



<http://dx.doi.org/10.11646/zootaxa.3608.6.2>

<http://zoobank.org/urn:lsid:zoobank.org:pub:8B60241F-8229-49B8-9B28-0CAC90614E38>

Checklist of the Inland Fishes of El Salvador

CALEB D. MCMAHAN¹, WILFREDO A. MATAMOROS^{1,2}, FRANCISCO S. ÁLVAREZ CALDERÓN³, WENDY YAMILETH HENRÍQUEZ³, H. MICHELLE RECINOS³, PROSANTA CHAKRABARTY¹, ENRIQUE BARRAZA⁴ & NÉSTOR HERRERA⁴

¹LSU Museum of Natural Science (Ichthyology), Department of Biological Sciences, Louisiana State University, 119 Foster Hall, Baton Rouge LA 70803 USA.

E-mail: cmcmah2@lsu.edu.

²Department of Biological Sciences, University of Southern Mississippi, 118 College Dr., Hattiesburg, MS 39406 USA.

E-mail: wilmatamoros@yahoo.com.

³Universidad de El Salvador, Facultad de Ciencias Naturales y Matemáticas, Escuela de Biología, Final 25 Avenida Norte, Ciudad Universitaria, San Salvador, El Salvador.

E-mail: Samuel_biologo@hotmail.com, walex_1021@hotmail.com, michelle-2586@hotmail.com.

⁴Ministerio de Medio Ambiente y Recursos Naturales, Col. y Calle Las Mercedes, San Salvador, El Salvador.

E-mail: ebarraza@marn.gob.sv, nherrera@marn.gob.sv.

Abstract

The inland fish fauna of El Salvador and its distribution was originally described in 1925 by Samuel Hildebrand. That work has been the main source of information for freshwater fishes of El Salvador up to today. Based on the combination of an intensive literature review, electronic database searches, re-identification of museum specimens, and fieldwork, we hereby provide an updated checklist of the inland fishes of El Salvador. This checklist provides distributional data at the Salvadoran hydrographical and political (by department) levels. The checklist is systematically arranged at the ordinal and familial level and then alphabetically therein. The freshwater fish fauna of El Salvador includes 101 species divided into 64 genera, 29 families, and 14 orders. According to their supposed tolerance to salinity, 73% of these species are peripheral, 23% secondary, and only 4% are primary freshwater fishes. One species is endemic to the country, *Amatitlania coatepeque*. The low number of primary freshwater fishes and endemics is comparable to the Central American Pacific slope in particular, as well as northern Central America in general.

Key words: Pisces, Central America, hydrographic zones, Middle America

Resumen

La fauna de peces de las aguas interiores de El Salvador y su distribución fueron originalmente descritas en 1925 por Samuel Hildebrand. Hasta hoy dicho estudio ha sido la fuente principal de información en cuanto a peces de agua dulce de El Salvador. Basados en una combinación de intensa revisión de la literatura, búsqueda en bases de datos electrónicas, verificación de colecciones de museos y trabajo de campo, proveemos una lista actualizada de los peces de aguas interiores de El Salvador. La lista incluye datos de distribución al nivel de las unidades hidrológicas salvadoreñas, así como también de los departamentos políticos. La lista esta ordenada sistemáticamente por orden y familia y después alfabéticamente. La ictiofauna de agua dulce de El Salvador está formada por 101 especies, en 64 géneros, 29 familias y 14 órdenes. Según su tolerancia a la salinidad, 73% de las especies son periféricas, 23 por ciento son secundarias, y solo un cuatro por ciento se encontró como primarios de agua dulce. Una especie es endémica del país, *Amatitlania coatepeque*. El bajo número de especies primarias de agua dulce así como de especies endémicas es comparable con otras áreas del Pacifico centroamericano en particular, así como al norte de Centroamérica en general.

Key words: distribution, Neotropics, rivers, lake, Middle America

Introduction

El Salvador is the smallest of the Middle American countries, as well as the only one with coastline solely on the Pacific slope. It is bordered by Guatemala to the north and northwest, and by Honduras to the north and northeast. The Gulf of Fonseca separates El Salvador from Honduras and Nicaragua in the southeast. The Sierra Madre de Chiapas runs along northern El Salvador, and to the south is a mountainous chain of volcanoes, with a central plateau positioned between these two mountain ranges. Lowland tropical savannah largely characterizes the area from the mountains to the Pacific Ocean (Marshall 2007). Politically, the country is divided into 14 departments (Fig. 1) and has a total land area of approximately 23,040 km² (22,720 km² land and 320 km² freshwater).

Most of the rivers found in El Salvador are part of the Río Lempa basin, with a few exceptions such as the Río Goascorán at the border with Honduras. However, multiple hydrographic zones are recognized within the country, and these are used herein (Fig. 2). Within the highlands are several crater lakes of volcanic origin (e.g. Lago Ilopango, Lago Coatepeque, Lago Güija), and just north of San Salvador is the Cerrón Grande Dam damming the Río Lempa. The reservoir created by this dam (Lago Suchitlán) is the largest body of freshwater in the country. As typical of the Neotropics, El Salvador has a tropical climate with rainy (May through October) and dry (November through April) seasons. In addition to being the smallest of the Middle American countries, El Salvador is also the most densely populated, with a population of nearly 6,000,000 people.

