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THE FESTIVUS

A publication of the San Diego Shell Club

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MEMBERSHIP AND SUBSCRIPTION
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The Festivus is published monthly except December.
The publication date is on the masthead above.
Single copies of this issue: $5.00 plus postage.

Meeting date: third Thursday, 7:30 P.M., Room 104, Casa Del Prado, Balboa Park, San Diego.

PROGRAM

UPDATE ON THE MARINE FOSSIL RECORD OF DOWNTOWN SAN DIEGO

Dr. George L. Kennedy, who was an active leader in the research on the 120,000 year old Bay Point Formation in downtown San Diego (published in 2007), will update the knowledge as we learn more about the two middle Pleistocene marine faunas that date to the warm-water interglacial sea level highstands of over 330,000 years ago. Information based on new building excavations in the East Village and other downtown areas will be discussed.

Meeting date: February 20, 2014

CONTENTS

CLUB NEWS

Minutes of the San Diego Shell Club Meeting January 16, 2014

The meeting was called to order at 7:45 P.M. by Larry Buck, President. The previous minutes as published in *The Festivus* were accepted. Carole Hertz, editor, reminded members that papers for *The Festivus* are needed. First VP Rick Negus announced that Dr. Kennedy will be talking about fossil marine deposits from downtown San Diego in February. Rick then introduced our speaker for January.

Dr. Hans Bertsch gave a presentation titled: "Plants and Vertebrates, Bugs and Slugs: The Crossing Geographic and Taxonomic Paths of Five Naturalists." Hans discussed Johann Friedric Eschscholtz, Robert L Stearns, James Graham, William Healey Dall, and Theodore D. A. Cockerell.

These naturalists spanned well over 100 years of biological work in the Californias. All of them named nudibranchs but they also worked on other groups such as insects, salamanders, birds, or mammals. Eschscholtz, a Russian physician, has the genus of the California Poppy named after him. Dall was perhaps the most prolific with thousands of species named by him.

The naming of forms/variants as unique species was not an uncommon event. The lives of some individuals crossed paths which resulted in friendships or in some cases animosity. Field work in the 1800s could be a challenge as treks into the lesser known areas were by boat, horse, or foot. Maritime expeditions probably provided the most personal comforts and facilitated the storage and transport of large amounts of biological materials collected on such expeditions. Other means of transportation presented their own unique logistic problems. An interesting presentation filled with the unexpected.... But that was the life of a naturalist.

The door prize was won by Jules Hertz. The meeting was adjourned at 8:55 P.M. after which members enjoyed visiting and the snacks brought in by many members

Paul Tuskes

The San Diego Shell Club's Shell Donation to the Scripps Institution of Oceanography and the University of San Diego

Upon completion of the recent Mission Bay Survey, Club members were asked if they wished to donate extra material collected during the effort. The value of such common material is not always immediately obvious. While doing the research for the paper I was chronically disappointed by the fact that no material from prior surveys of Mission Bay could be located. Days were spent tracking down literature from the late 1800s to the 1940s in order to confirm the identity of species reported in past surveys, and in a few instances the name could not be applied to any specific organism currently known.

Dr. Greg Rouse, a member of the Club and a professor at Scripps, offered to find a home for the Mission Bay material at SIO. Five members, Nancy Schneider, John LaGrange, Carole and Jules Hertz and Paul Tuskes eollectively donated 134 species (499 specimens). Each individual specimen or lot contained full collecting data. The donation represented 71% of the species reported in the Mission Bay Survey paper. This notation allows future researchers to tie the specimen to a name, no matter how confusing the systematics of a group may become.

In addition, a reference collection of bivalves from Mission Bay was donated to the University of San Diego for use of the staff and students who are currently working on bivalves in the Kendall-Frost Reserve.

Paul Tuskes

SAVE THE DATE

The date is now definite for the Club's Annual Auction/ Potluck. It will be on Saturday the 26th of April. The venue will be the same. Wes Farmer has again offered his community room for the event – a perfect place. Details on the auction will come later.
BUT -- the Club would appreciate donations of quality shells and/or shell-related items.

