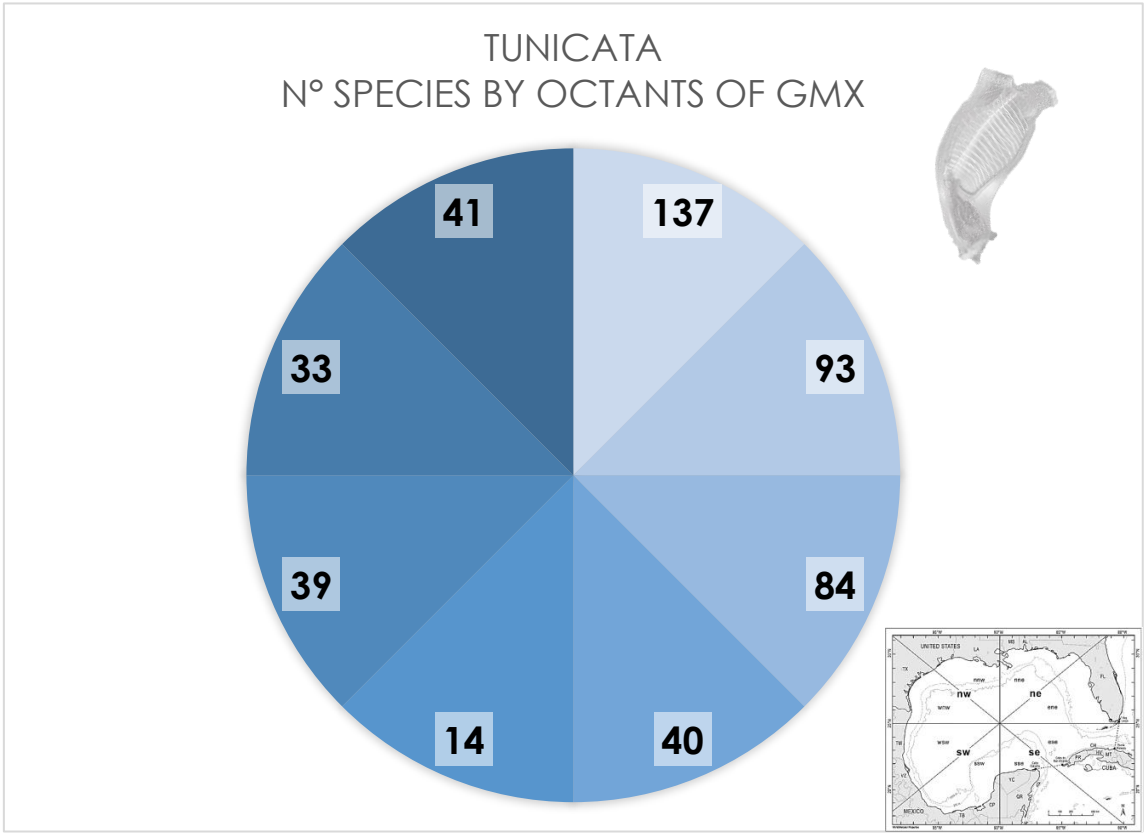
F. PORIFERA


PORIFERA
N° SPECIES BY CUADRANTS OF GMX
146
590
268
483

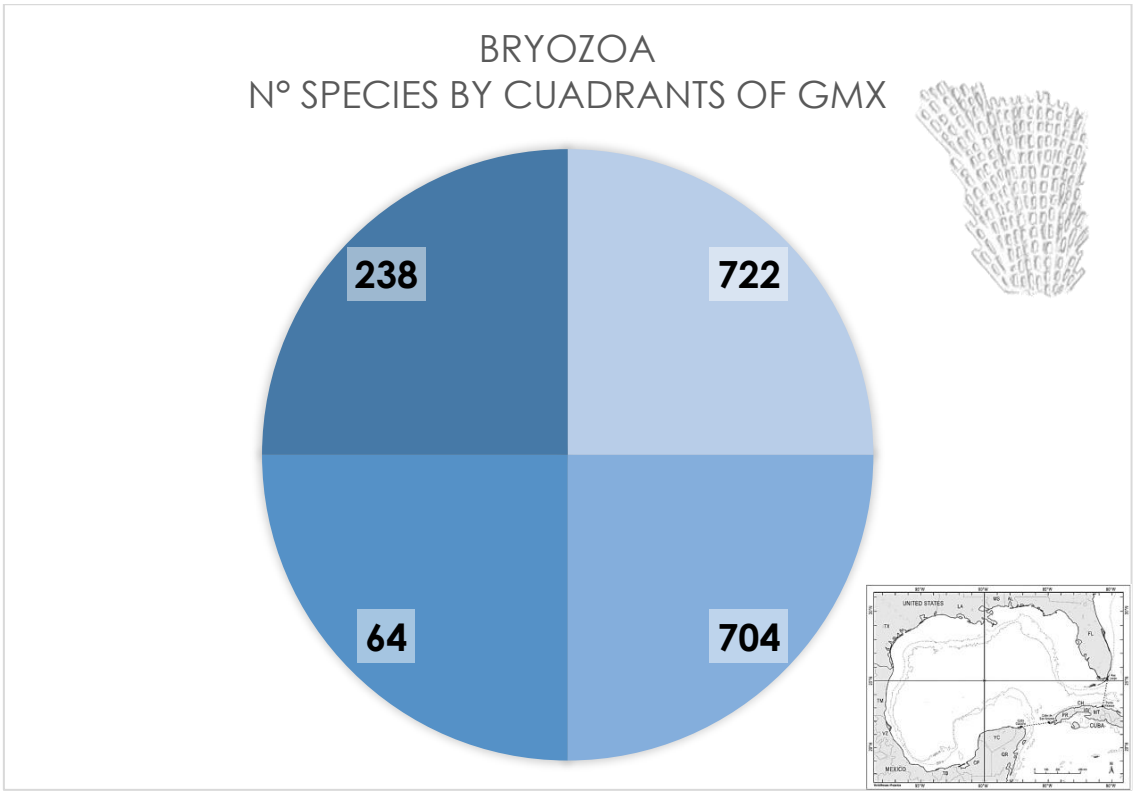

PORIFERA
N° SPECIES BY OCTANTS OF GMX
109
285
37
305
29
434
239
49

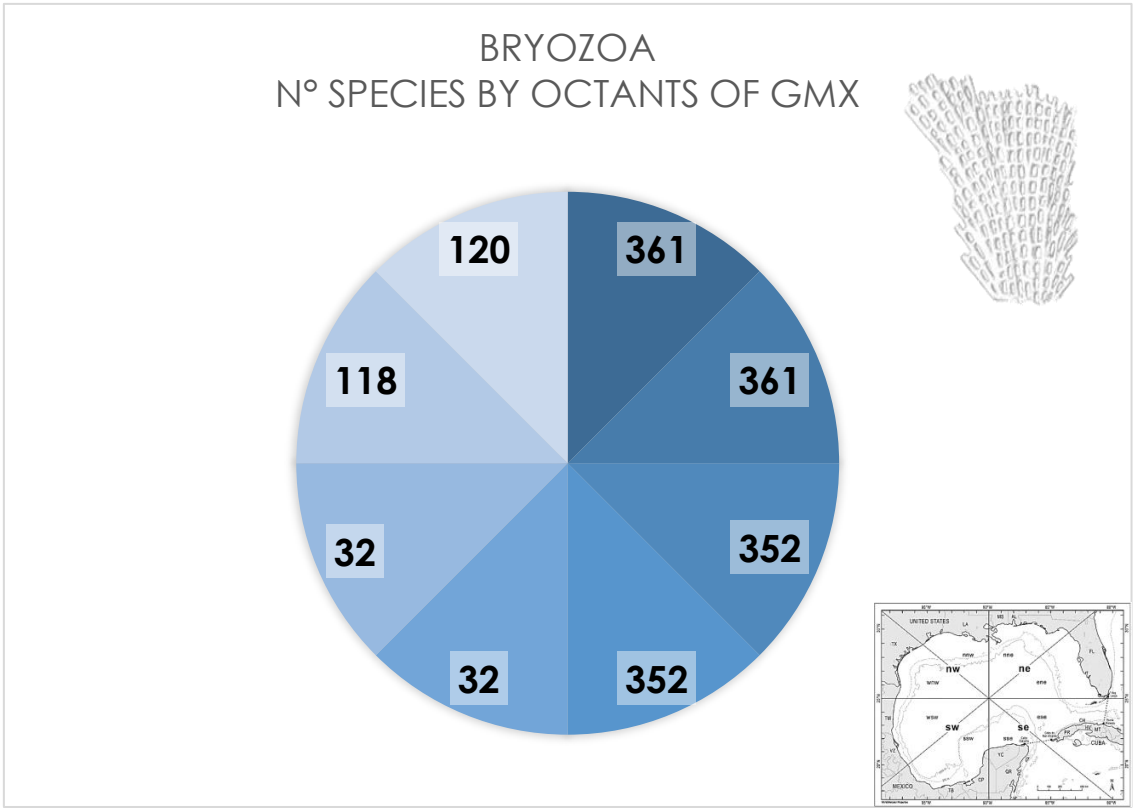
G. TUNICATA


TUNICATA
N° SPECIES BY CUADRANTS OF GMX
74
230
53
124


TUNICATA
N° SPECIES BY OCTANTS OF GMX
41
137
33
93
39
84
14
40

H. BRYOZOA

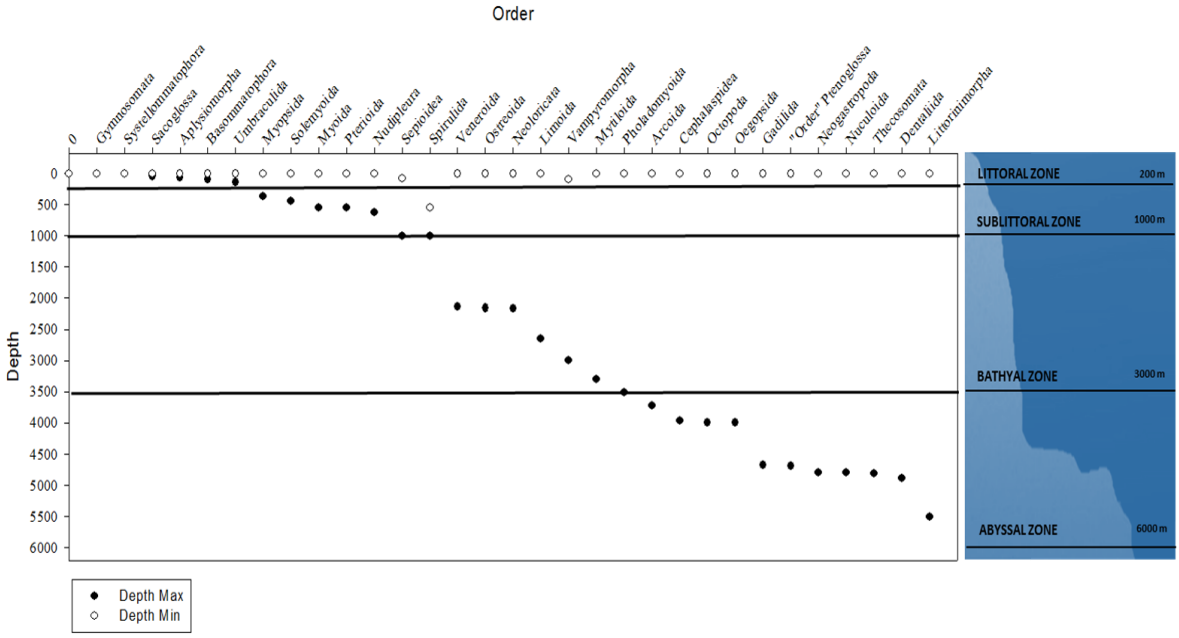

BRYOZOA
N° SPECIES BY CUADRANTS OF GMX
238
722
64
704

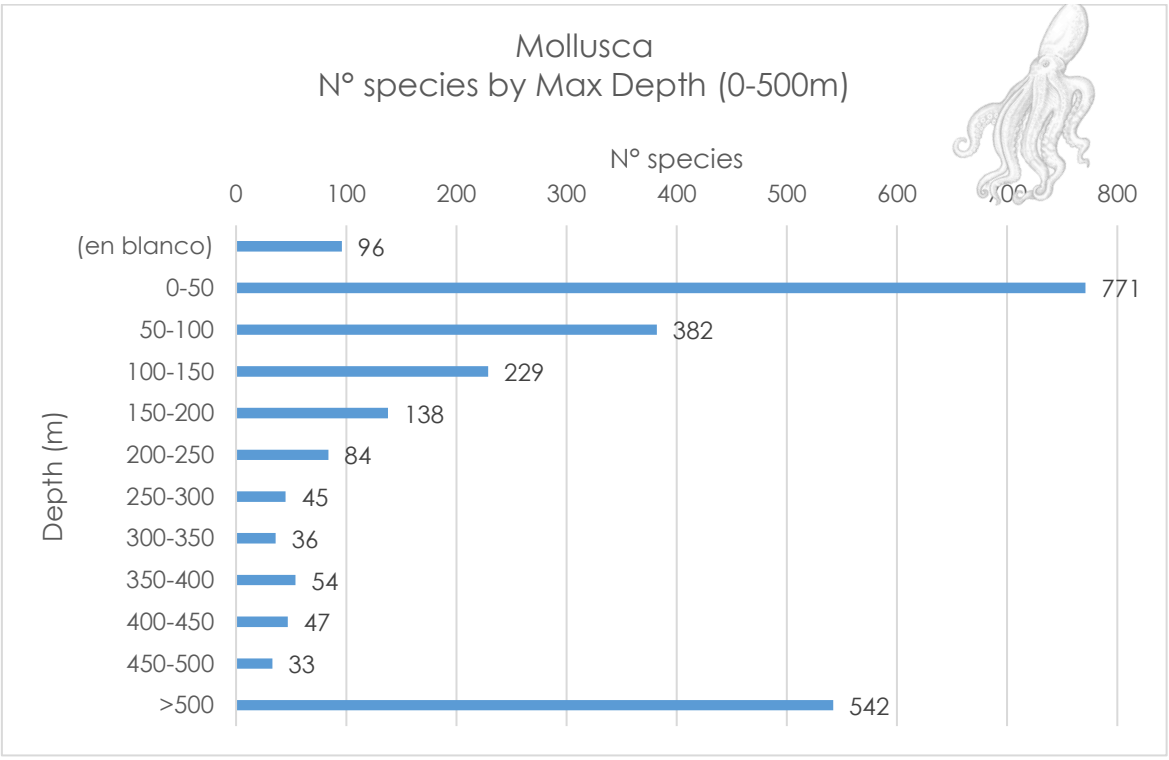

BRYOZOA
N° SPECIES BY OCTANTS OF GMX
120
361
118
361
32
352
32
352

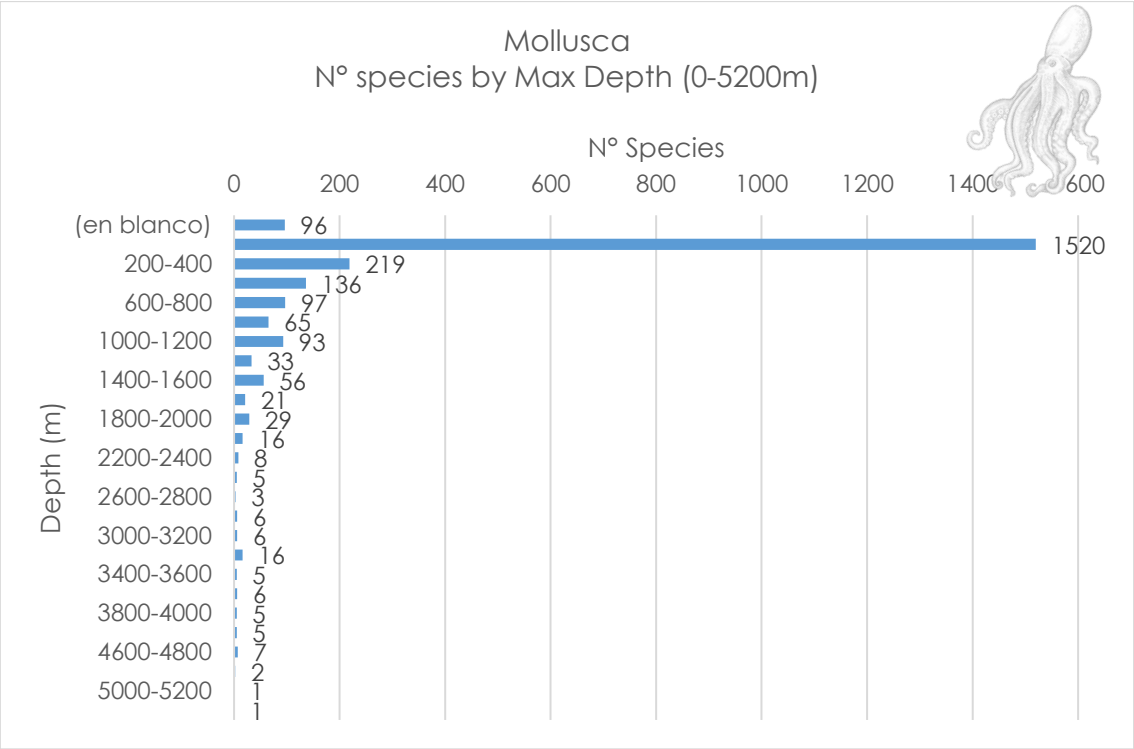
4. PERFIL BATIMÉTRICO

A. MOLLUSCA