The first review of fishes from El Salvador was by Hildebrand (1925). Samuel Hildebrand and Fred Foster of the US Bureau of Fisheries were sent to survey fishes (both freshwater and marine) of the country, and their checklist (Hildebrand 1925) was a summary of that expedition. Prior to this expedition, only two species records existed for the country. The most recent significant freshwater expeditions are those by the Natural History Museum of Sweden (NRM; 2006), and the Louisiana State University Museum of Natural Science in the United States (LSUMZ; 2011). In addition to native species, in past years multiple species of freshwater fishes have been introduced into the country for aquaculture and food. It should be noted that substantial material of marine fishes collected off the coast of El Salvador exist from recent expeditions by the Smithsonian National Museum of Natural History (USNM) and Smithsonian Tropical Research Institute (STRI). Those specimens are deposited in the USNM. In addition, an expedition to the coastal waters of El Salvador was conducted by the Natural History Museum at the University of Kansas (KU; 2008). Some recent work has also focused on biology of fishes from El Salvador (e.g. Hernández-Rivas & Calderón 1974, Phillips 1981, Phillips 1983, Burns & Ramírez 1990, Álvarez, *et al.* in review).

The purpose of this updated and revised checklist is to provide an overview of the inland fishes of the country, as we presently understand them. Here we refer to inland fishes as freshwater (primary, secondary) and peripheral species. As such, this information is intended to provide baseline data for future systematic and biogeographic studies, as well as illuminate where more sampling efforts are needed. In addition, checklists such as this are crucial to agencies interested in the biodiversity of fishes in El Salvador and their conservation.

Materials and Methods

Distributional and diversity data for El Salvador inland fishes were obtained by several methods. Initially, a thorough review of scientific literature was conducted for studies on fishes of El Salvador. Species occurrence records were further obtained by querying the inter-institutional online database FishNet2 (www.fishnet2.org). Finally, in order to supplement the data obtained by the above sources, we conducted an expedition to El Salvador from 29 May to 11 June 2011. In the field, fishes were captured by the use of multiple methods including seines, cast nets, and electrofishing. Specimens were preserved and deposited in the LSU Museum of Natural Science. All species presented in this checklist have vouchered specimens in museum collections. Comments are provided for species where annotations are necessary (e.g. substantial range extensions). This checklist is arranged evolutionarily at the ordinal and familial levels following Nelson (2006). Genera and species within families are arranged in alphabetical order. Valid species names, their authorities, and year of publication follow Eschmeyer (2012), with the exception of *Rhamdia guatemalensis* (*sensu* Perdices *et al.* 2002). Each family is classified by salinity tolerance (primary, secondary, peripheral) following Myers (1949). When available, Salvadoran Spanish and English names (following Fischer *et al.* 1995 and Nelson *et al.* 2004) are also provided for each species, as well as the origin of each species (native unless otherwise noted as introduced or endemic). Finally, distributional ranges are presented at the political (department) level (Fig. 1) and at the hydrographical level (Fig. 2). All rivers in

El Salvador drain to the Pacific Ocean; therefore, slope is not included in the checklist as we assume that it is implicit that all species occurrences are for the Pacific slope.

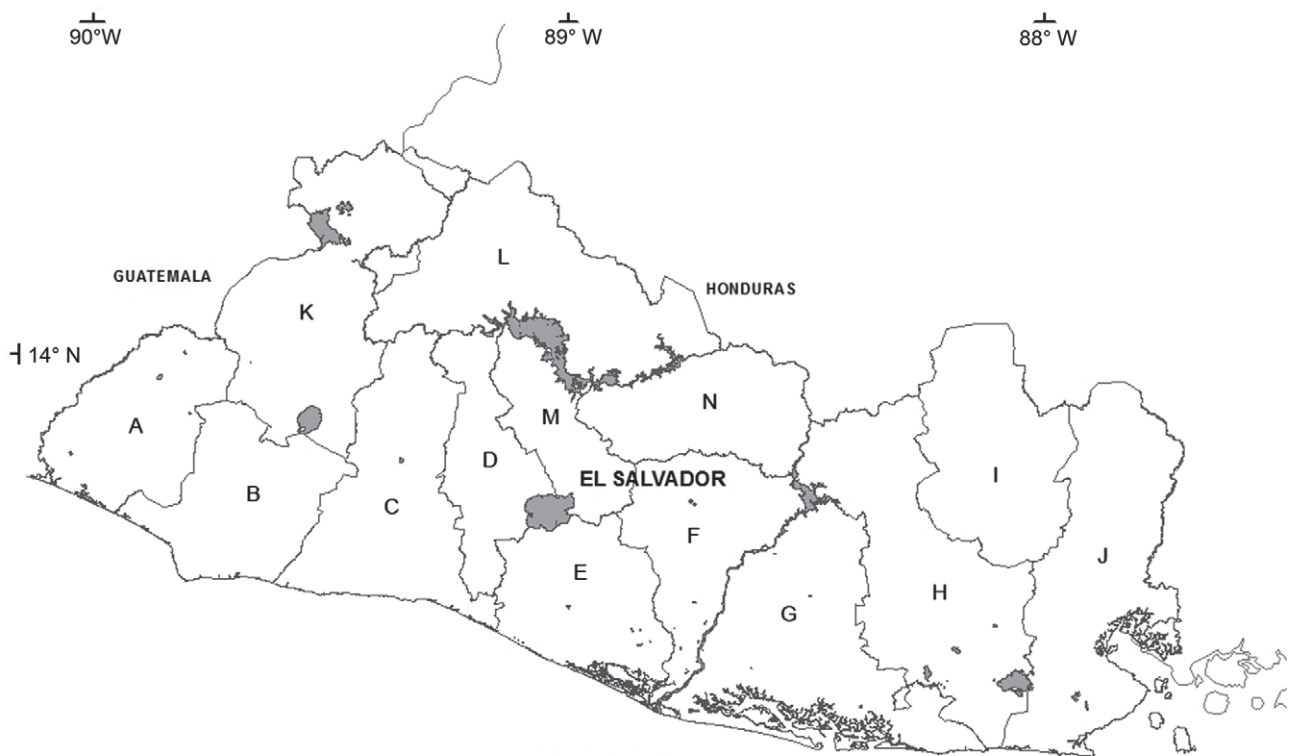


FIGURE 1. Political map of El Salvador. A=Ahuachapán, B=Sonsonate, C=La Libertad, D=San Salvador, E=La Paz, F=San Vicente, G=Usulután, H=San Miguel, I=Morazán, J=La Unión, K=Santa Ana, L=Chalatenango, M=Cuscatlán, N=Cabañas.