While the auction/potluck is always a fun event – good material is necessary to make it a special event.

Editor's Note

We regret that this will be the last issue of *The Festivus* published in its current format. The 2014 Board of Directors of the San Diego Shell Club has voted to make *The Festivus* a quarterly publication in an e-format (with hard copies available only as necessary).

In 1969 Jules and I were part of a San Diego Shell Club Committee to start a Club publication — not a newsletter. It was decided at that time not to have advertisements, poetry and chit-chat with announcements of birthdays and the like. Since its initiation in 1970, *The Festivus* has followed those guidelines. As time went on it reached the stage where we were urged by Dr. Eugene Coan to become a peer-reviewed publication so that papers published would have more credibility with professional malacologists, amateur workers and the general public. At that time the Club members urged us to take Dr. Coan's advice and become peer-reviewed. As a result we received subscriptions from major museums around the world with a far-reaching membership.

Jules and I are very proud of what *The Festivus* has become during these 45 years and do not want to be part of a quarterly publication with lower standards. As a result, I am resigning as Editor and Jules as Business Manager. This will be effective the end of February. At this time we want to thank our very supportive scientific review board and the many authors who published with us.

Not only has the San Diego Shell Club Board changed the direction of our publication, but it has changed what used to be friendly, cooperative board meetings to ones of great turbulence being led dictatorially. These underhanded tactics have caused the resignation of the long-serving Treasurer and Corresponding Secretary and also replaced the Website Manager who created our fine website.

At this time, Jules and I will remain Club members but will no longer be responsible for *The Festivus*, the Annual Auction/Potluck, and the Christmas party. It is with great sadness that we take this action. Please send all future correspondence for the San Diego Shell Club and *The Festivus* to Larry Buck, 3649 Sage Canyon Drive, Encinitas, CA 92024 • 760-580-1726 • larry@glbuckplumbing.com.

THE 18TH ANNUAL MEETING OF SCUM (THE SOUTHERN CALIFORNIA UNIFIED MALACOLOGISTS)

On Saturday January 25, 2014, SCUM once again convened for its annual meeting, this time in San Diego at the City of San Diego Marine Biology Lab. There were over 21 of us: professionals, amateurs and students. We had a great time thanks to the considerable efforts of Wendy Enright and George Kennedy.

After early refreshments, the proceedings opened with Lindsey Groves presenting a photographic tour through the first 17 years of our meetings. It was a terrific idea and one enjoyed by all of us – the long-timers, for sure. Then we continued with the traditional round of introductions during which we met some new people and learned what all the attendees were doing professionally.

The first paper was given by Jean Alupay who gave a fascinating look at her research on octopus, studying arm autotomy in *Octopus aculeatus*. She accompanied her talk with aquarium photos of the octopus shedding an arm for defense. She discussed how this behavior occurs, noting that it happens frequently – up to 40% in the Philippines and that it doesn't really seem to bother the octopus– some shown had two arms missing or were in the proeess of re-growing. She added that it takes two to three months for the arm(s) to grow back and showed that the regrown arm is thinner from the point at which it was autotomized. During the question period she noted that *Octopus rubescens* rarely drops arms. It was a terrific presentation.

This talk was followed by Hans Bertsch who discussed two species in the families Tritoniidae and Bornellidae from the Mexican Pacific. Then Doug Eernisse discussed highlights of work in his lab – including a major project on the shell eyes of some speeies of chitons which have both lens and cornea. When Doug finished outlining some of the projects he was working on, alone or with student co-authors, I wondered when he has time to breathe. Wes Farmer closed the morning talks with a lovely short show on hunting whales and dolphins with a camera.

This was followed by a pizza luneh brought in for us all with soft drinks, coffee, tea and cookies. The annual photo (Figure 1) was taken in the entryway after lunch and then it was back to the meeting for the afternoon program (Figure 2).