Maximum and minimum depths for the orders of Mollusca. The depths of each order were obtained according to the maximum and minimum value found in each order.

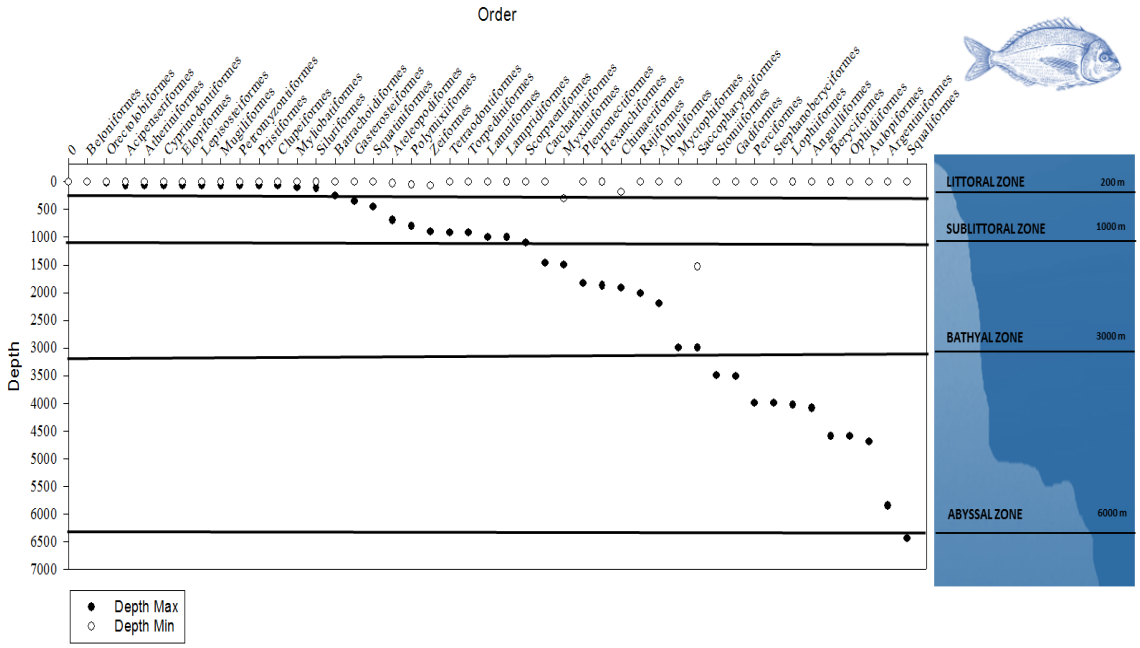


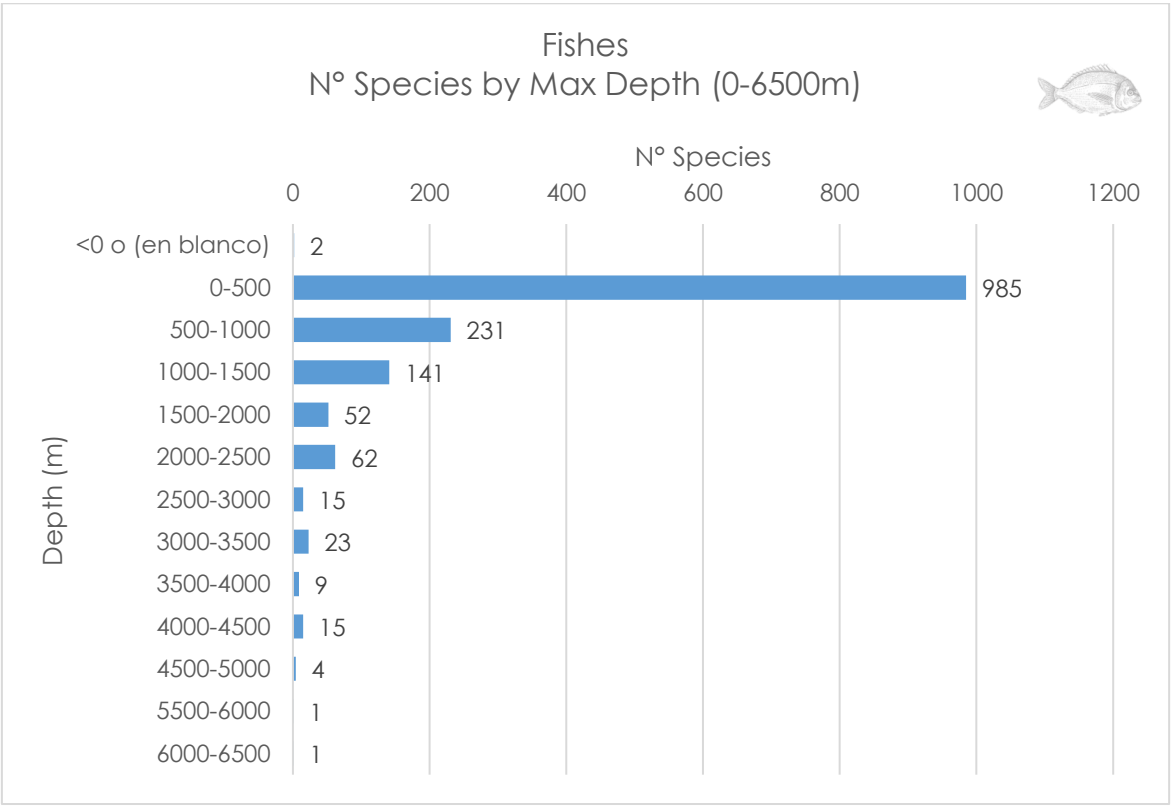


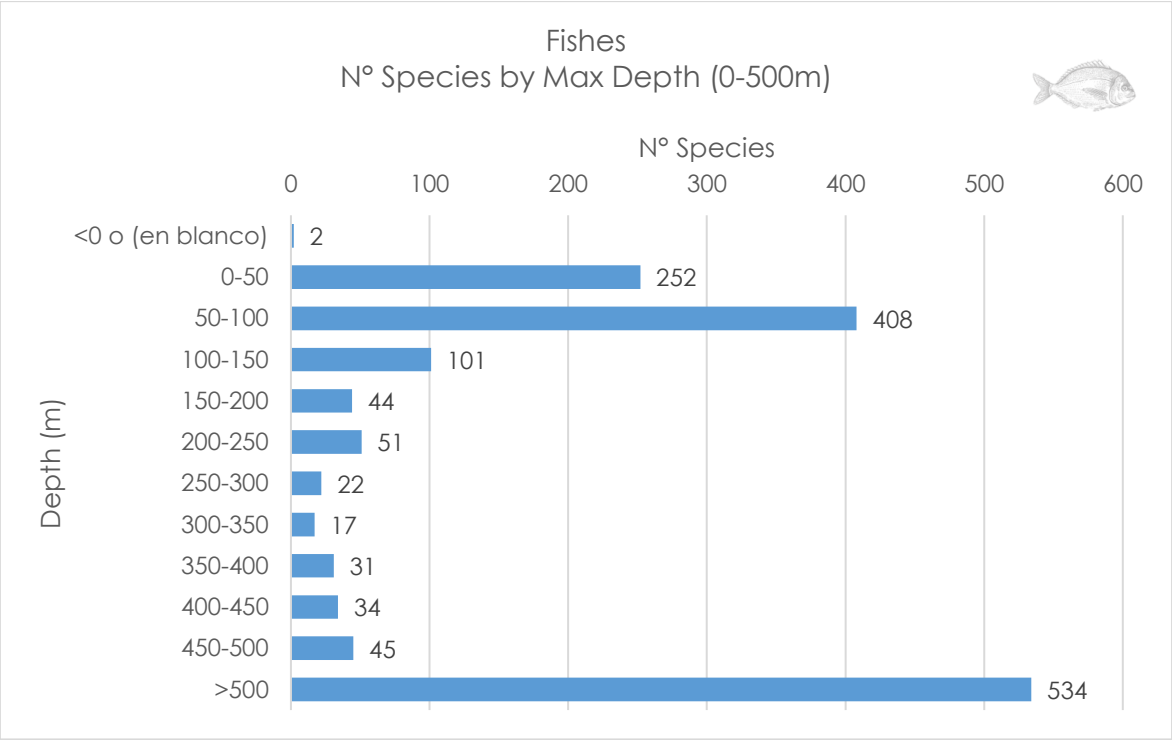

Mollusca
N° species by Max Depth (0-5200m)
N° Species
0
200
400
600
800
1000
1200
1400
1600
Depth (m)
(en blanco)
200-400
600-800
1000-1200
1400-1600
1800-2000
2200-2400
2600-2800
3000-3200
3400-3600
3800-4000
4600-4800
5000-5200
96
1520
219
136
97
65
93
33
56
21
29
16
8
5
3
6
6
16
5
6
5
5
7
2
1
1

B. PECES

Maximum and minimum depths for Fish orders. The depths of each order were obtained according to the maximum and minimum value found in each order.

