Preliminary list of fishes from the Smithsonian Tropical Research Institute expedition to Curaçao with comparison to previously formulated lists

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ABSTRACT

In 2005, the Smithsonian Tropical Research Institute sponsored a collecting trip to Curaçao and Klien Curaçao , as part of a grant to Ross Robertson, to document the fishes of the greater Caribbean region. The Curaçao Sea Aquarium provided support and accommodations for the research team. Collections were made at 29 stations between 2 January and 13 January 2005. Most of the collections were made using rotenone, which is the only effective method of collecting cryptic fishes. A total of 6,114 specimens of 119 taxa were collected. Along with those documented by Metzelaar (1919), FishBase, and several web-based museum collections, we present our findings from Curaçao to document a preliminary list of fishes from that region.

OBJECTIVE

1.) Collect in a range of habitats around Curaçao using rotenone to document cryptic fishes not generally collected by other methods.
2.) Evaluate collection data from museums.
3.) Obtain published records of fishes from local Curaçao reports and collections.
4.) Assess the validity of the list of fishes from Curaçao derived from FishBase.

Taxaname	Reference	STRI	FB
HEXANCHIDAE			
Hexanchus vitulus	LV		
RHINCODONTIDAE			
Rhincodon typus	LV, CS		FB
GINGLYMOSTOMATIDAE			
Ginglymostoma cirratum	CS		
LAMNIDAE			
Isurus oxyrinchus	LV		
ALOPIIDAE			
Alopias superciliosus			FB
Alopias vulpinus	LV		
TRIAKIDAE			
Mustelus canis		FB	
Mustelus higmani		FB	
Mustelus norrisi		FB	
CARCHARHINIDAE			
Carcharhinus acronotus		FB	
Carcharhinus falciformis	LV	FB	
Carcharhinus leucas	LV	FB	
Carcharhinus limbatus	LV		
Carcharhinus longimanus	LV		
Galeocerdo cuvier	LV		
Prionace glauca	LV		
Rhizoprionodon lalandii			FB
Rhizoprionodon porosus	LV		
Rhizoprionodon terraenovae	MZ		
SPHYRNIDAE			
Sphyrna lewini	LV		FB
Sphyrna mokarran	LV		FB
Sphyrna tiburo			FB
RAJIDAE			
Dipturus bullisi		FB	
Raja cervigoni		FB	
DASYATIDAE			
Dasyatis americana	CS	FB	
Dasyatis guttata		FB	
Dasyatis say		FB	
Himantura schmardae		FB	
GYMNURIDAE			
Gymnura micrura		FB	
MYLIOBATIDAE			
Aetobatus narinari	CS		FB
Manta birostris	LV		FB
Mobula hypostoma	CS		FB
Myliobatis freminvillei		FB	
Myliobatis goodei		FB	
UROLOPHIDAE			
Urolophus jamacensis		FB	
ELOPIDAE			
Elops saurus	CS, MZ		FB
MEGALOPIDAE			
Megalops atlanticus	CS		FB
ALBULIDAE			
Albula vulpes	CS,NM		FB
ANGUILLIDAE			
Anguilla rostrata	DB		FB
MORINGUIDAE			
Moringua sp.	MZ		
Moringua edwardsi		ST	
CHLOPSIDAE			
Chilorhinus suensonii	MZ		
Kaupichthys hyoproroides	LA	ST	
Kaupichthys nuchalis	LA	ST	FB
MURAENIDAE			
Channomuraena vittata	CS		FB
Echidna catenata	CS, MZ	ST	FB
Enchelycore carychroa	CS, LA	ST	
Enchelycore nigricans	CS	ST	FB
Gymnothorax conspersus		ST	FB
Gymnothorax funebris	CS, MZ	ST	FB
Gymnothorax miliaris	CS, MZ	ST	FB
Gymnothorax moringa	CS,NM,	ST	FB
Gymnothorax ocellatus	MZ		FB
Gymnothorax saxicola	CS		
Gymnothorax vicinus	CS	ST	FB
Monopenchelys acuta		ST	
Muraena retifera	CS		
Uropterygius macularius		ST	
OPHICHTHIDAE			
Ahla egmontis	LA	ST	
Aplatophis chauliodus			
Echiophis intertinctus		FB	
Echiophis punctifer		FB	
Myrichthys breviceps	CS,NM		
Myrichthys ocellatus	CS, MZ		FB
Myrophis punctatus	AM		FB
Ophichthus gomesii	MZ,		FB
Ophichthus ophis	CS, MZ		FB
Ophichthus parilis			FB
CONGRIDAE			
Conger esculentus			FB
Conger triporiceps	CS		FB
Conger conger	MZ		
Heteroconger longissimus	CS		FB
Rhynchoconger flavus			FB
MURAENESOCIDAE			
Cynoponticus savanna			FB