Shawn Wiedrick gave us insights into his Database of Shelled Gastropod Mollusks and his library with a tour of his beautifully arranged collection and library at his home – and the agonies of moving it from one resi-

Figure 1. Group photo of attendees at SCUM XVIII. Photo: H. Bertsch.

Figure 2. Shawn Wiedrick, Jim McLean, Lindsey Grove and George Kennedy. Photo: H. Bertsch.

dence to another. The thought was a tiring one to anyone who might even contemplate it. Then Pat LaFollette gave us information on the availability on the internet of the Biodiversity Heritage Library – a free information site with many valuable references.

Lance Gilbertson, discussed his eompleted project with co-authors (Wallace and Eernisse) on *Cahuilles fultoni*, a new dartless species of helminthoglyptid snail he found in the desert at Zzyzx at Soda Mts. and Soda Dry Lake. He showed a group of photos of these rarely seen animals which appear only after rains. This ended the more formal part of the meeting, but people were encouraged to stay awhile and enjoy chatting with fellow attendees. It was a most enjoyable and successful meeting. Next year's meeting will be held in Orange County.

Carole M. Hertz

COMPOSITION AND COMMUNITY STRUCTURE OF SOFT BOTTOM MOLLUSKS IN ISLA SAN FRANCISCO, GOLFO DE CALIFORNIA, MÉXICO

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Abstract

We analyzed the composition and community structure of soft-bottom mollusks of Isla San Francisco (24°48' N, 110°34' W) and its possible relationship to some environmental variables. We selected 18 sampling sites in the summer of 2012, 36 samples were collected, 18 corresponded to biological samples and 18 to sediment. The temperature, depth, sediment type, and organic matter were used as environmental indicators. We analyzed the abundance and diversity of the malacological benthic community as ecological descriptors. Two thousand, seven hundred and seventy-three specimens were registered belonging to 36 bivalve species distributed in 11 families and five orders. The gastropods were the most represented group with 44 species distributed in 25 families and six orders. The highest values of richness and abundance were found south of the island in carbonate sediments of coarse sand and shallow bottoms. The most abundant bivalves were *Tellina eburnea* with an average size of 5 mm H followed in importance by *Gary helenae*. The most abundant gastropod was the micromollusk *Cystiscus politulus*. The species with the highest frequency of occurrence (≥ 50%) were: *Laevicardium substriatum* (58%), *Crepidula aculeata* (58%); *Gari helenae* (50%) and *Lucina undatoides* (50%). The mean values of diversity index was 2.7 bits per ind. and the evenness were high (> 0.8) in most of the sample sites, the minimum value recorded was 0.65 influenced by the abundance of the bivalve *Tellina eburnea* that was the dominant species. We found a strong association of mollusks with deposits of calcareous algae, pieces of coral and echinoderms.

Introduction

The Golfo de California is considered one of five major most productive and biologically diverse marine ecosystems of the world. The highest diversity is in its rocky and sandy bottoms that are found at less than 50 meters deep, mainly around the islands and coasts of the Baja California Peninsula. However, in most islands little marine ecological information has been published, which is a problem for developing strategies for conservation and development of these areas. The purpose of this study was to determine the composition and community structure of mollusks present in soft bottoms of the subtidal zone of Isla San Francisco and describe characteristics associated with its habitat.

Study Area

Isla San Francisco, Baja California Sur, México, is located in the Golfo de California, north of the Bahía de La Paz and south of Isla San José, at 25° 39'N and 110° 45 ' W.

Material and Methods

We selected 18 sampling sites (Figure1) in the summer of 2012. Thirty-six samples were collected, 18 correspond to biological samples and 18 to sediment. The temperature, depth, sediment type, and organic matter were used as environmental indicators. We analyzed the abundance and diversity of the malacological benthic community as ecological descriptors (Figure 1).