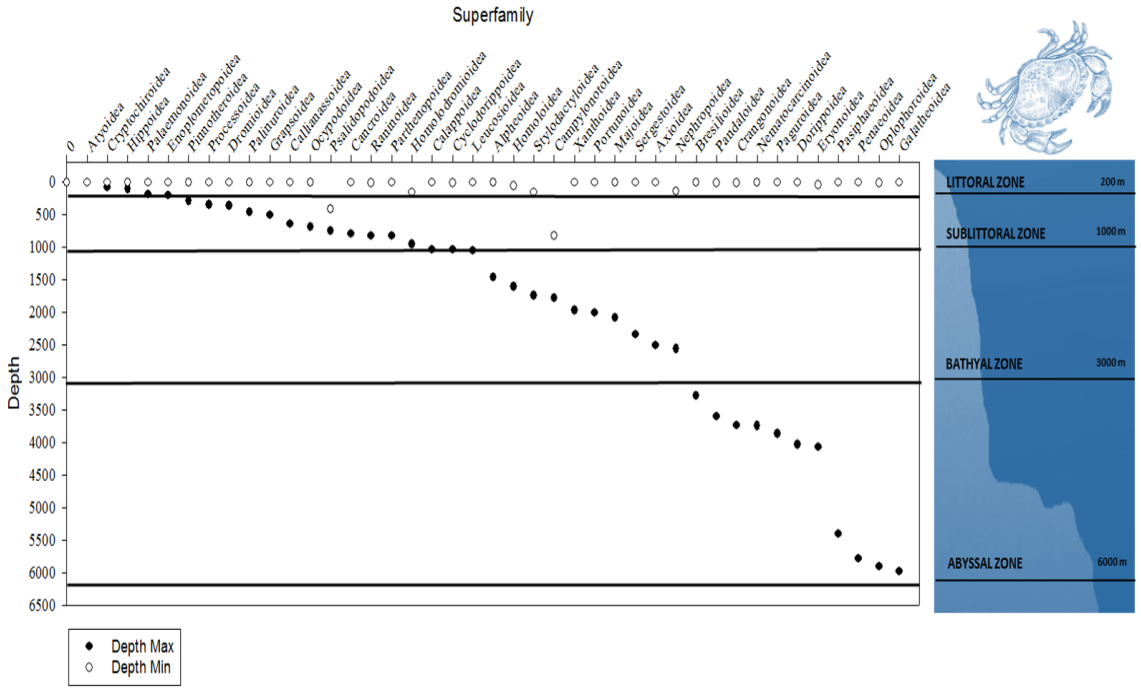


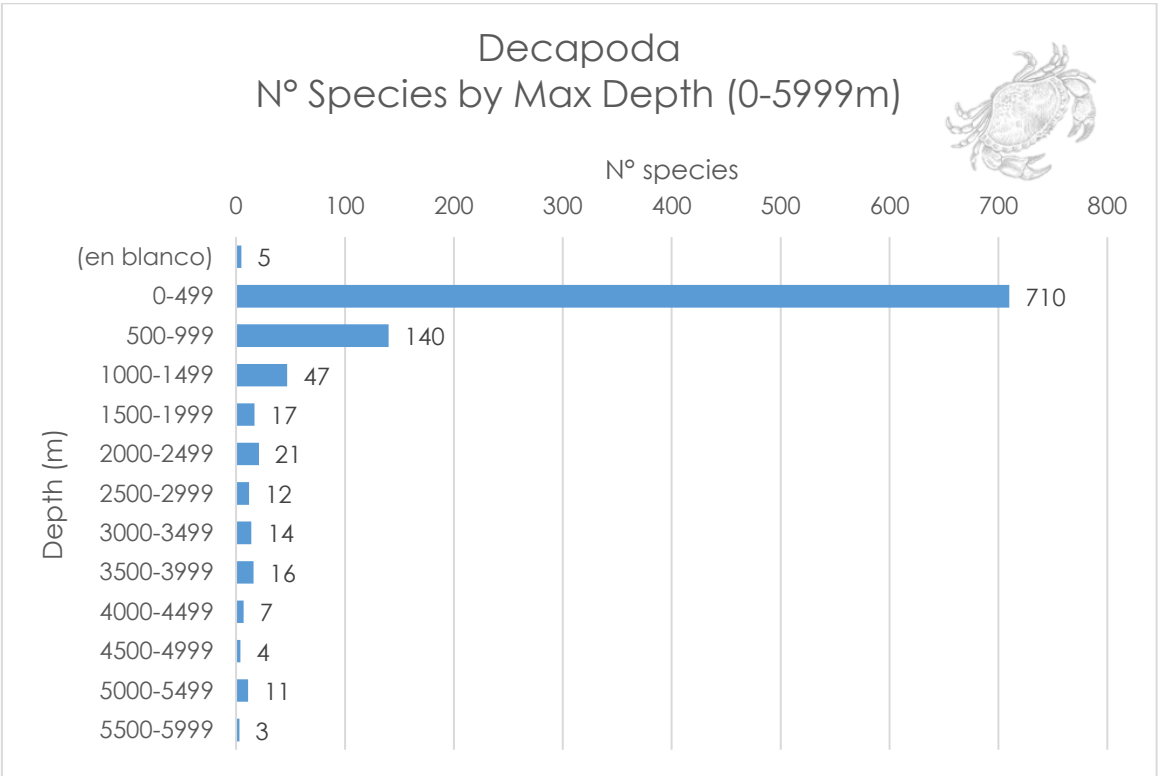


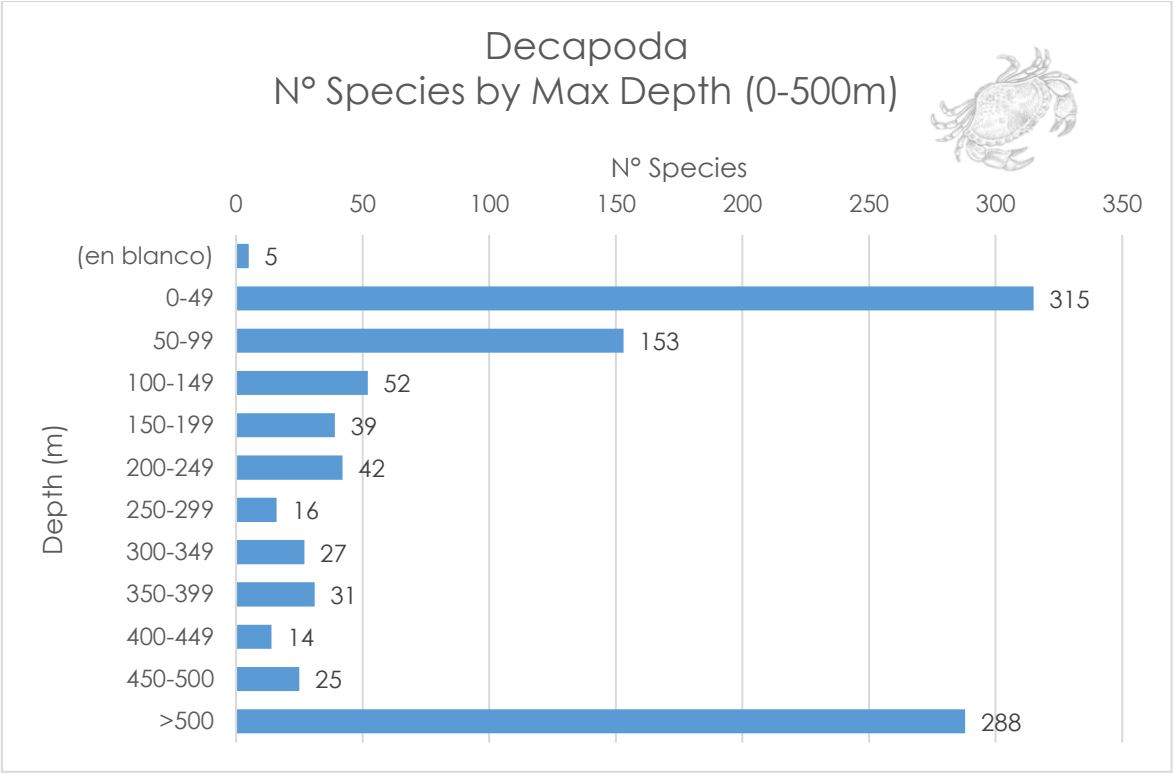

Fishes
N° Species by Max Depth (0-500m)
N° Species
0
100
200
300
400
500
600
Depth (m)
<0 o (en blanco)
0-50
50-100
100-150
150-200
200-250
250-300
300-350
350-400
400-450
450-500
>500
2
252
408
101
44
51
22
17
31
34
45
534

C. DECAPODA

Maximum and minimum depths for Decapoda orders. The depths of each Supermalia were obtained according to the maximum and minimum value found in each order.

