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New records of fishes from Guadalupe Island, northwest Mexico

Nuevos registros de peces en la Isla Guadalupe, noroeste de México

Mariana Walther-Mendoza,[1,2,4] Arturo Ayala-Bocos,[1] Mauricio Hoyos-Padilla[3] and Héctor Reyes-Bonilla[1]

[1]Universidad Autónoma de Baja California Sur. Departamento Académico de Biología Marina. Carretera al sur km. 5.5 Col. El Calandrio. La Paz, B.C.S., 23080. México
[2]University of Queensland. School of Geography, Planning and Environmental Management. St. Lucia 4072, Brisbane, Australia
[3]Pelagios-Kakunjá A.C. Sinaloa 1540. La Paz, B.C.S., 23070. México
[4]Sociedad de Historia Natural Niparajá, A.C. Programa de Conservación Marina Revolución 430. Col. Esterito. La Paz, B.C.S. 23020. México
email: hreyes@uabcs.mx

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ABSTRACT

The icthyofauna from Guadalupe Island, Mexico, has been scarcely studied. This paper presents additions to the systematic checklist of fishes from that oceanic island, and is based on data obtained from museums, field records and international databases. A total of 22 new records are depicted for that locality (19 deep-water species and 3 shallow reef-dwelling fishes), including one addition to the Mexican fauna (*Nansenia candida*). These reports complement the previous list of 328 species for Guadalupe Island,which now reaches 350 species, distributed in 5 classes, 44 orders and 127 families.

Key words: Biogeography, Biosphere Reserve, Pacific Ocean, Oceanic Island.

RESUMEN

La ictiofauna de la Isla Guadalupe, México, ha sido escasamente estudiada. Este trabajo presenta adiciones al listado sistemático de los peces de dicha isla oceánica, y se basa en datos de museos, registros de campo y bases de datos internacionales. Un total de 22 nuevos registros se dan a conocer para esa localidad (19 especies de agua profunda y 3 de fondos arrecifales someros), incluyendo una adición a la fauna conocida de peces de México (*Nansenia candida*). Esos reportes complementan la lista previa de 328 especies de peces para la Isla Guadalupe, la cual ahora alcanza 350 especies, distribuidas en 5 clases, 44 órdenes y 127 familias.

Palabras clave: Biogeografía, Reserva de la Biósfera, Océano Pacífico, Isla Oceánica.

INTRODUCTION

Guadalupe Island (29°00' N, 118°26' W), the northernmost oceanic territory of Mexico in the Pacific Ocean, has been worldwide recognized due to its endemism and great biodiversity, both in land and sea (Santos-del Prado & Peters, 2008). Declared by the Mexican Government as a Biosphere Reserve in 2005, it is an important fishing area for commercial species of high economic value such as abalone, lobsters and sea cucumbers (Campos, 2007; Gallo-Reynoso *et al.,* 2008). Also, this location has recently developed as a tourist site for sightings of great white sharks, *Carcharodon carcharias* (Linnaeus, 1758), as these predators aggregate in the area and show site fidelity (Domeier & Nasby-Lucas, 2007). The island is located 240 km off the western coast of Baja California,

Mexico, and is directly influenced by the California Current, with an average sea surface temperature of 18 °C (Santos-del Prado & Peters, 2008). Its extreme isolation has limited the number of studies and resulted in a dearth of biological information, especially about the basic ecology and characterization of its marine communities. This paper aims to improve our knowledge on the fish fauna of Guadalupe Island, by providing a collection of new records of species obtained from museums, field records and internet databases.