The mollusks association analysis was performed considering living organisms. Dead organisms were included only for those with their valves together or no alteration in the periostracum. Species were identified according to: Keen (1971), Brusca (1980) and

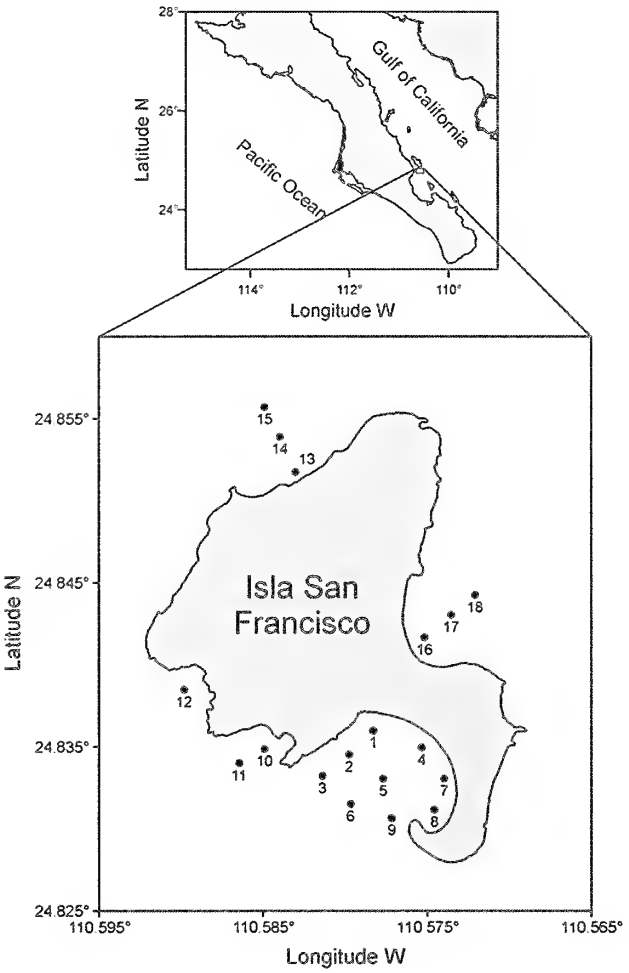

Figure 1. Study area and location of the sampling sites in Isla San Francisco, Golfo de California, México.

Coan & Valentich-Scott (2012). To examine and to characterize the species relationships as well as the species number (S) and relative abundances (N) the Shannon-Weiner index (H) was used (Margaleff, 1982). The species richness (S) is determined according to Margaleff (1982); we calculated the frequency of occurrence (FO), and for the evenness (J) the index of Pielou (1975) was applied. Temperature, depth, salinity and sediment texture were used as environmental indicators.

Results

In the subtidal zone of Isla San Francisco, 2,773 specimens were registered belonging to 36 species of bivalve distributed in 11 families and five orders (Table 1). The gastropods were the most represented group with 44 species distributed in 25 families and six orders. The highest values of richness and abundance were found south of the island in carbonate sediments of coarse sand and shallow bottoms. The most abundant bivalves were *Tellina eburnea* (Figure 2) with an average height of 5 mm followed in importance by *Gary helenae*. The most abundant gastropod was the micromollusk *Cystiscus politulus*. The sample site with the highest abundance of mollusks was station 9 (Figure 3).

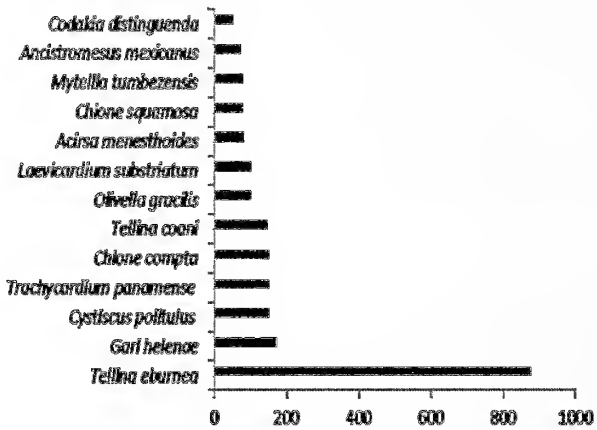

Figure 2. The most numerous soft bottom species for their abundance (>70 individuals) were 12 of the 79 identified in the study.