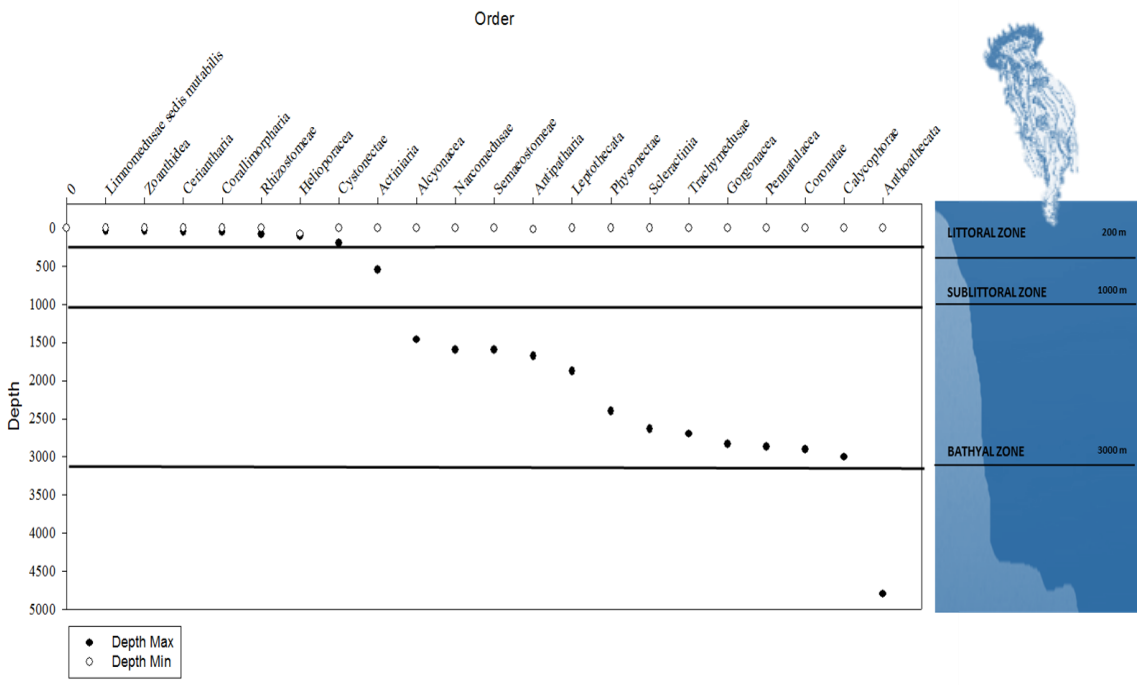


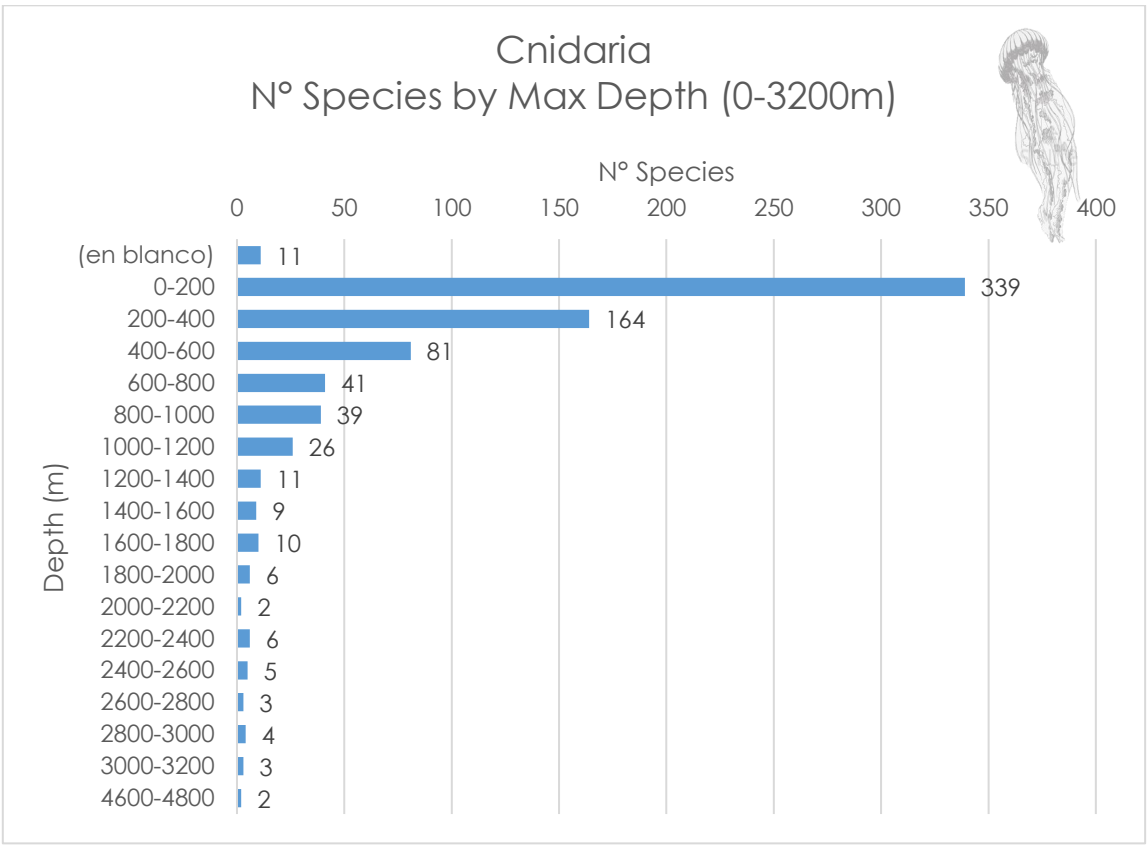


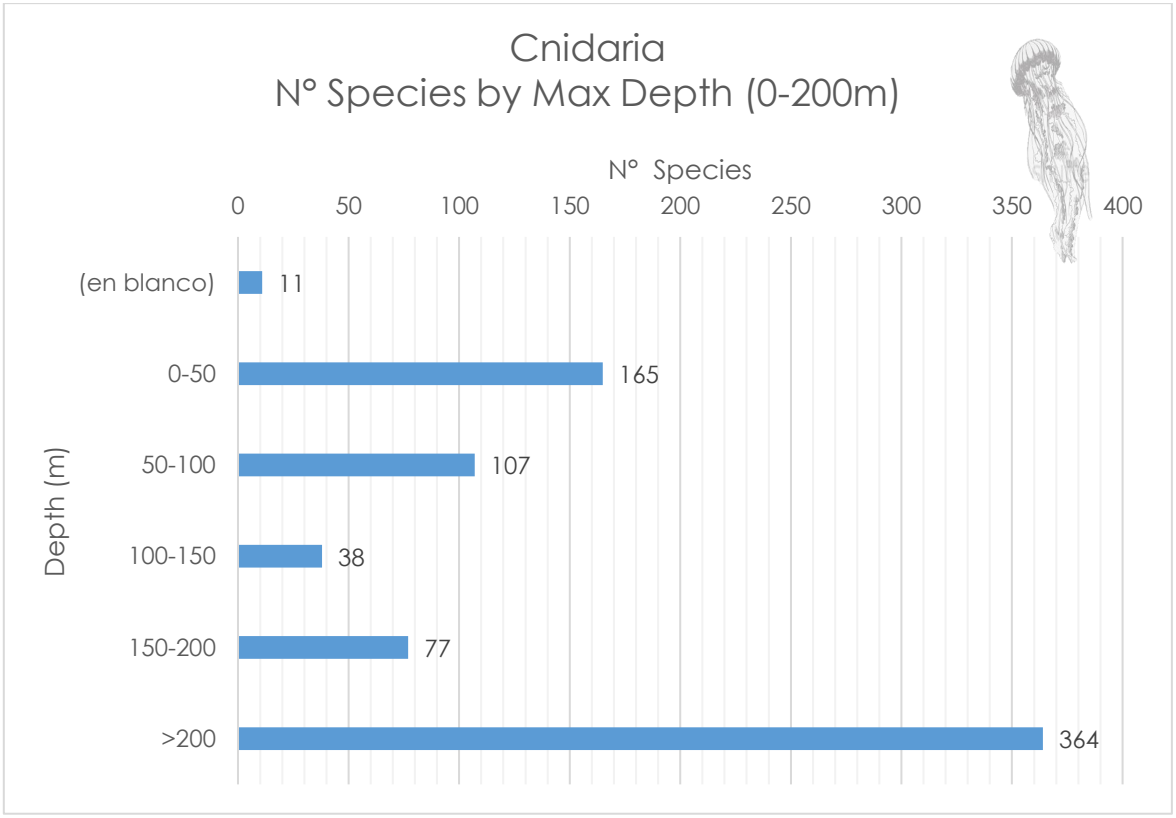

Decapoda
N° Species by Max Depth (0-500m)
N° Species
0
50
100
150
200
250
300
350
Depth (m)
(en blanco)
0-49
50-99
100-149
150-199
200-249
250-299
300-349
350-399
400-449
450-500
>500
5
315
153
52
39
42
16
27
31
14
25
288

D. CNIDARIA

Maximum and minimum depths for Cnidarian orders. The depths of each order were obtained according to the maximum and minimum value found in each order.