MATERIALS AND METHODS

Information for this study was extracted from a variety of sources. Most records were obtained from the Ichthyology Department of the Natural History Museum of Los Angeles County (LACM) database, as the specimens have been checked for correct identification. In addition, an internet search of the following sites was made: FishBase (www.fishbase.org), the Global Biodiversity Information Facility (www.gbif.org) and the Ocean Biogeographic Information System (www.obis.org). In the results, only those taxa that were specific to Guadalupe Island were incorporated, including observations, census or collections on site or in its surroundings (50 km from the center of the island). In addition, field observations from SCUBA diving surveys (2008-2010) and records from sport fishing log books (2005-2009) provided by the authorities of the Biosphere Reserve of Guadalupe Island (Reserva de la Biósfera Isla Guadalupe RBIG), were considered in the revision. Finally we include sightings and photographic evidence obtained at submersions conducted aboard the "Ocean Pearl" and "Deep See", two self-propelled electric submersibles that can carry two or three occupants to depths of 153 m and 457 m respectively. Eighteen submersible dives were made in four sites: Playa Norte (11 dives), Cañones Gemelos (4 dives), Playa Palmas (2 dives) and Punta Pilar (1 dive), during September, October and December, 2008. To take into consideration only valid names in the checklist, we consulted the taxonomic arrangements and synonyms presented in FishBase, Love *et al.* (2005), and the Catalog of Fishes of the California Academy of Sciences (http://research.calacademy.org/research/ichthyology/Catalog/fishcatmain.asp).

RESULTS

From the information search, we could identify a total of 22 new records of fishes for Guadalupe Island, belonging to 22 genera, 22 families, 14 orders and 2 classes (Table 1). Of these, nine (41%) have tropical affinities, while the remaining ones inhabit cold or temperate waters. In relation to bathymetry, 11 species (50%) are typical from deep waters (depth mid-range > 50 m), and the remainder 11 are common in shallow water, including the chub *Kyphosus elegans* (Peters, 1869), the cardinalfish *Apogon retrosella* (Gill, 1862) and the triggerfish *Balistes polylepis* Steindachner, 1876, typical residents in rocky reefs (Robertson and Allen, 2010). From the biogeographic perspective and considering the 22 new records, Guadalupe Island marks the southern range border of only one of these fish species *Nansenia candida* Cohen, 1958, which is also a new record for Mexican waters.

DISCUSSION

The data from Table 1 are complementary to the recently published ichtyofaunal checklist of Guadalupe Island, which includes 328 species (Reyes-Bonilla *et al.,* 2011); thus adding to a new total of 350 species, in 127 families, 44 orders and 5 classes. Probably the most relevant result is that this location represents the southernmost range of the bluethroat argentine *Nansenia candida* (previously acknowledged at California, U.S.A.; Moser, 1996; Love *et al.*, 2005; www.fishbase.org).

Most fishes in Table 1 are small (less than 20 cm in total length) or hard to observe or catch as they live in deep or open waters (Love *et al.*, 2005); therefore, this is the first paper to properly address their presence at Guadalupe. However it is rather surprising that the formal literature has overlooked the presence of species that have been observed repeatedly in the area and which are of touristic and fishing importance, such as the whale shark *Rhincodon typus* Smith, 1828, the whitenose shark *Nasolamia velox* (Gilbert, 1898), the hake *Merluccius productus* (Ayres, 1855) and the dolphinfish *Coryphaena hippurus* Linnaeus, 1758. This situation calls for a more thorough study of the marine communities of this isolated island in order to have a full checklist of the local ichtyofauna. Finally, it is worthwhile to note that eight of the new records included here are confirmed in a non-refereed tablet application authored by two specialists (Robertson and Allen, 2012; Table 1); unfortunately the program did not specify the origin of the records, but nevertheless that source supports the results here presented.

The use of submersibles might significantly improve our knowledge, as occurred in the case of the first documented reports of the longnose skate *Raja rhina* Jordan & Gilbert, 1880, the roughbar frogfish *Antennarius avalonis* Jordan & Starks, 1907, and the triggerfish *Balistes polylepis* at the island (Table 1). An interesting note was the photographic and video record of two specimens of a chimera, the spotted ratfish *Hydrolagus colliei*, (Lay & Bennett, 1839) found at a depth of 289 m. This species is distributed from southeastern Alaska to Sebastian Vizcaino Bay (27ºN) in the Baja California Peninsula (Miller and Lea, 1972), but has never been pictured in Mexico before, probably because of its benthopelagic habits and null commercial importance (Gonzalez-Acosta *et al.*, 1999).