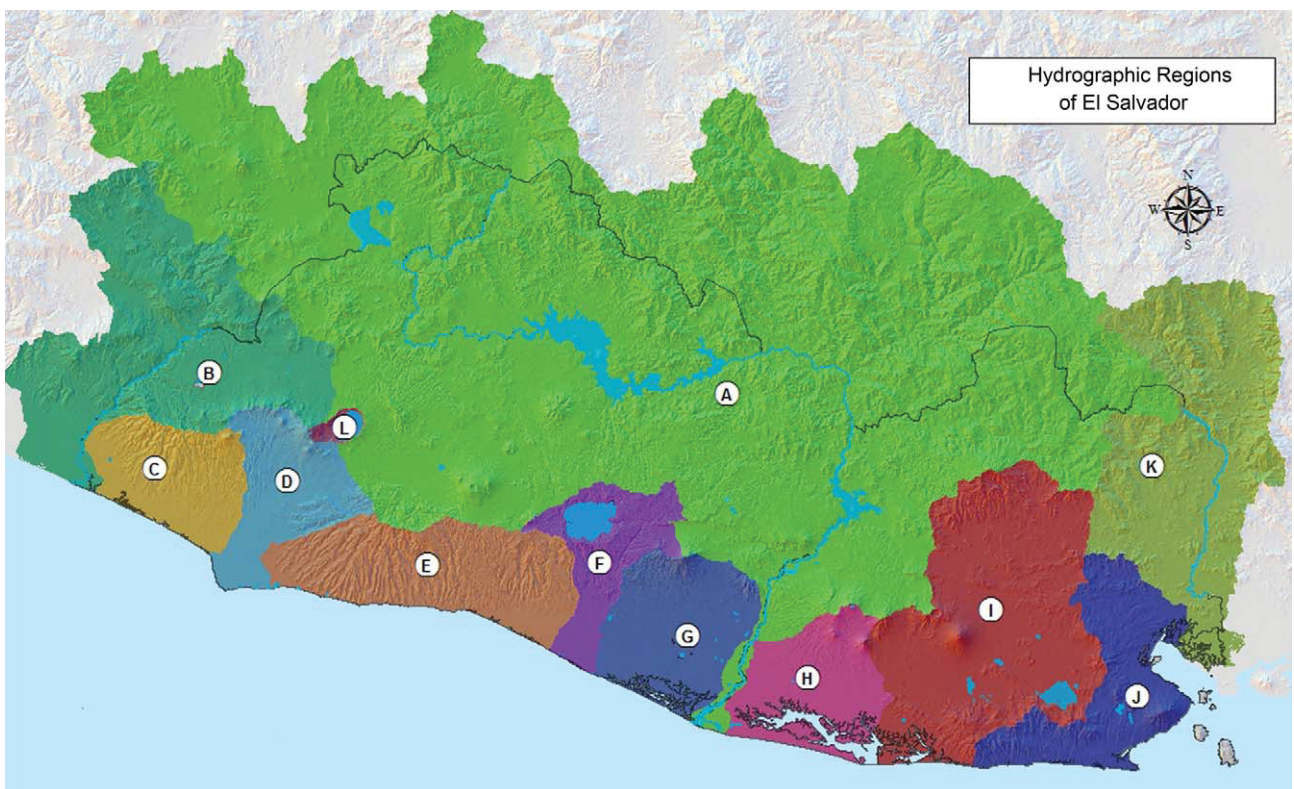


FIGURE 2. Hydrographic map showing major hydrographic zones in El Salvador. A=Río Lempa, B=Río Paz, C=Cara Sucia San Pedro, D=Grande de Sonsonate, E=Mandinga Comalapa, F=Río Jiboa, G=Estero Jaltepeque, H=Bahía Jiquilisco, I=Río Grande de San Miguel, J=Sirama, K=Río Goascorán, L=Lago Coatepeque.

Checklist of El Salvador Inland Fishes

ORDER LEPISOSTEIFORMES

Family Lepisosteidae

Secondary

Atractosteus tropicus Gill, 1863

(Machorra, Tropical Gar)

Hydrographical zones: Río Paz, Cara Sucia San Pedro

Department: Ahuachapán

ORDER CLUPEIFORMES

Family Engraulidae

Peripheral

Anchoa curta (Jordan & Gilbert, 1882)

(Anchoa corta, Short anchovy)

Hydrographical zone: Sirama

Department: La Unión

Anchoa mundeola (Gilbert & Pierson, 1898)

(Falsa anchoveta, False Panama anchovy)

Hydrographical zone: Río Paz

Departments: Ahuachapán, Usulután

Anchoa spinifer (Valenciennes, 1848)

(Anchoa de fondo, Spicule anchovy)

Hydrographical zones: Mandinga-Comalapa, Sirama

Departments: La Libertad, La Unión

Anchoa starksi (Gilbert & Pierson, 1898)