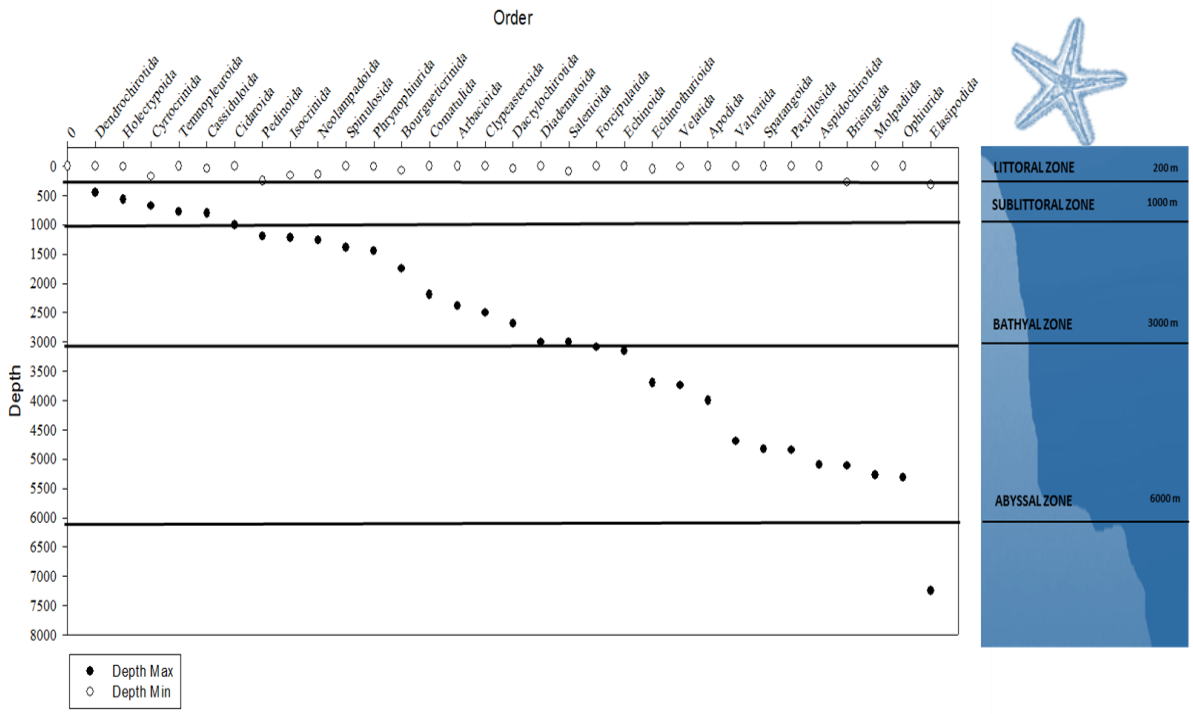


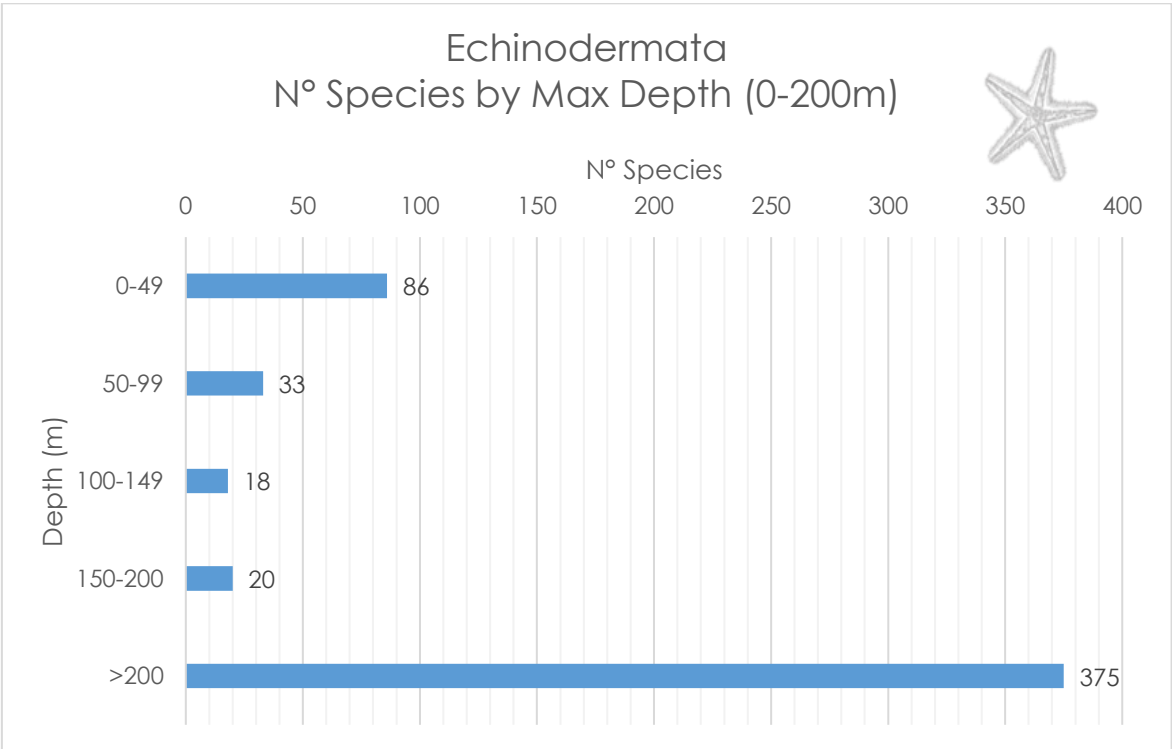


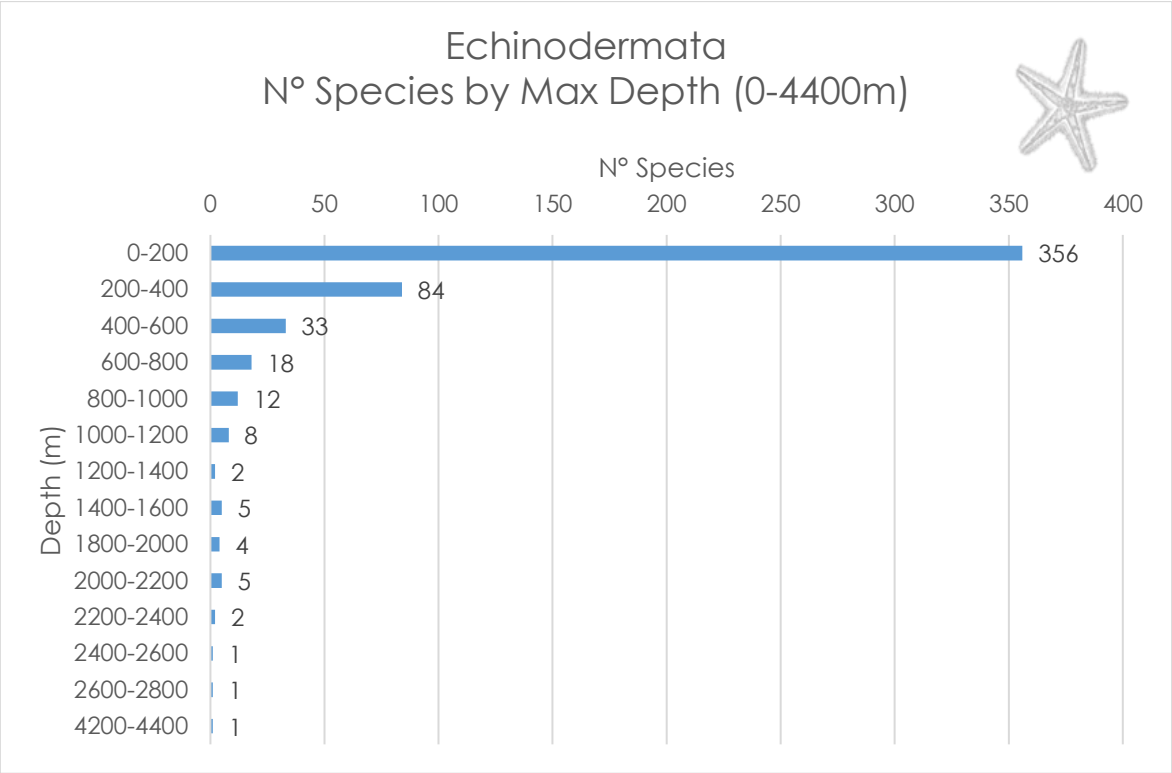

Cnidaria
N° Species by Max Depth (0-200m)
N° Species
0
50
100
150
200
250
300
350
400
Depth (m)
(en blanco)
11
0-50
165
50-100
107
100-150
38
150-200
77
>200
364

E. ECHINODERMATA

Maximum and minimum depths for Echinodermata orders. The depths of each order were obtained according to the maximum and minimum value found in each order.

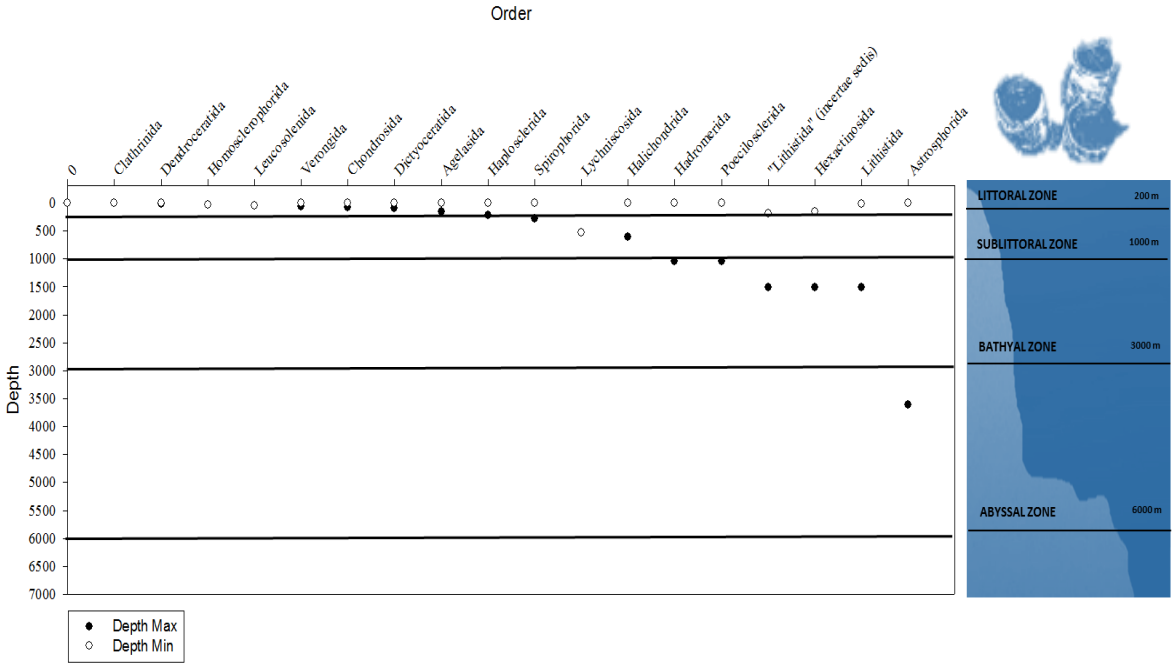


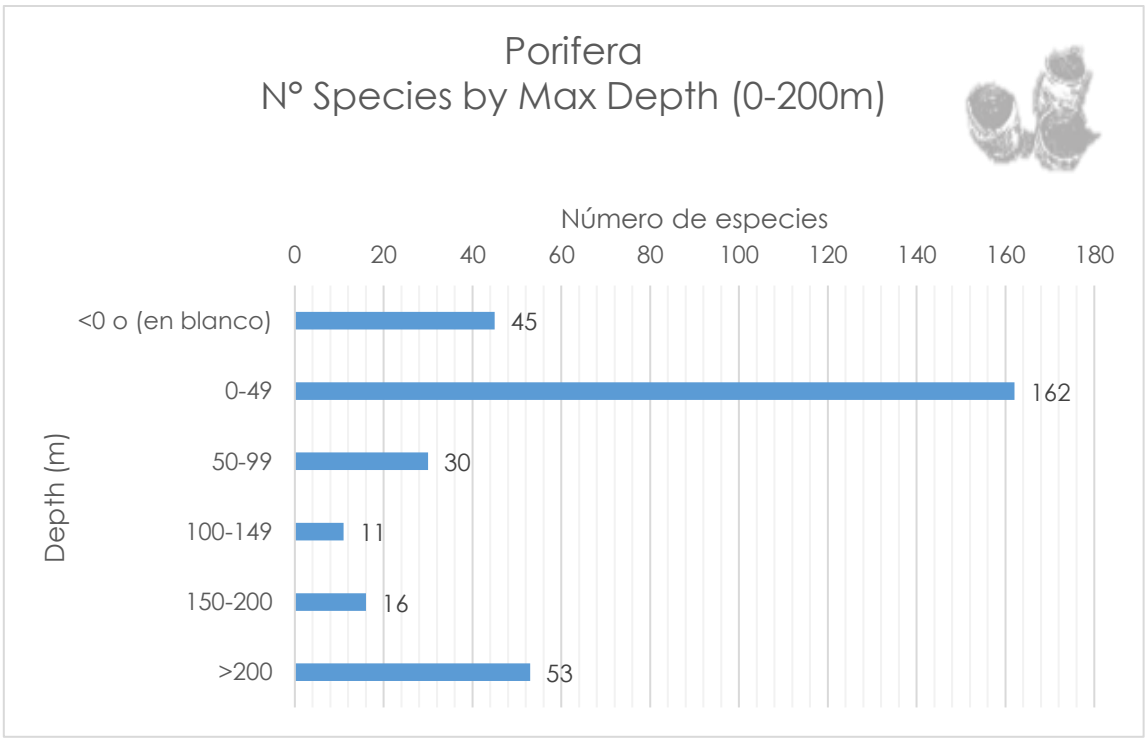


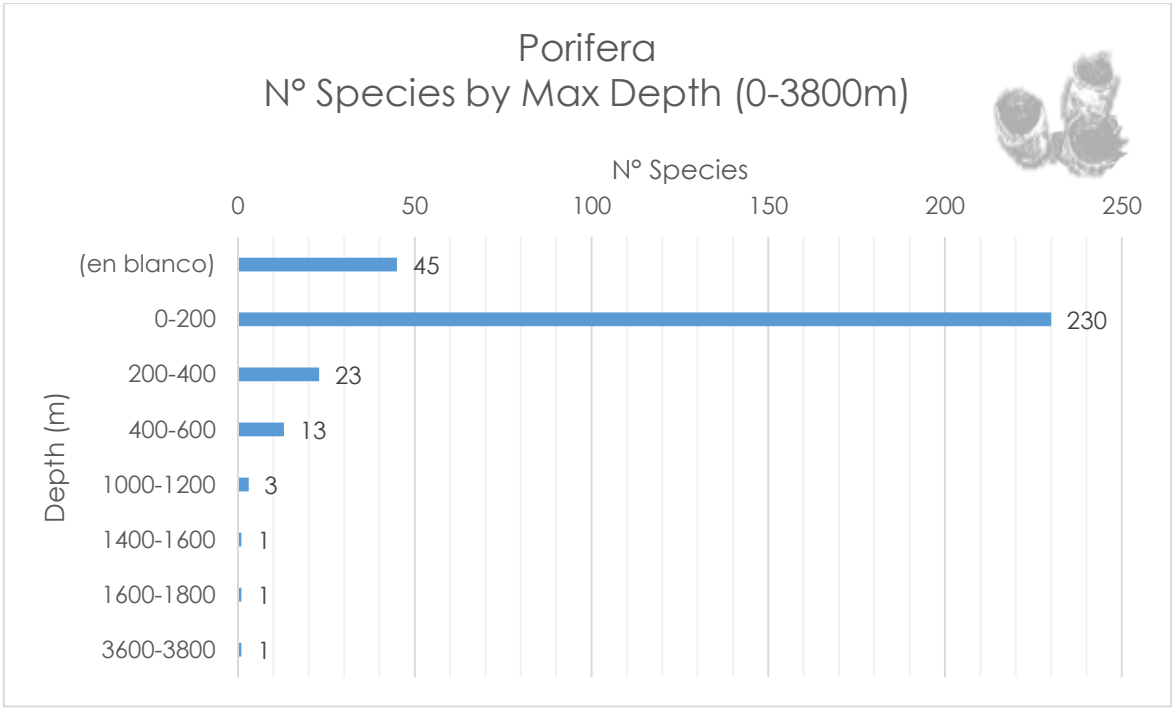

Echinodermata
N° Species by Max Depth (0-4400m)
N° Species
0
50
100
150
200
250
300
350
400
Depth (m)
0-200
356
200-400
84
400-600
33
600-800
18
800-1000
12
1000-1200
8
1200-1400
2
1400-1600
5
1800-2000
4
2000-2200
5
2200-2400
2
2400-2600
1
2600-2800
1
4200-4400
1

F. PORIFERA

Maximum and minimum depths for Porifera orders. The depths of each order were obtained according to the maximum and minimum value found in each order.