In conclusion, this paper documents 22 new fish records for Guadalupe Island, increasing the checklist to 350 in total. One of the new findings represents an addition to the Mexican ichthyofaunal records.

Table 1. Systematic list of new records for cartilaginous and bony fish of Guadalupe Island, Baja California, Mexico. Classification according to Eschmeyer & Fricke (2010).

	LACM Collection number	Web reference	Field observation	Distribution and bathymetric range	Notes
Phylum Chordata					
Class CHONDRICHTHYES					
Subclass HOLOCEPHALI					
Order CHIMAERIFORMES					
Family Chimaeridae					
1. *Hydrolagus colliei* (Lay & Bennett, 1839)			a	C, D	
Subclass ELASMOBRANCHII					
Order ORECTOLOBIFORMES					
Family Rhincodontidae					
2. *Rhincodon typus* Smith, 1828		1, 2, 3	b	T, S	
Order CARCHARHINIFORMES					
Family Carcharhinidae					
3. *Nasolamia velox* (Gilbert, 1898)		1, 2	c	T, S	In tablet application
Order RAJIFORMES					
Family Rajidae					
4. *Raja rhina* Jordan & Gilbert, 1880			a	C, D	
Class ACTINOPTERYGII					
Order OSMERIFORMES					
Family Microstomatidae					
5. *Nansenia candida* Cohen, 1958					
	976			C, D	Southern limit; first record in Mexico
Family Bathylagidae					
6. *Bathylagus pacificus* Gilbert, 1890	6731, 9318, 9638, 9646, 9648, 30028	1		C, D	
Order STOMIIFORMES					
Family Stomiidae					
7. *Bathophilus filifer* (Garman, 1899)	35503	1		C, D	
Order AULOPIFORMES					
Family Paralepididae					
8. *Magnisudis atlantica* (Krøyer, 1868)	9766			C, D	
Order MYCTOPHIFORMES					
Family Myctophidae					
9. *Taaningichthys bathyphilus* (Tåning, 1928)	9572, 9650, 30421, 30422, 30515, 30609, 31053			C, D	
Order GADIFORMES					
Family Moridae					
10. *Physiculus rastrelliger* Gilbert, 1890		1, 2	b	C, D	

Table 1. Continue.

	LACM Collection number	Web reference	Field observation	Distribution and bathymetric range	Notes
Family Merluccidae					
11. *Merluccius productus* (Ayres, 1855)	9809, 32164	1, 2		C, S	In tablet application
Order LOPHIIFORMES					
Family Antennariidae					
12. *Antennarius avalonis* Jordan & Starks, 1907			a	T, S	
13. *Gigantactis microdontis* Bertelsen, Pietsch & Lavenberg, 1981	30284, 32204			C, D	
Order STEPHANOBERYCIFORMES					
Family Melamphaidae					
14. *Melamphaes laeviceps* Ebeling, 1962	9577			C, D	
Order PERCIFORMES					
Family Apogonidae					
15. *Apogon retrosella* (Gill, 1862)		2	b	T, S	In tablet application
Family Echeneidae		1, 2	b	T, S	
16. *Remora remora* (Linnaeus, 1758)					In tablet application
Family Coryphaenidae					
17. *Coryphaena hippurus* Linnaeus, 1758		1, 2	b	T, S	In tablet application
Family Kyphosidae					
18. *Kyphosus elegans* (Peters, 1869)		1, 2	b	T, S	In tablet application
Family Scombridae					
19. *Acanthocybium solandri* (Cuvier, 1832)		1	c	T, S	In tablet application
Family Tetragonuridae					
20. *Tetragonurus cuvieri* Risso, 1810	30029, 30609, 30611	1		C, D	
Order PLEURONECTIFORMES					
Family Paralichthyidae					
21. *Citharichthys xanthostigma* Gilbert, 1890	9806	1, 2	b	T, S	In tablet application
Order TETRAODONTIFORMES					
Family Balistidae					
22. *Balistes polylepis* Steindachner, 1876			a	T, S	