(Ancho de starks, Starks' anchovy)

Hydrographical zone: Sirama

Department: La Unión

Anchoa walkeri Baldwin & Chang, 1970

(Anchoa de Walker, Walker's anchovy)

Hydrographical zones: Mandinga-Comalapa, Sirama

Departments: La Libertad, La Unión

Anchovia macrolepidota (Kner, 1863)

(Anchoveta escamuda, Bigscale anchovy)

Hydrographical zones: Bahía Jiquilisco, Sirama

Departments: Usulután, La Unión

Family Pristigasteridae

Peripheral

Ilisha fuerthii (Steindachner, 1875)

(Sardina hacha, Pacific ilisha)

Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Family Clupeidae

Peripheral

Neoopisthopterus tropicus (Hildebrand, 1946)

(Sardinela pelada, Tropical longfin herring)

Hydrographical zone: Bahía Jiquilisco

Department: Usulután

Odontognathus panamensis (Steindachner, 1876)

(Sardina machete panameña, Panama longfin herring)

Hydrographical zone: Sirama

Department: La Unión

ORDER CHARACIFORMES

Family Characidae

Primary

Astyanax aeneus (Günther, 1860)

(Plateada, Banded tetra)

Hydrographical zones: Río Lempa, Río Paz, Cara Sucia San Pedro, Mandinga-Comalapa, Río Jiboa, Río Grande de San Miguel

Departments: Ahuachapán, La Libertad, La Paz, Usulután, San Miguel, Morazán, Santa Ana, Chalatenango

Roeboides bouchellei Fowler, 1923

(Alma seca, Crystal tetra)

Hydrographical zones: Río Lempa, Río Grande de San Miguel

Departments: La Libertad, San Miguel, Santa Ana

ORDER SILURIFORMES

Family Heptapteridae

Primary

Rhamdia guatemalensis (Günther, 1864)

(Filin/Juilin, Guatemalan chulin)

Hydrographical zones: Río Lempa, Río Grande de San Miguel

Departments: La Libertad, San Salvador, San Miguel, Morazán, Santa Ana, Chalatenango, Cuscatlán

Rhamdia laticauda (Kner, 1858)

(Filin, Filespine chulin)

Hydrographical zone: Río Lempa

Department: San Miguel, Santa Ana

Family Ariidae

Peripheral

Ariopsis guatemalensis (Günther, 1864)

(Bagre cuatete, Blue sea catfish)

Hydrographical zones: Río Lempa, Río Grande de San Miguel
Departments: San Vicente, Usulután, San Miguel, Santa Ana, Cuscatlán

Ariopsis seemanni (Günther, 1864)
(Bagre tete, Tete sea catfish)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Bagre panamensis (Gill, 1863)
(Bagre chihuil, Chihuil sea catfish)
Hydrographical zones: Río Lempa, Mandinga-Comalapa, Bahía Jiquilisco
Departments: La Libertad, Usulután, Santa Ana

Cathorops raredonae Marceniuk, Betancur-R., & Acero, 2009
(Bagre curadora, Curator's sea catfish)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Cathorops steindachneri (Gilbert & Starks, 1904)
(Congo baboso, Steindachner's sea catfish)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Notarius kessleri (Steindachner, 1877)
(Bagre esculpido, Sculptured sea catfish)
Hydrographical zone: Sirama
Department: La Unión

Notarius troschelii (Gill, 1863)
(Bagre chili, Chili sea catfish)
Hydrographical zone: Sirama
Department: La Unión

ORDER BATRACHOIDIFORMES

Family Batrachoididae

Peripheral

Batrachoides waltersi Collette & Russo, 1981
(Sapo peludo, Multipored toadfish)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

ORDER MUGILIFORMES

Family Mugilidae

Peripheral

Agonostomus monticola (Bancroft, 1834)
(Tepemechin, Mountain mullet)
Hydrographical zones: Río Grande de Sonsonate, Mandiga Comalapa, Río Jiboa
Departments: Sonsonate, La Libertad, La Paz

Mugil curema Valenciennes, 1836
(Chimbera, White mullet)
Hydrographical zones: Mandinga-Comalapa, Bahía Jiquilisco, Sirama
Departments: La Libertad, Usulután, La Unión

Mugil cephalus Linnaeus, 1758
(Lisa, Flathead grey mullet)
Hydrographical zone: Río Paz
Department: Ahuachapán

Mugil hospes Jordan & Culver, 1895
(Lisa hospe, Hospe mullet)
Hydrographical zone: Sirama
Department: La Unión

ORDER ATHERINIFORMES

Family Atherinopsidae

Peripheral

Atherinella argentea Chernoff, 1986
(Pejerrey argénteo, Moon silverside)
Hydrographical zones: Río Lempa, Bahía Jiquilisco, Lago Coatepeque
Departments: San Salvador, Usulután, Santa Ana

Atherinella guatemalensis (Günther, 1864)
(Ejote guatemalteco, Guatemala silverside)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Atherinella guija (Hildebrand, 1925)
(Ejote, Guija silverside)
Hydrographical zones: Río Lempa (including Lago Güija)
Departments: San Vicente, Santa Ana

Atherinella pachylepis (Günther, 1864)
(Pejerrey alón, Thickscale silverside)
Hydrographical zones: Sirama
Department: La Unión

ORDER BELONIFORMES

Family Hemiramphidae

Peripheral

Hyporhamphus unifasciatus (Ranzani, 1841)
(Pajarito, Common halfbeak)
Hydrographical zone: Sirama
Department: La Unión