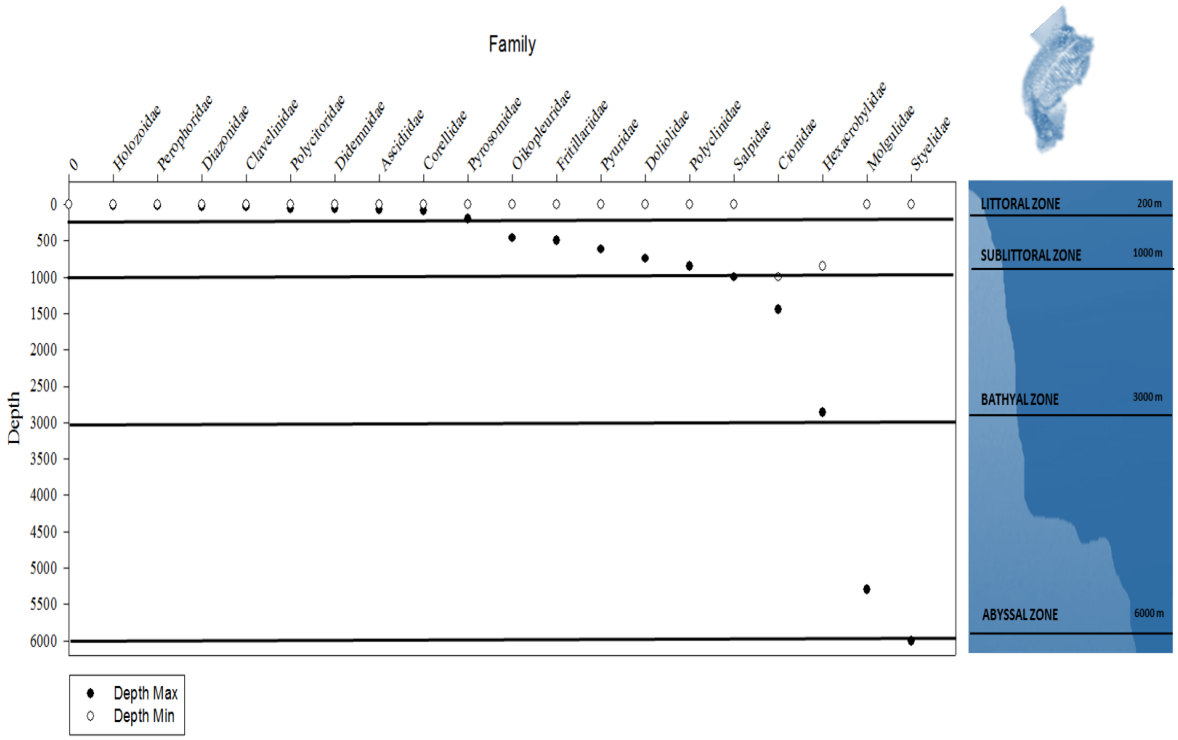


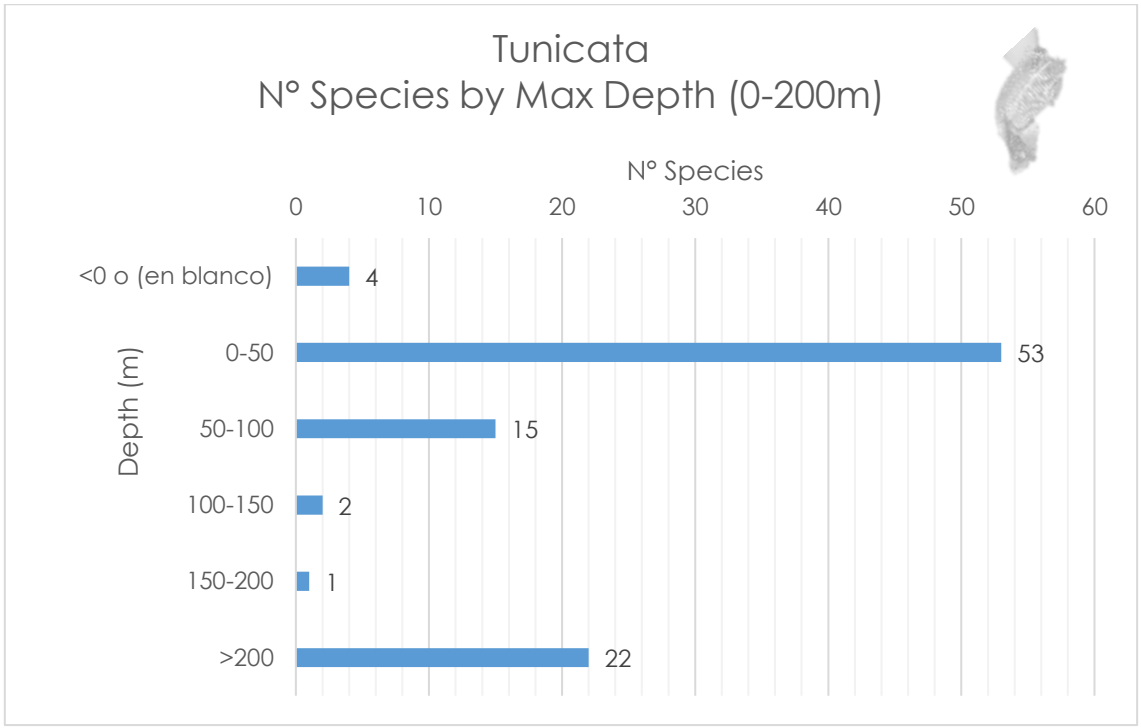


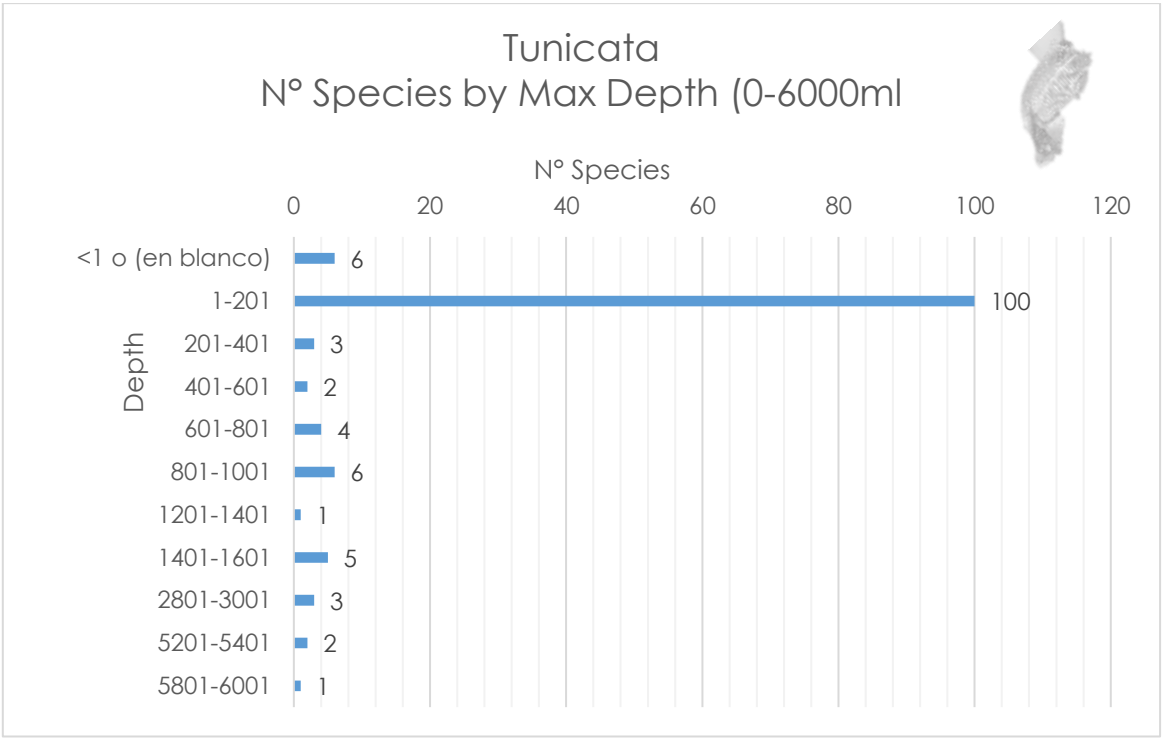

Porifera
N° Species by Max Depth (0-3800m)
N° Species
0
50
100
150
200
250
Depth (m)
(en blanco)
0-200
200-400
400-600
1000-1200
1400-1600
1600-1800
3600-3800
45
230
23
13
3
1
1
1

G. TUNICATA

Maximum and minimum depths for Tunicata orders. The depths of each order were obtained according to the maximum and minimum value found in each order.