Web references: 1) FishBase, 2) Ocean Biogeographic Information System (OBIS); 3) Global Biodiversity Information Facility (GBIF).
Field observations: a) Submersibles, b) Staff of the Reserva de la Biosfera Isla Guadalupe; c) Sport fishing log books.
Key to distribution: T: Species of tropical affinity (midpoint of its distribution south of 24 ° N); C: Species of cold-temperate affinity (midpoint of its distribution north of 24° N). Geographic ranges from Love *et al.* (2005), FishBase (2010) and Robertson and Allen (2010).
Key to bathymetric range: S; Shallow water species (resident from surface to 50 m deep); D: Deep water species (bathymetric limit deeper than –50 m). Data from Love *et al.* (2005) and FishBase (2010).
Notes: Refers to records which Guadalupe Island marks the northern or southern limit of the distribution of the species in the eastern Pacific, if this is the first time the species is reported in that region or in Mexico, or if the fish is referred as present at Guadalupe in a tablet application (Robertson and Allen, 2012).

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LITERATURE CITED

Campos, E. 2007. Comentarios sobre la distribución de la langosta pinta *Panulirus inflatus* y la langosta roja *Panulirus interruptus* (Crustacea: Palinuridae) en el Pacifico mexicano. Revista Mexicana de Biodiversidad 78: 201-204.

Domeier, M. & N. Nasby-Lucas. 2007. Annual re-sightings of photographically identified white sharks (*Carcharodon carcharias*) at an eastern Pacific aggregation site (Guadalupe Island, Mexico) Marine Biology 150: 977–984.

Eschmeyer, W. N. & R. Fricke (eds.). Catalog of Fishes electronic version. Disponible en línea en: http://research.calacademy.org/ichthyology/catalog/fishcatmain.asp. (consulted 25 October 2010).

Gallo-Reynoso J. P., B. J., LeBoeuf, A. L, Figueroa-Carranza & M. O. Maravilla-Chávez. 2008. Los pinnípedos de Isla Guadalupe. In: K. Santos-del Prado & E. Peters (Eds.). Isla Guadalupe: restauración y conservación. Instituto Nacional de Ecología, pp. 171-202.

González-Acosta, A. F., J. de la Cruz-Agüero & V. M. Cota-Gómez. 1999. Extension of geographical distribution and first occurrence of fishes in the northwest of Mexico. Hidrobiológica 9: 39-44.

Love, M. S., C. W. Mecklenburg, T. A. Mecklenburg & L. K. Thorsteinson. 2005. Resource inventory of marine and estuarine fishes of the west coast and Alaska: A checklist of north Pacific and Arctic Ocean species from Baja California to the Alaska-Yukon border. United States Geological Survey, Seattle. 276 p.

Miller, D. J. & R. N. Lea. 1972. Guide to the coastal marine fisheries of California. California Department of Fish and Game Fishery Bulletin 157: 1-249.

Moser, H. G. (editor). 1996. The early stages of fishes in the California Current region. California Cooperative Oceanic Fisheries Atlas 33: 1-1517.

Reyes-Bonilla, H., Y. R. Bedolla-Guzmán, L. E. Calderón-Aguilera, A. Ayala-Bocos, A. Ramírez-Valdez, S. González-Romero, N. C. Olivares-Bañuelos, I. Sánchez-Alcántara & M. Walther-Mendoza. 2011. Checklist and biogeography of fishes from Guadalupe Island, western Mexico. CalCOFI Reports 51: 195-209.

Robertson, D. R. & G. R. Allen. 2010. Shorefishes of the tropical eastern Pacific. Disonible en línea en: http://www.stri.org/sftep (consulted november 10, 2010).

Robertson, D. R. & G. R. Allen. 2012. Peces costeros del Pacífico oriental tropical: Aplicación de guía de identificación, versión 2.1. Aplicación para Ipad (Apple). Instituto Smithsoniano de Investigaciones Tropicales, Panamá.

Santos-del Prado, K. & E. Peters (eds.). 2008. Isla Guadalupe: restauración y conservación. Instituto Nacional de Ecología, 324 p.

Recibido: FALTA.

Aceptado: FALTA.