The species with the highest frequency of occurrence (≥ 50%) were: *Laevicardium substriatum* (58%), *Crepidula aculeata* (58%), *Gari helenae* (50%) and *Lucina undatoides* (50%). Species richness (S) ranged from nine to 25 species in 75% of the sampling stations, a median of 16.5 and maximum values of 34 species at station 14.

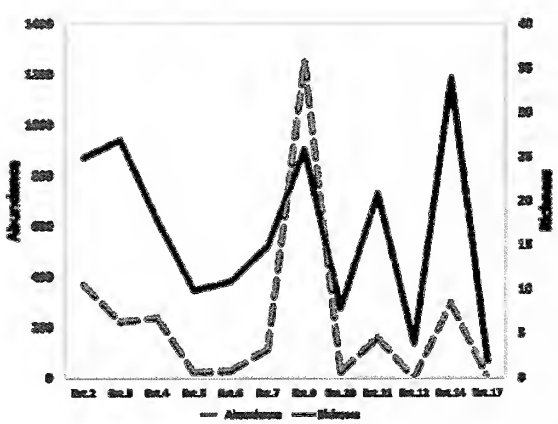

Figure 3. Variation in abundance (N) and richness (S) among the eighteen sampling sites.

The mean values of diversity index was 2.7 bits per ind. and the evenness were high (> 0.8). In most of the sample sites, the minimum value recorded was 0.65 influenced by the abundance of the dominant bivalve species *Tellina eburnea*. The highest values of diversity were found at station 14 with values of 3.5 bits per ind. The highest values of evenness were found in station 12 with values of 1 (Figure 4).

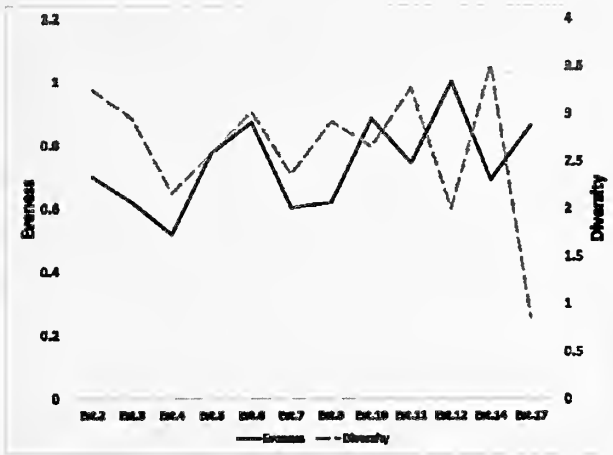

Figure 4. Variation in diversity (H) equitability (J) among the eighteen sampling sites.

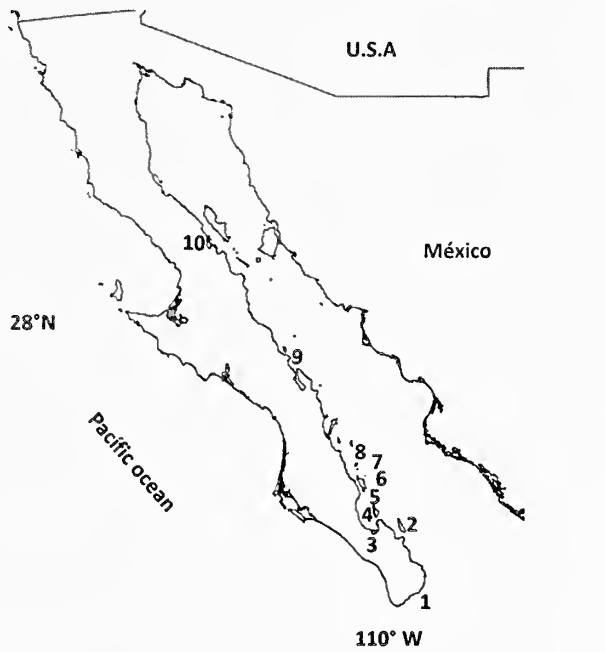

Figure 5. Sites in the Golfo de California where communities of soft-bottom mollusks have been studied using the same sampling method: (1) Cabo Pulmo, (2) Isla Cerralvo, (3) Ensenada de La Paz, (4) Bahía de La Paz, (5) Isla San Francisco, (6) Isla San José, (7) Isla Santa Cruz, (8) Isla Santa Catalina or Catalana, (9) Punta Chivato and (10) Bahía de Los Angeles.