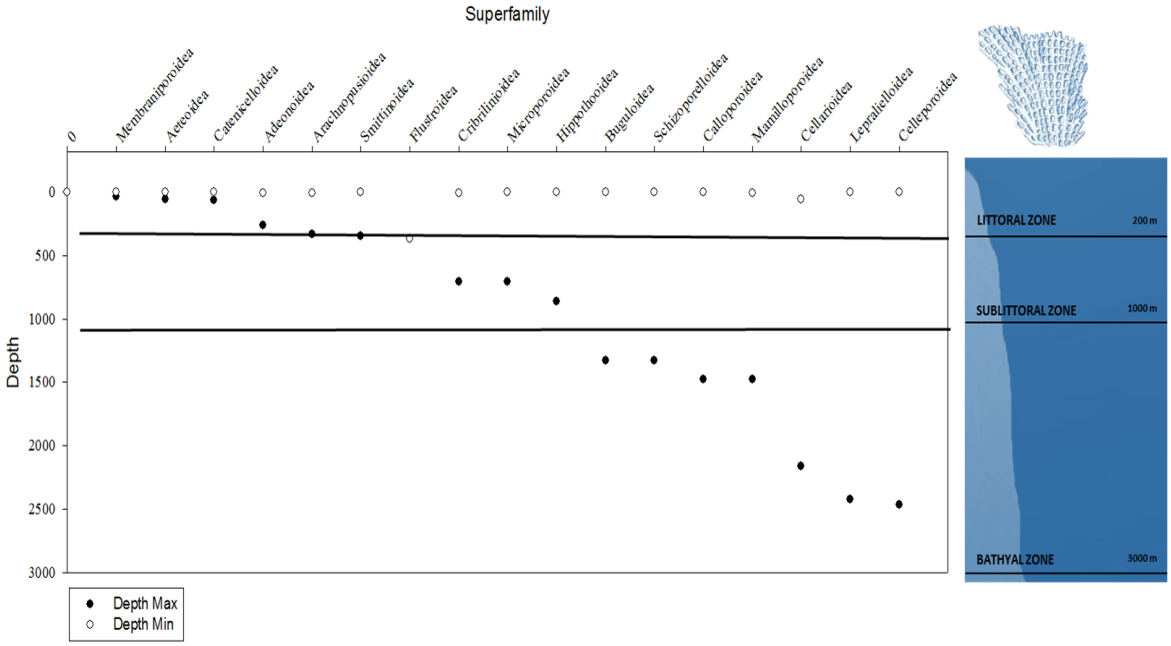


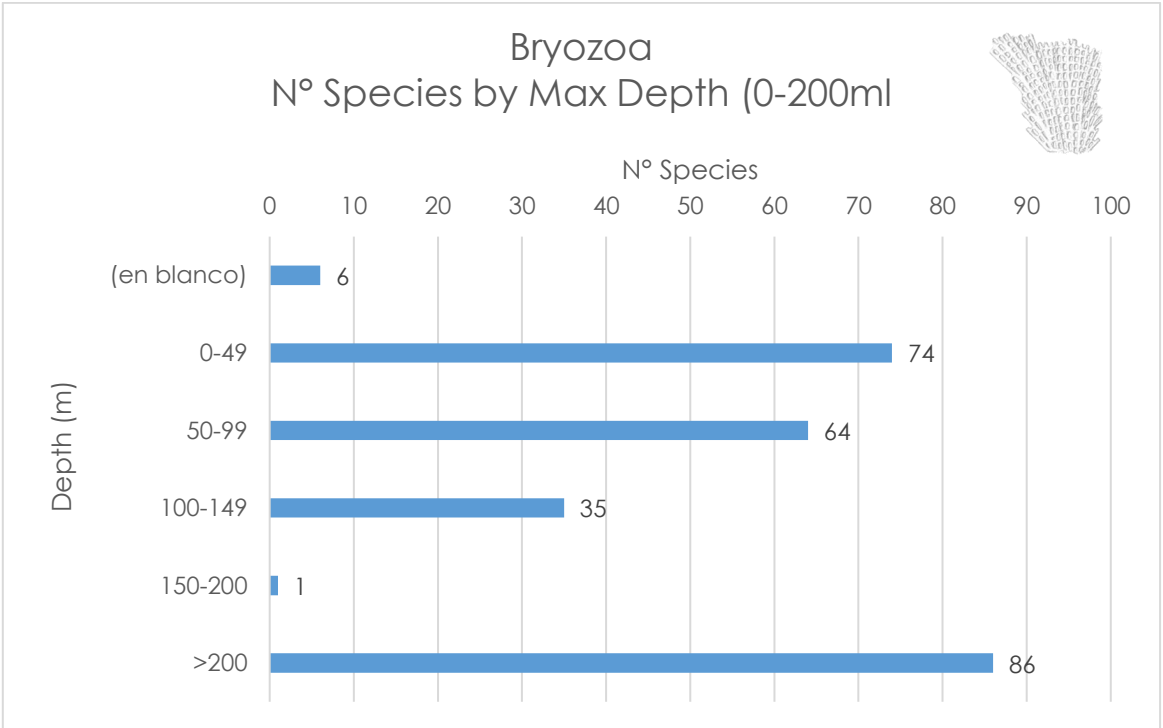


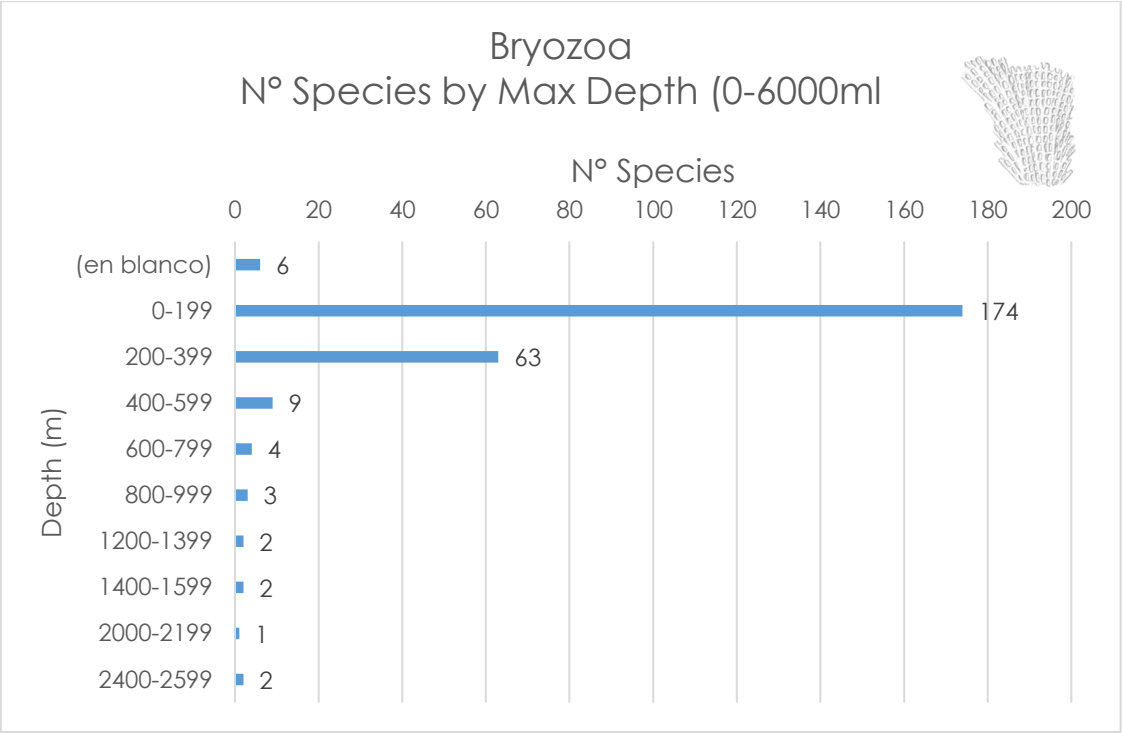

Tunicata
N° Species by Max Depth (0-6000ml
N° Species
0
20
40
60
80
100
120
Depth
<1 o (en blanco)
1-201
201-401
401-601
601-801
801-1001
1201-1401
1401-1601
2801-3001
5201-5401
5801-6001
6
100
3
2
4
6
1
5
3
2
1

H. BRYOZOA

Maximum and minimum depths for Bryozoa orders. The depths of each Superfamily were obtained according to the maximum and minimum value found in each Superfamily.



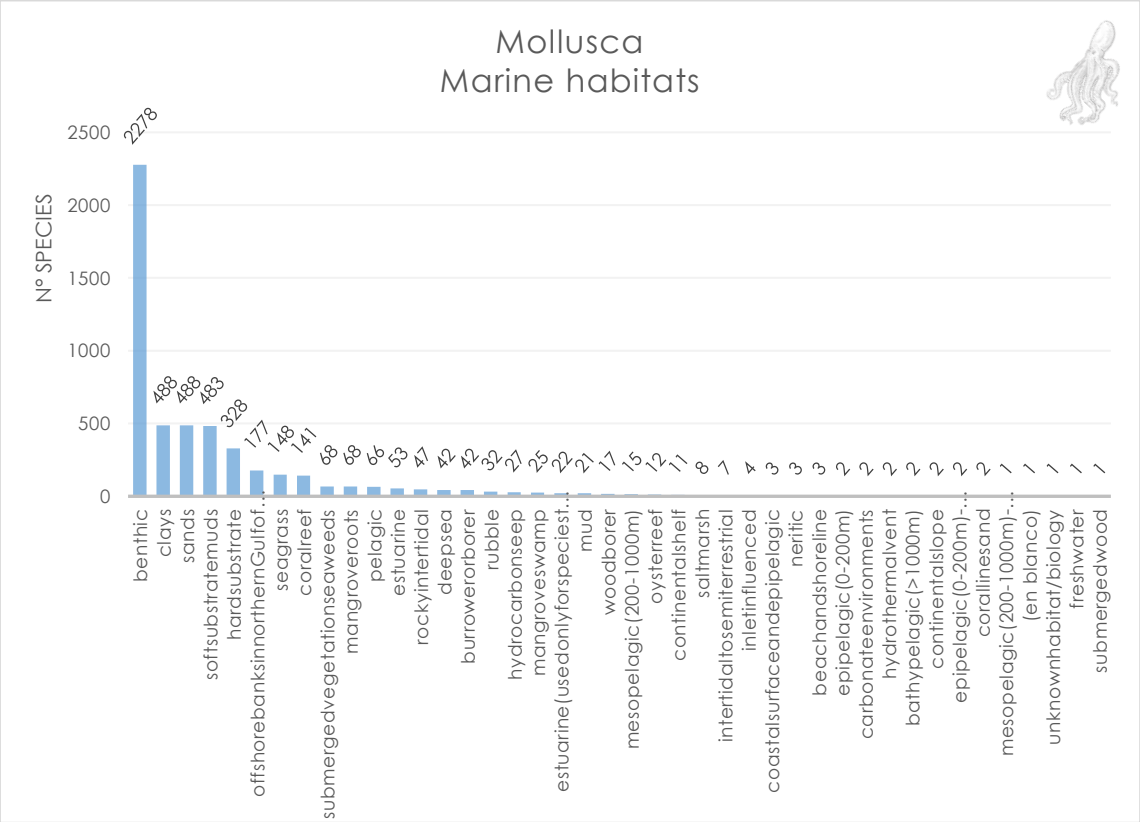



Bryozoa
N° Species by Max Depth (0-6000ml
N° Species
0
20
40
60
80
100
120
140
160
180
200
Depth (m)
(en blanco)
6
0-199
174
200-399
63
400-599
9
600-799
4
800-999
3
1200-1399
2
1400-1599
2
2000-2199
1
2400-2599
2

5. HABITAT

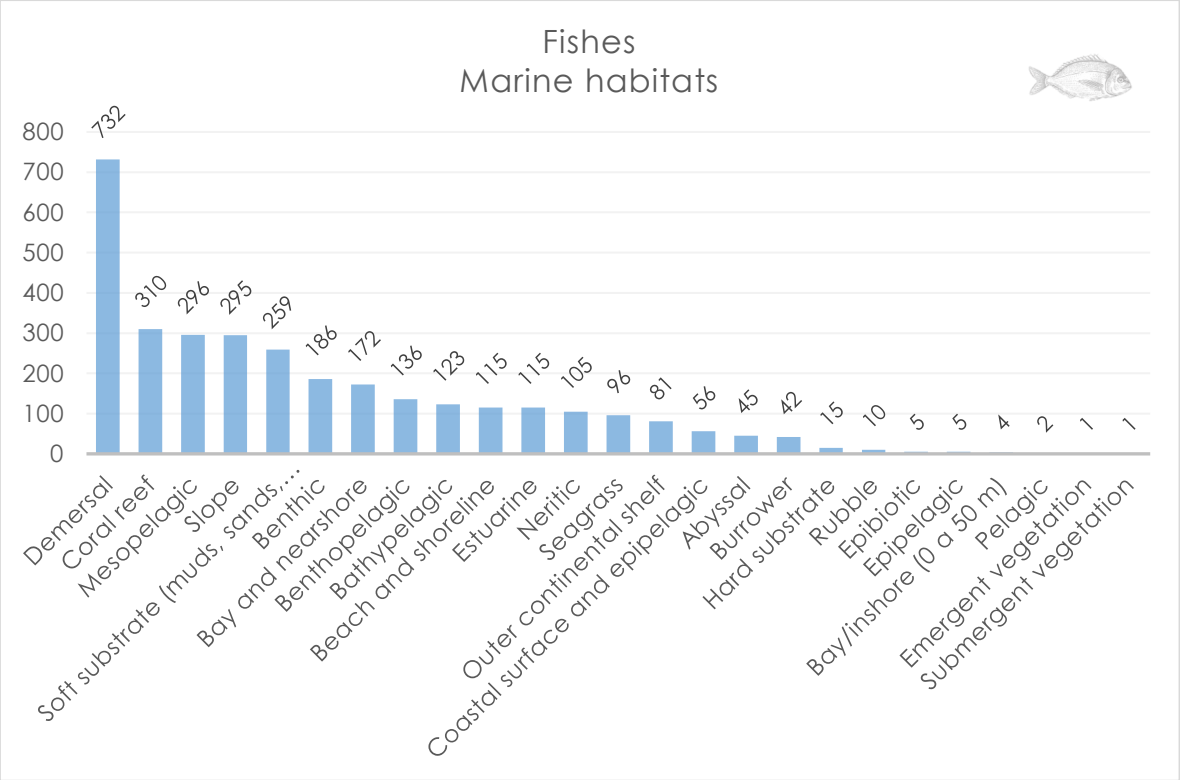
A. MOLLUSCA

The Phylum Mollusca presents 42 habitats. Of which, the habitats where the most species are found, are: benthic, clays and sands. In comparison, the habitats with the smallest number of species are freshwater, coralline sand, continental slope. Information is missing for two species: *Argonauta hians* and *Octopus mercatoris*.



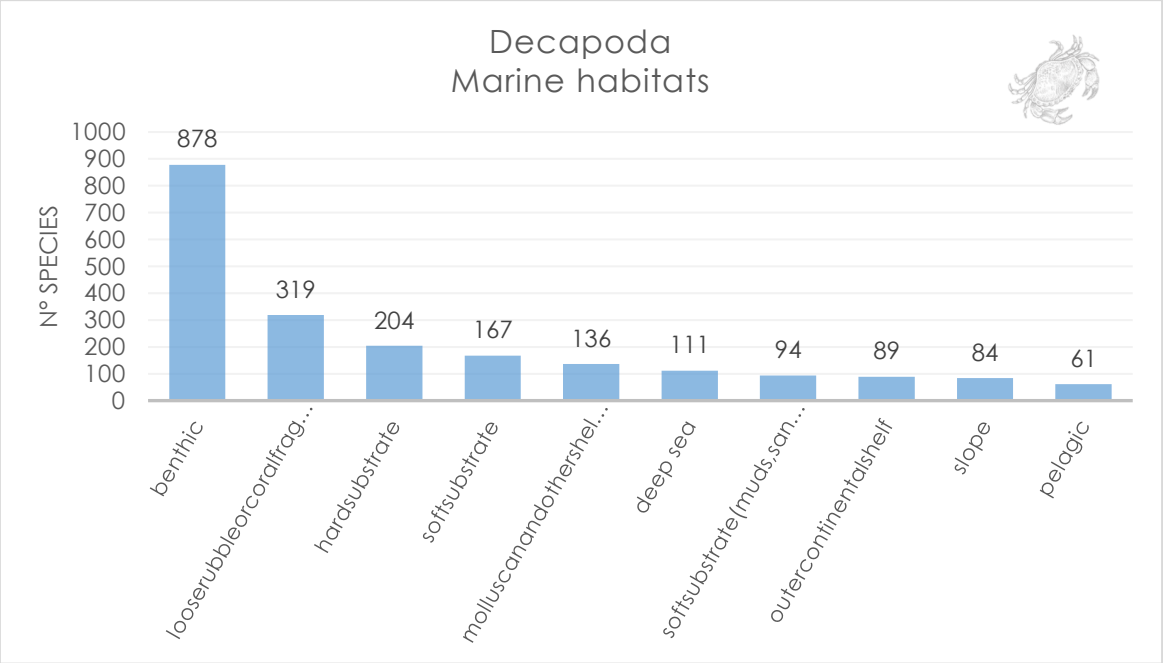
B. PECES

The Phylum Pisces has 25 habitats. Of which, the habitats where the most species are found, are: demersal, coral reef and mesopelagic. In comparison, the habitats with the fewest species are emergent vegetation and sub-emergent vegetation.