ORDER CYPRINODONTIFORMES

Family Profundulidae

Secondary

Profundulus guatemalensis (Günther, 1866)
(Escamudo guatemalteco, Guatemalan killifish)
Hydrographical zone: Río Paz
Department: Ahuachapán

Profundulus kreiseri Matamoros, Schaefer, Hernández, & Chakrabarty, 2012
(Escamudo de Kreiser, Kreiser's killifish)
Hydrographical zone: Río Lempa
Department: Santa Ana

Family Anablepidae

Secondary

Anableps dowei Gill, 1861
(Cuatro ojos, Pacific four-eyed fish)
Hydrographical zones: Río Lempa, Río Paz, Río Grande de San Miguel, Sirama
Departments: Ahuachapán, La Libertad, San Vicente, Usulután, San Miguel, La Unión, Santa Ana, Cuscatlán

Family Poeciliidae

Secondary

Heterandria anzueto Rosen & Bailey, 1979
(Chimbolo, Anzueto's killifish)
Hydrographical zone: Río Lempa
Departments: Cabañas, Cuscatlán

Poecilia butleri Jordan, 1889
(Topote del Pacífico, Pacific molly)
Hydrographical zone: Río Jiboa
Department: La Paz

Poecilia gillii (Kner, 1863)
(Olomina, Gill's molly)
Hydrographical zones: Río Lempa, Cara Sucia San Pedro
Departments: Ahuachapán, La Libertad, San Salvador, La Paz, San Miguel, Morazán, Santa Ana

Poecilia marcellinoi Poeser, 1995
(Topote de Ilopango, Ilopango molly)
Hydrographical zones: Río Lempa, Grande de Sonsonate, Mandinga-Comalapa
Departments: Sonsonate, La Libertad, Santa Ana

Poecilia salvatoris Regan, 1907
(Topote de El Salvador, Salvadoran molly)
Hydrographical zones: Río Lempa, Río Paz, Grande de Sonsonate
Departments: Ahuachapán, Sonsonate, San Salvador, Santa Ana, Chalatenango

Poecilia sphenops Valenciennes, 1846
(Topote mexicano, Mexican Molly)
Hydrographical zones: Río Lempa, Río Paz, Mandinga-Comalapa, Río Grande de San Miguel
Departments: Ahuachapán, La Libertad, San Salvador, Usulután, San Miguel, Santa Ana, Cuscatlán

Poeciliopsis pleurospilus (Günther, 1866)

(Guatopote manchote, Largespot livebearer)

Hydrographical zones: Río Lempa, Río Paz, Grande de Sonsonate, Mandinga-Comalapa, Río Jiboa, Río Grande de San Miguel, Lago Coatepeque

Departments: Ahuachapán, Sonsonate, La Libertad, San Salvador, La Paz, San Miguel, Morazán, Santa Ana, Chalatenango, Cuscatlán

Poeciliopsis turrubarensis (Meek, 1912)

(Guatopote del Pacífico, Barred livebearer)

Hydrographical zones: Río Lempa, Bahía Jiquilisco

Departments: San Vicente, Usulután

ORDER GASTEROSTEIFORMES

Family Syngnathidae

Peripheral

Pseudophallus starksii (Jordan & Culver, 1895)

(Pipeta/Falso Caballo, Yellowbelly pipefish)

Hydrographical zones: Mandinga-Comalapa, Sirama

Departments: La Libertad, La Unión

ORDER SYNBRANCHIFORMES

Family Synbranchidae

Secondary

Synbranchus marmoratus Bloch, 1795

(Falsa anguila/Anguila, Marbled swamp eel)

Hydrographical zones: Río Lempa, Río Grande de San Miguel, Sirama

Departments: Morazán, La Unión

ORDER PERCIFORMES

Family Centropomidae

Peripheral

Centropomus armatus Gill, 1863

(Robalo espina larga, Longspine snook)

Hydrographical zones: Cara Sucia San Pedro, Bahía Jiquilisco, Sirama

Departments: Ahuachapán, Usulután, La Unión

Centropomus medius Günther, 1864

(Robalo aleta prieta, Blackfin snook)

Hydrographical zones: Río Lempa, Sirama

Departments: Usulután, La Unión

Centropomus nigrescens Günther, 1864

(Robalo negro, Black snook)

Hydrographical zones: Río Lempa, Bahía Jiquilisco

Department: Usulután

Centropomus robalito Jordan & Gilbert, 1882
(Robalo aleta amarilla, Yellowfin snook)
Hydrographical zones: Río Lempa, Bahía Jiquilisco
Department: Usulután

Family Carangidae

Peripheral

Caranx caballus Günther, 1868
(Jurel bonito, Green jack)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Caranx caninus Günther, 1867
(Jurel común, Pacific crevalle jack)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Chloroscombrus orqueta Jordan & Gilbert, 1883
(Casabe, Pacific bumper)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Oligoplites altus (Günther, 1868)
(Zapatero sierrita, Longjaw leatherjacket)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Trachinotus kennedyi Steindachner, 1876
(Pámpano plateado, Blackblotch pompano)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Family Lutjanidae

Peripheral

Lutjanus argentiventris (Peters, 1869)
(Pargo amarillo, Yellow snapper)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Lutjanus colorado Jordan & Gilbert, 1882
(Pargo rojo, Colorado snapper)
Hydrographical zones: Mandinga-Comalapa, Sirama
Departments: La Libertad, La Unión

Lutjanus guttatus (Steindachner, 1869)
(Pargo lunarejo, Spotted rose snapper)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Family Gerreidae