Discussion

The 36 species of bivalves and 44 gastropods reported here may seem high compared to other investigations in the Golfo de California islands (Figure 5 and Table 2). The communities of mollusks in the study site showed high values of diversity (3.5 bits per ind) and their distribution were limited to shallow water with a strong association with deposits of calcareous algae (rhodoliths), pieces of coral and echinoderms, similarly found in the islands of San José and Espiritu Santo. These environmental characteristics are similar to those reported by Halfar *et al* (2003) and Tripp-Quezada (2008) in the same localities and the Espíritu Santo Archipelago. These islands, are defined by Halfar *et al* (2006 a) as a warm tropical transition zone with mesotrophic conditions. The difference in species richness from other sites of the Golfo de California may be due to the sediment grain size heterogeneity (Tripp-Quezada 2008; Tripp-Quezada *et al* 2008; Tripp-Quezada *et al* 2009a, 2009b; Tripp-Quezada *et al* 2011a, 2011b; Vázquez-Vega 2013), but coincide on these sites where the greater abundance of organisms (represented by the Tellinidae family) are located in sediments of medium to coarse sand.

To have an inventory of species is a fundamental requirement in developing an environmental management plan of the biodiversity of a country or region and maintaining it in a rational and responsible way. With the results of this study, we have a reference on the diversity of mollusks in the infra-littoral zone of Isla San Francisco. This information also may be useful in the evaluation of possible environmental impacts by anthropogenic actions, or effects of climate change reflected in changes in the structure or composition of the mollusk benthic community of the island.

Acknowledgments

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Table 1. Systematic list of the mollusk species collected according to Keen (1971) and systematic update according to Skoglund (2001, 2002).

CLASS BIVALVIA			
Family			
Mytilidae	*Brachidontes adamsiana* (Dunker, 1857)	**Pectinidae**	*Argopecten ventricosus* (Sowerby II, 1843)
	Brachidontes laevis (Menke, 1848)		*Leptopecten camerella* (Berry, 1968)
	Modiolus tumbezensis (Pilsbry & Olsson, 1935)	**Cardiidae**	**Carditamera radiata* (Sowerby I, 1833)
	Septifer zeteki (Hertlein & Strong, 1945)		*Laevicardium elenense* (Sowerby II, 1840)
Arcidae	*Anadara formosa* (Sowerby I, 1833)		*Laevicardium substriatum* (Conrad, 1837)
	Anadara multicostata (Sowerby I, 1833)		*Trachycardium panamense* (Sowerby I, 1833)
	Anadara obesa (Sowerby I, 1833)		**Ctenocardia biangulata* (Broderip & Sowerby, 1829)
Glycymeridae	*Glycymeris gigantea* (Reeve, 1843)		*Trigoniocardia granifera* (Broderip & Sowerby, 1829)
Lucinidae	*Codakia distinguenda* (Tryon, 1832)	**Chamidae**	*Chama echinata* Broderip, 1835
	Divalinga eburnea Reeve, 1850	**Tellinidae**	*Tellina eburnea* (Hanley, 1844)
	Divalinga perparvula (Dall, 1901)		*Tellina coani* Keen, 1971
	Cavilinga prolongata (Carpenter, 1857)		*Tellina subtrigona* Sowerby *in* Reeve, 1866
	**Pleurolucina undata* (Carpenter, 1865)	**Psammobiidae**	*Gari helenae* Olsson, 1961