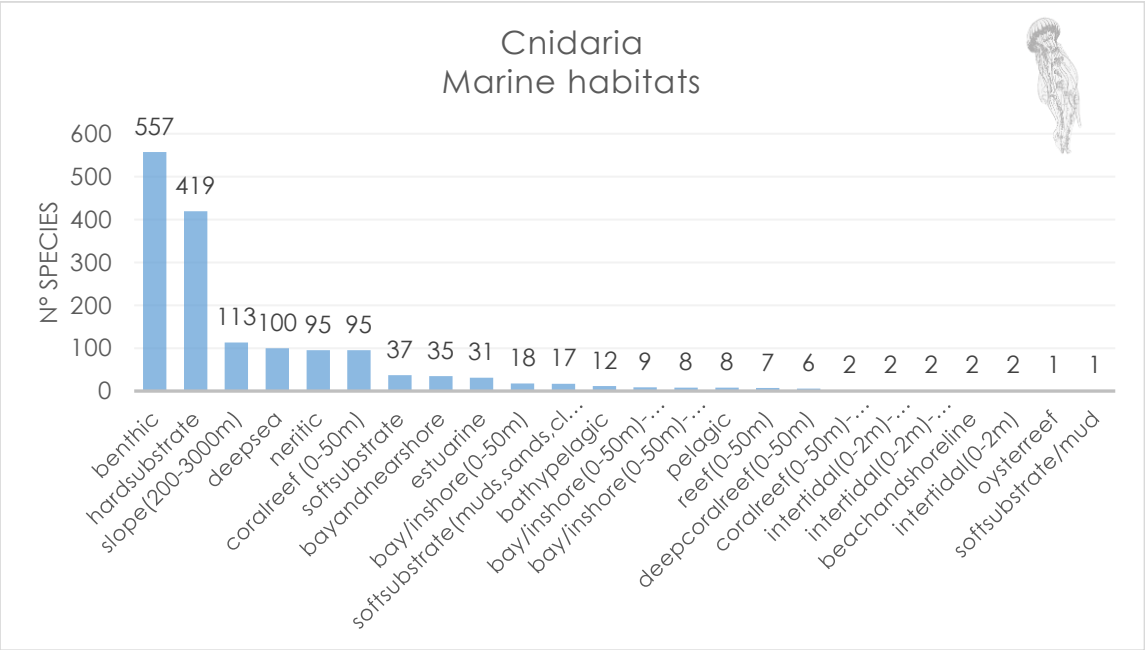
C. DECAPODA

The Phylum Decapoda has 10 habitats. Of which, the habitats where the most species are found, are: benthic, loose rubble or coral fragments and hard substrate. In comparison, the habitats with the smallest number of species are pelagic, slope and outer continental shelters.



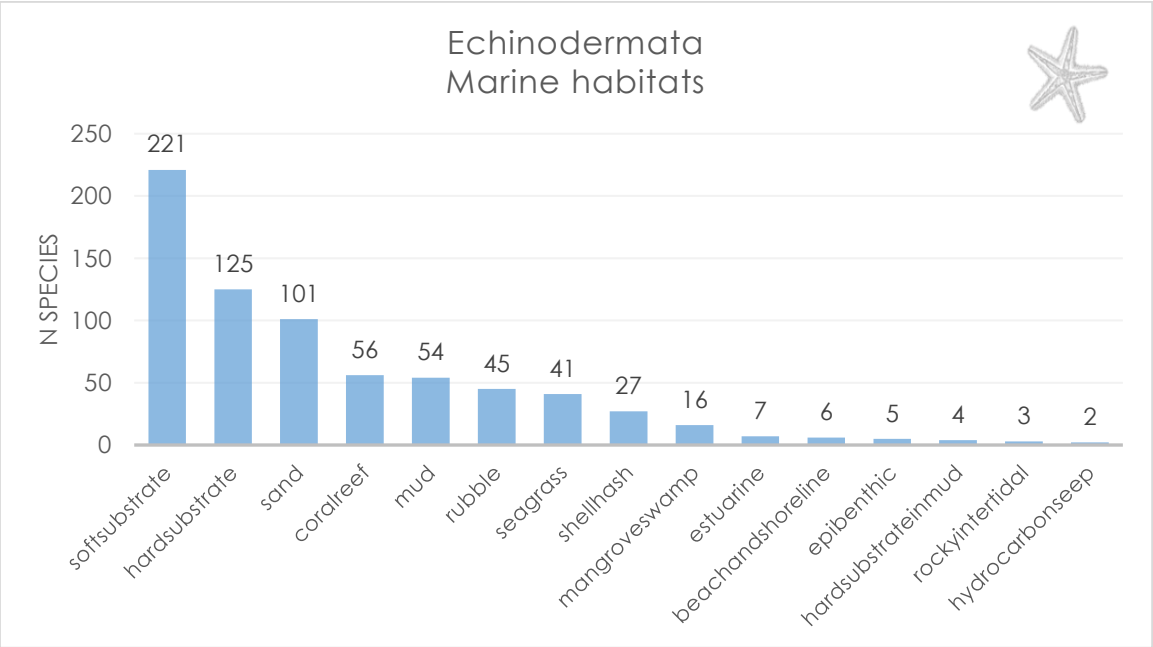
D. CNIDARIA

The Phylum Cnidaria has 24 habitats. Of which, the habitats where the most species are found, are: benthic, hard substrate and slope (200-3000m). In comparison, the habitats with the smallest number of species are soft substrate / mud, oyster reef and intertidal (0-2m).



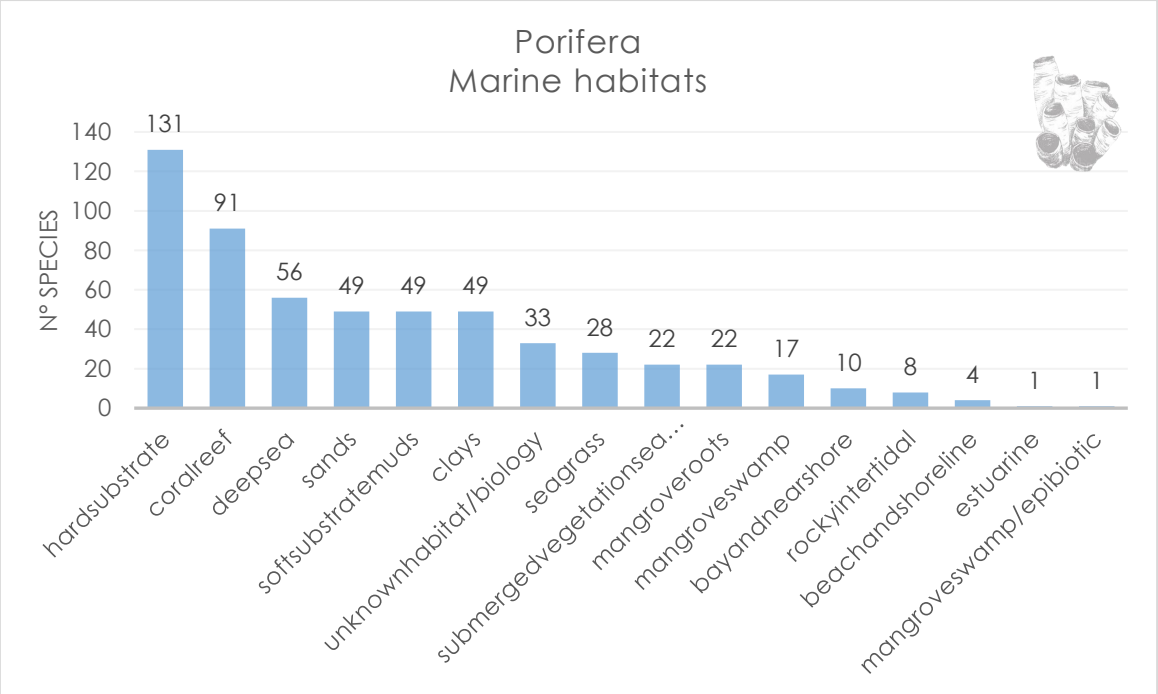
E. ECHINODERMATA

The Phylum Echinodermata presents 15 habitats. Of which, the habitats where the most species are found, are: a soft substrate, hard substrate and sand. In comparison, the habitats with the fewest species are hydrocarbon seep, rocky intertidal and hard substrate in mud.



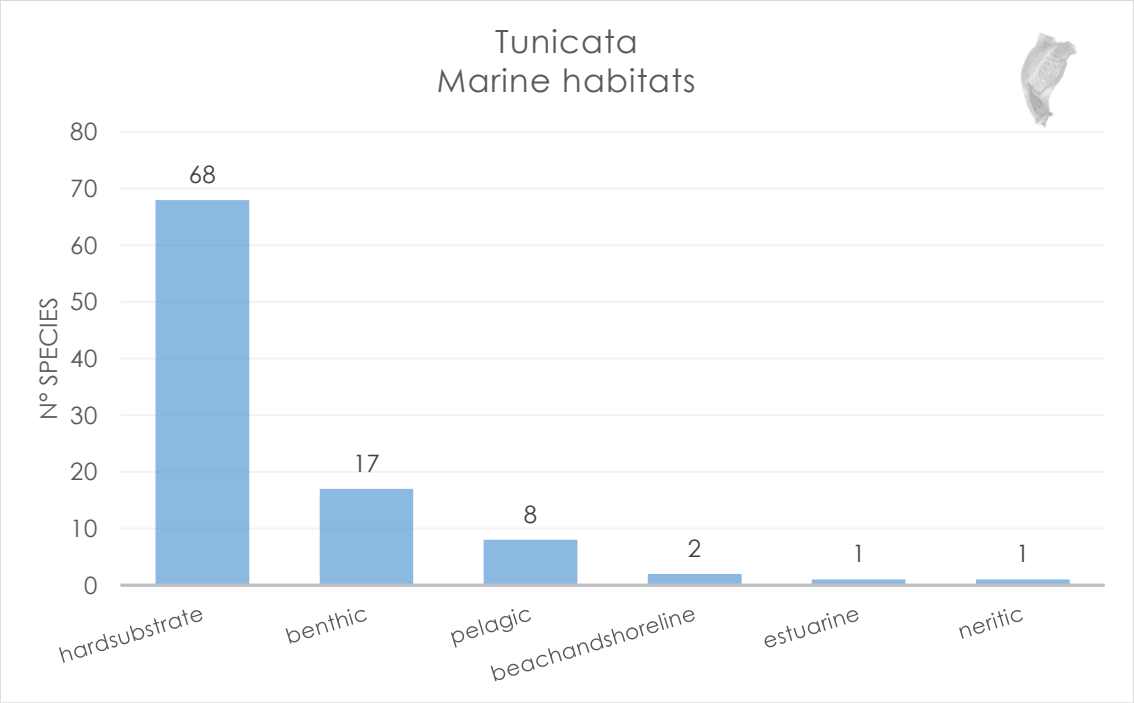
F. PORIFERA

The Phylum Porifera has 16 habitats. Of which, the habitats where the most species are found are: a hard substrate, coral reef, and deep sea. In comparison, the habitats with the least amount of species are mangrove swamp / epibionts, estuarine and beach and shoreline.



G. TUNICATA

The tunicate group has 6 habitats. Of which, the habitat where the most species is found: hard substrate. In comparison, the habitats with the smallest number of species are: neritic, estuarine and beach and shoreline



H. BRYOZOA

The bryozoan group presents 7 habitats. Of which, the habitats where the most species are found: epibenthic encrusting, coral and attached to algae. In comparison, the habitats with the fewest species are: attached to hydroids, pseudopelagic on floating substrata. Information missing for two species: *Codonellina montferrandii* and *Setosella vulnerata*