Peripheral

Diapterus peruvianus (Cuvier, 1830)
(Mojarra aletas amarillas, Peruvian mojarra)
Hydrographical zone: Sirama
Department: La Unión

Eucinostomus argenteus Baird & Girard, 1855
(Mojarra plateada, Silver mojarra)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Eucinostomus currani Zahuranec, 1980
(Mojarra aleta de bandera, Pacific flagfin mojarra)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Eucinostomus gracilis (Gill, 1862)
(Mojarra charrita, Graceful mojarra)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Gerres cinereus (Walbaum, 1792)
(Mojarra blanca, Yellowfin mojarra)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Family Haemulidae

Peripheral

Haemulopsis elongatus (Steindachner, 1879)
(Ronco alargado, Elongate grunt)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Haemulopsis leuciscus (Günther, 1864)
(Ronco ruco, Raucous grunt)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Pomadasys macracanthus (Günther, 1864)
(Corocoro coche, Longspine grunt)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Family Sciaenidae

Peripheral

Bairdiella armata Gill, 1863
(Corvineta armada, Armed croaker)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Cynoscion squamipinnis (Günther, 1867)
(Corvina aguada, Weakfish)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Cynoscion stolzmanni (Steindachner, 1879)
(Corvina de Stolzmann, Stolzmann's weakfish)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Isopisthus remifer Jordan & Gilbert, 1882
(Corvineta azul, Silver weakfish)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Micropogonias altipinnis (Günther, 1864)
(Corvina berrugato, Tallfin croaker)
Hydrographical zone: Bahía Jiquilisco
Department: Usulután

Paralonchurus dumerilii (Bocourt, 1869)
(Lambe suco, Suco croaker)
Hydrographical zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Family Cichlidae

Secondary

Amatitlania coatepeque Schmitter-Soto, 2007 (Endemic)
(Mojarra del Coatepeque, Coatepeque convict cichlid)
Hydrographic zone: Lago Coatepeque
Department: Santa Ana

Amatitlania nigrofasciata (Günther, 1867)
(Burra/Burrita, Convict cichlid)
Hydrographic zones: Río Lempa, Río Paz, Cara Sucia San Pedro, Grande de Sonsonate, Río Grande de San Miguel
Departments: Ahuachapán, Sonsonate, San Miguel, Morazán, Santa Ana, Chalatenango, Cuscatlán

Amphilophus longimanus (Günther, 1867)
(Machaca, Red breast cichlid)
Hydrographic zone: Río Lempa
Department: Santa Ana

Amphilophus macracanthus (Günther, 1864)
(Mojarra negra, Blackthroat cichlid)
Hydrographic zones: Río Lempa, Río Paz, Cara Sucia San Pedro, Río Grande de San Miguel
Departments: Ahuachapán, San Miguel, Santa Ana, Cuscatlán

'*Cichlasoma*' *trimaculatum* (Günther, 1867)
(Istataua, Three spot cichlid)
Hydrographic zones: Río Lempa, Cara Sucia San Pedro, Río Grande de San Miguel
Departments: Ahuachapán, San Salvador, San Miguel, Santa Ana, Cuscatlán

Cryptoheros cutteri (Fowler, 1932)
(Congo hondureño, Honduran congo)
Hydrographic zones: Río Lempa, Río Grande de San Miguel
Departments: San Miguel, Santa Ana

Oreochromis niloticus (Linnaeus, 1758) (Introduced)
(Tilapia, Nile tilapia)
Hydrographic zone: Grande de Sonsonate
Departments: Sonsonate, Santa Ana

Parachromis dovii (Günther 1864) (Introduced)
(Guapote, Wolf cichlid)
Hydrographic zone: Río Lempa
Department: Santa Ana

Parachromis managuensis (Günther, 1867) (Introduced)
(Guapote tigre, Jaguar guapote)
Hydrographic zones: Río Lempa, Río Paz, Río Grande de San Miguel
Departments: Ahuachapán, San Miguel, Santa Ana

Parachromis motaguensis (Günther, 1867)
(Guapote, False yellowjacket cichlid)
Hydrographic zones: Río Lempa, Río Paz, Río Grande de San Miguel, Lago Coatepeque
Departments: Ahuachapán, La Libertad, San Salvador, San Miguel, Santa Ana

Paraneetroplus guttulatus (Günther, 1864)
(Mojarra de Amatitlán, Amatitlán cichlid)
Hydrographic zone: Lago Coatepeque
Department: Santa Ana

Family Gobiesocidae

Peripheral

Gobiesox potamius Briggs 1955
(Chupapiedra, Clingfish)
Hydrographic zones: Grande de Sonsonate, Mandinga-Comalapa
Departments: Sonsonate, La Libertad

Family Eleotridae

Peripheral

Dormitator latifrons (Richardson, 1844)
(Sambo, Pacific fat sleeper)
Hydrographic zones: Cara Sucia San Pedro, Mandinga-Comalapa, Bahía Jiquilisco, Río Grande de San Miguel, Sirama
Departments: Ahuachapán, La Libertad, Usulután, San Miguel, La Unión

Eleotris picta Kner, 1863
(Guavina manchada, Spotted sleeper)
Hydrographic zones: Cara Sucia San Pedro, Grande de Sonsonate, Mandinga-Comalapa, Río Grande de San Miguel
Departments: Ahuachapán, Sonsonate, La Libertad, San Miguel

Gobiomorus maculatus (Günther, 1859)

(Guavina, Pacific sleeper)

Hydrographic zones: Río Lempa, Cara Sucia San Pedro, Grande de Sonsonate, Mandinga-Comalapa, Río Jiboa, Río Grande de San Miguel