	Gari maxima (Deshayes, 1855)		*Chioneryx squamosa* (Carpenter, 1864)
Semelidae	*Semele pacifica* Dall, 1915		*Megapitaria squalida* (Sowerby 1, 1835)
Veneridae	*Chione californiensis* (Broderip, 1835)		*Megapitaria aurantiaca* (Sowerby 1, 1831)
	Chione compta (Broderip, 1835)		*Transennella modesta* (Broderip & Sowerby, 1835)
	Chionopsis pulicaria (Broderip, 1835)		
CLASS GASTROPODA			
Family			
Fissurellidae	*Diodora digueti* (Magille, 1895)	**Olividae**	*Oliva incrassata* [Lightfoot, 1786]
	Fissurella morrisoni McLean, 1970	**Olivellidae**	*Olivella altatae* Burch & Campbell, 1963
Patellidae	*Scutellastra mexicana* (Broderip & Sowerby, 1829)		*Olivella gracilis* (Broderip & Sowerby, 1829)
Lottiidae	*Lottia acutapex* (Berry, 1960)		*Olivella sphoni* Burch & Campbell, 1964
Turbinidae	*Macrarene californica* (Dall, 1908)	**Cystiscidae**	*Cystiscus palantirulus* Roth & Coan, 1968
	Turbo squamiger Reeve, 1843		*Cystiscus politulus* (Dall, 1919)
Epitoniidae	*Acirsa cerralvoensis* (DuShane, 1970)	**Conidae**	*Conus fergusoni* Sowerby, 1873
	Acirsa menesthoides (Carpenter, 1864)		*Conus nux* Broderip, 1833
	Crepidula aculeata (Gmelin, 1791)	**Terebridae**	**Terebra allyni* Bratcher & Burch, 1979
	Crepidula excavata (Broderip, 1834)	**Turridae**	*Bellaspira acclivicosta* McLean & Poorman, 1970
	Crucibulum monticulus Berry, 1969		*Lioglyphostoma ericea* (Hinds, 1843)
	Crucibulum spinosum (Sowerby 1, 1824)	**Architectonicidae**	*Architectonica nobilis* Röding, 1798
	Crucibulum scutellatum (Wood, 1828)	**Pyramidellidae**	*Pyramidella adamsi* Carpenter, 1864
	Crucibulum umbrella (Deshayes, 1830)	**Retusidae**	*Volvulella cylindrica* (Carpenter, 1864)
Capulidae	*Capulus sericeus* J. & R. Burch, 1961	**Cylichnidae**	*Acteocina inculta* (Gould, 1855)
Naticidae	*Natica lunaris* (Berry, 1964)		*Cylichna fantasma* (Baker & Hanna, 1927)
	Polinices bifasciatus (Griffith & Pidgeon, 1834)	**Trimusculidae**	*Trimusculus stellatus* (Sowerby, 1835)
	Polinices helicoides Gray, 1825)	**Siphonariidae**	*Williamia peltoides* (Carpenter, 1864)
	Polinices uber (Valenciennes, 1832)		*Siphonaria brannani* Stearns, 1873
Triphoridae	*Triphora hannai* Baker, 1926		*Siphonaria gigas* (Sowerby I, 1825)
Columbellidae	*Columbella haemastoma* Sowerby, 1832		*Siphonaria maura* Sowerby, 1835
	Mitrella delicata (Reeve, 1859)		
			*Skoglund (2001, 2002)

Table 2. Variation in species richness of soft bottom mollusks among ten sites of the Golfo de California.

	Sites	Species richness	Bivalves	Gastropods	Scaphopods
1	Cabo Pulmo	84	40	44	0
2	Isla Cerralvo	133	76	54	3
3	Bahía de La Paz	72	32	40	0
4	Ensenada de La Paz	66	38	28	0
5	Isla San Francisco	80	36	44	0
6	Isla San José	58	39	19	0
7	Isla Santa Cruz	45	26	19	0
8	Isla Santa Catalina	65	32	33	0
9	Punta Chivato	86	54	32	0
10	Bahía de Los Ángeles	91	63	28	0