Departments: Ahuachapán, Sonsonate, La Libertad, La Paz, San Vicente, Usulután, San Miguel

Family Gobiidae

Peripheral

Awaous banana (Valenciennes, 1837)

(Gobio del río, River goby)

Hydrographic zones: Cara Sucia San Pedro, Grande de Sonsonate, Mandinga-Comalapa, Río Jiboa

Departments: Ahuachapán, Sonsonate, La Libertad, La Paz

Bathygobius ramosus Ginsburg, 1947

(Mapo panámico, Panamic frillfin)

Hydrographic zones: Bahía Jiquilisco, Sirama

Departments: Usulután, La Unión

Ctenogobius sagittula (Günther, 1862)

(Gobio aguzado, Longtail goby)

Hydrographic zones: Bahía Jiquilisco, Sirama

Departments: Usulután, La Unión

Gobionellus microdon (Gilbert, 1892)

(Gobio cola de palma, Estuary goby)

Hydrographic zones: Cara Sucia San Pedro, Bahía Jiquilisco, Sirama

Departments: Ahuachapán, Usulután, La Unión

Sicydium multipunctatum Regan, 1906

(Dormilón pecoso, Multispotted goby)

Hydrographic zones: Grande de Sonsonate, Mandinga-Comalapa

Departments: Sonsonate, La Libertad

Sicydium salvini Ogilvie-Grant, 1884

(Gobio de Salvin, Salvin's goby)

Hydrographic zones: Mandinga-Comalapa, Río Jiboa

Departments: La Libertad, La Paz

ORDER PLEURONECTIFORMES

Family Paralichthyidae

Peripheral

Citharichthys gilberti Jenkins & Evermann, 1889

(Lenguado tapadera, Bigmouth sanddab)

Hydrographic zones: Bahía Jiquilisco, Sirama

Departments: Usulután, La Unión

Cyclopsetta panamensis (Steindachner, 1876)

(Lenguado panámico, God's flounder)

Hydrographic zone: Bahía Jiquilisco

Department: Usulután

Cyclopsetta querna (Jordan & Bollman, 1890)
(Lenguado dientón, Toothed flounder)
Hydrographic zones: Mandinga-Comalapa, Bahía Jiquilisco
Departments: La Libertad, Usulután

Etropus crossotus Jordan & Gilbert, 1882
(Lenguado ribete, Fringed flounder)
Hydrographic zone: Bahía Jiquilisco
Department: Usulután

Family Achiridae

Peripheral

Achirus mazatlanus (Steindachner, 1869)
(Suela guardaboya, Mazatlan sole)
Hydrographic zone: Bahía Jiquilisco
Department: Usulután

Achirus scutum (Günther, 1862)
(Suela listada, Network sole)
Hydrographic zones: Bahía Jiquilisco, Sirama
Departments: Usulután, La Unión

Family Cynoglossidae

Peripheral

Symphurus chabanaudi Mahadeva & Munroe, 1990
(Lengua de Chabanaud, Chabanaud's tonguefish)
Hydrographic zones: Bahía Jiquilisco, Sirma
Departments: Usulután, La Unión

Symphurus elongatus (Günther, 1868)
(Lengua esbelta, Elongate tonguefish)
Hydrographic zone: Bahía Jiquilisco
Department: Usulután

ORDER TETRAODONTIFORMES

Family Tetraodontidae

Peripheral

Sphoeroides annulatus (Jenyns, 1842)
(Botete diana, Bullseye puffer)
Hydrographic zones: Río Paz, Bahía Jiquilisco, Río Grande de San Miguel
Departments: Ahuachapán, Usulután, San Miguel, La Unión

Sphoeroides lobatus (Steindachner, 1870)
(Tamboreta, Longnose puffer)
Hydrographic zone: Bahía Jiquilisco
Department: Usulután

Discussion & Conclusions

At present, a total of 101 species of fishes are known from the inland waters of El Salvador. By far the vast majority of species are peripheral, followed by secondary freshwater fishes. Only two families of primary freshwater fishes occur in El Salvador (Characidae and Heptapteridae), consisting of four currently known species (about 4% of fishes). A total of 23% of fishes are secondary freshwater fishes, and 73% are classified as peripheral fishes. This is consistent with what has been observed in the Pacific slope of Honduras (Matamoros *et al.* 2009), Guatemala (Kihn-Pineda *et al.* 2006), and México (Miller *et al.* 2005).

At present, only one endemic species of fish, *Amatitlania coatepeque*, is known from the waters of El Salvador. This species is found in Lago Coatepeque, and in addition to being the only endemic fish species, it is the only endemic vertebrate species. This pattern is consistent with species endemism in the Pacific slope of Honduras, where the only endemic is *Amphilophus hogaboomorum* (Carr & Giovannoli 1950) (Matamoros *et al.* 2009). The occurrence of some species presented herein represents substantial range extensions. *Gobiesox potamius* Briggs 1955 is known only from rivers in the Pacific slope of Costa Rica and Panama (Bussing 1998). Specimens presented here from El Salvador morphologically appear most similar to *G. potamius* (K. Conway, personal communication). The specimens were taken from mid-low reaches of rivers, and do not fit the diagnosis for the primarily marine/estuarine and widespread *G. daedaleus* Briggs 1951, nor the freshwater *G. fluviatilis* Briggs & Miller 1960 found in Pacific rivers of México (Miller *et al.* 2005). Additionally, the killifish *Profundulus kreiseri* was described from the Río Ulua and Río Chamelecon in the Caribbean slope of Honduras (Matamoros *et al.* 2012). Records presented here are based on specimens collected from the upper reaches of the Río Lempa. These occurrences document the presence of this fish in a neighboring Pacific drainage.

Recent expeditions to rivers in the lowland forests, as well as in the highlands, have resulted in some new species records (e.g. *Heterandria anzueto*, Álvarez, *et al.* in review). These expeditions and this checklist have substantially increased the number of species from that documented by Hildebrand (1925). Hildebrand (1925) reported a total of 45 species, including freshwater and marine fishes, some of which are no longer valid. We have more than doubled this number while restricting the checklist to inland fishes. The results of this checklist provide a framework for future biogeographic work on fishes from this region, particularly by providing up-to-date knowledge on distributions and illuminating areas in need of more collecting effort. In addition, this checklist will aid conservation biologists and agencies both in El Salvador and elsewhere, as they work to study, conserve, and sustainably utilize fishes in this country.

Acknowledgments

We thank the Salvadoran Ministerio de Medio Ambiente y Recursos Naturales for issuing permits to WAM and CDM. In addition we thank staff at The Field Museum (FMNH) for a collections study grant awarded to CDM to examine specimens. We are grateful to Kevin Conway (TAMU) for assistance with *Gobiesox* identifications and information. We thank Meche Gavilanez for assisting with translations. CDM and WAM were supported by NSF grant DEB 0916695 to Prosanta Chakrabarty for the collecting expedition to El Salvador.

Literature Cited

- Álvarez, F.S., Recinos, H.M., & Henríquez, W.Y. (in review) First record of *Heterandria anzueto* (Cyprinodontiformes: Poeciliidae) in El Salvador. *Revista Mexicana de Biodiversidad*.
- Burns, J.R. & Ramirez, M.A. (1990) Annual pattern of reproduction of the bagre, *Arius guatemalensis* (Pisces: Ariidae), in El Salvador. *Revista de Biología Tropical*, 31, 29–36.
- Bussing, W.A. (1998) *Peces de las aguas continentales de Costa Rica*. Universidad de Costa Rica, San José. 468 pp.
- Eschmeyer, W.N. (2012) Catalog of Fishes. California Academy of Sciences, USA. Available from <http://research.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (accessed 2012).
- Fischer, W., Krupp, F., Schneider, W., Sommer, C., Carpenter, K.E., & Niem, V.H. (1995) *Guía FAO para la identificación de especies para los fines de la pesca: Pacífico Centro-Oriental Volumes II & III*. FAO, Rome, pp. 647–1747.
- Hernández-Rivas, R.A. & Calderón, M.G. (1974) *Inventario preliminar de la flora y fauna acuática de la Bahía de Jiquilisco, Servicio. Servicio de Recursos Pesqueros*. D.G.R.N.R., M.A.G., San Salvador, El Salvador, 30 pp.

- Hildebrand, S.F. (1925) Fishes of the Republic of El Salvador, Central America. *Bulletin of the Bureau of Fisheries*, 41, 237–287.
- Kihn-Pineda, P.H., Cano, E.B. & Morales, A. (2006) Peces de las aguas interiores de Guatemala. In Cano, E.B. (Ed.), *Biodiversidad de Guatemala*. Universidad del Valle de Guatemala, Guatemala, pp 457–486.
- Marshall, J.S. (2007) The geomorphology and physiographic provinces of Central America. In: Bundschuh, J. & Alvarado, G.E. (Eds.), *Central America: Geology, Resources, and Hazards*. Taylor & Francis Publishers, pp. 1–51. <http://dx.doi.org/10.1201/9780203947043.pt2>
- Matamoros, W.A., Schaefer, J.F., Hernández, C.L. & Chakrabarty, P. (2012) *Profundulus kreiseri*, a new species of Profundulidae (Teleostei: Cyprinodontiformes) from northwestern Honduras. *ZooKeys*, 227, 49–62. <http://dx.doi.org/10.3897/zookeys.227.3151>
- Matamoros, W.A., Schaefer, S. & Kreiser, B. (2009) Annotated checklist of the freshwater fishes of continental and insular Honduras. *Zootaxa*, 2307, 1–38.
- Miller, R.R., Minckley, W.L. & Norris, S.M. (2005) *Freshwater Fishes of México*. The University of Chicago Press, Chicago, 490 pp.
- Myers, G.S. (1949) Salt-tolerance of fresh-water fish groups in relation to zoogeographical problems. *Bijdragen tot de Dierkunde*, 28(1949), 315–322.
- Nelson, J.S. (2006) *Fishes of the World – 4th ed.* Univ. of Alberta, Canada, 624 pp.
- Nelson, J.S., Crossman, E.J., Espinoza-Pérez, H., Findley, L.T., Gilbert, C.R., Lea, R.N. & Williams, J.D. (2004) *Common and Scientific Names of Fishes from the United States, Canada, and Mexico*, 6th ed. American Fisheries Society Special Publication 29, 386 pp.
- Perdices, A., Bermingham, E., Montilla, A. & Doadrio, I. (2002) Evolutionary history of the genus *Rhamdia* (Teleostei: Pimelodidae) in Central America. *Molecular Phylogenetics and Evolution*, 25(1), 172–189. [http://dx.doi.org/10.1016/S1055-7903\(02\)00224-5](http://dx.doi.org/10.1016/S1055-7903(02)00224-5)
- Phillips, P.C. (1981) Annotated checklist of fishes at Jiquilisco Bay, El Salvador. *Revista de Biología Tropical*, 29, 45–58.
- Phillips, P.C. (1983) Observations on abundance and spawning seasons of three fish families from an El Salvador coastal lagoon. *Revista de Biología Tropical*, 31, 29–36.