CLUPEIDAE			
Chirocentrodon bleekerianus			FB
Etrumeus teres			
Harengula clupeola	LV, MZ		FB
Harengula humeralis	LV, MZ		
Harengula jaguana		ST	FB
Jenkinsia lamprotaenia	MZ		FB
Lile piquitinga			FB
Opisthonema oglinum	LV, MZ		FB
Pellona harroweri			FB
Sardinella aurita	MZ		FB
Sardinella janeiro			FB
ENGRAULIDAE			
Anchoa colonensis			FB
Anchoa cubana			FB
Anchoa filifera			FB
Anchoa hepsetus	AM		
Anchoa lyolepis		ST	FB
Anchoa spinifer			FB
Anchovia clupeoides	CS, MZ		FB
Lycengraulis grossidens			FB
SYNODONTIDAE			
Saurida normani			FB
Saurida suspicio			FB
Synodus foetens			FB
Synodus intermedius	CS, MZ		
Synodus synodus	LA	ST	FB
Trachinocephalus myops			FB
OPHIDIIDAE			
Lepophidium brevibarbe		FB	
Ophidion holbrookii		FB	
CARAPIDAE			
Carapoideus bermudensis	CS, PH		
BYTHITIDAE			
Calamopteryx goslinei		FB	
Grammonus claudei		FB	
Ogilbia cayorana		FB	
Stygnobrotula latebricola	CS		FB
BATRACHOIDIDAE			
Amphichthys cryptocentrus			FB
Batrachoides surinamensis		FB	
Porichthys plectrodon		FB	
Thalassophryne maculosa		FB	
LOPHIIDAE			
Lophiodes reticulatus		FB	
Lophius gastrophysus		FB	
ANTENNARIIDAE			
Antennarius bermudensis		ST	
Antennarius multiocellatus	CS,NM	ST	FB
Antennarius striatus	MZ	ST	FB
Histrio histrio	LV, MZ		FB
Anthias tenuis	CS		
Bulliacithys caribbaeus	CS		
Cephalopholis cruentata	WN CS,		FB
Cephalopholis fulva	WN CS	ST	FB
Dermatolepis inermis	CS		FB
Diplectrum formosum			FB
Diplectrum radiale	MZ		FB
Epinephelus adscensionis	WN CS,		FB
Epinephelus flavolimbatus			FB
Epinephelus guttatus	WN CS,		FB
Epinephelus itajara	WN CS		FB
Epinephelus morio	WN CS,		FB
Epinephelus mystacinus			FB
Epinephelus niveatus			FB
Epinephelus punctatus	MZ		
Epinephelus stellatus	MZ		
Epinephelus striatus	WN CS,		FB
Gonioplectrus hispanus	CS		FB
Hemanthias aureorubens			FB
Hemanthias leptus			FB
Hypoplectrus chlorurus	CS		FB
Hypoplectrus guttavarius	CS		
Hypoplectrus nigricans	CS		FB
Hypoplectrus puella	CS		FB
Hypoplectrus sp. B (tan)	CS		
Hypoplectrus unicolor	CS		FB
Liopropoma carmabi	CS, NM	ST	FB
Liopropoma mowbrayi			
Liopropoma rubre	CS	ST	FB
Mycteroperca acutirostris	WN CS		FB
Mycteroperca bonaci	WN CS,		FB
Mycteroperca interstitialis	WN		FB
Mycteroperca phenax			FB
Mycteroperca rubra	MZ		FB
Mycteroperca tigris	WN CS		FB
Mycteroperca venenosa	WN		FB
Paralabrax dewegeri	MZ		FB
Paranthias furcifer	CS, MZ		FB
Parapriacanthus incisus	CS		FB
Plectranthias garnpellus	CS		
Pronotogrammus martinicensis	CS		
Pseudogramma gregorjy	CS	ST	FB
Rypticus saponaceus	CS, MZ	ST	FB
Rypticus subbifrenatus	CA, LA	ST	FB
Schultzea beta	CS, FM		
Serranus annularis	CS		FB
Serranus atrobranchus			FB
Serranus baldwini	CS		FB
Serranus chionaraia	CS		
Serranus luciopercanus	CS		
Serranus phoebe	MZ		FB
Serranus tabacarius	CS MZ		FB
Serranus tigrinus	CS MZ		FB
Serranus tortugarum	CS		FB
ANOMALOPIDAE			
Kryptophanaron alfredi			FB
HOLOCENTRIDAE			
Holocentrus adsensionis	CS, MZ		FB
Holocentrus rufus	CS		FB
Myripristis jacobus	CS, MZ		FB
Pristis microdon	CS, NM		FB
Neoniphon marianus	CS		FB
Plectrypops retrospinis	CS		FB
Sargocentron coruscum	CS, MZ		FB
Sargocentron vexillarium	CS		FB
AULOSTOMIDAE			
Aulostomus maculatus	CS MZ, LA	ST	FB
FISTULARIIDAE			
Fistularia petimba			FB
Fistularia tabacaria	CS, MZ		FB
SYNGNATHIDAE			
Cosmocampus albirostris	CA		FB
Hippocampus erectus	NM, MZ		FB
Hippocampus reidi	CS		
Micrognathus crinitus			FB
Microphis brachyurus			FB
brachyurus			
Anarchopterus criniger	MZ		
Syngnathus dunckeri	MZ, CA		
Syngnathus pelagicus	MZ		FB
Syngnathus scovelli			FB
SCORPAENIDAE			
Scorpaena agassizi			FB
Scorpaena albifimbria	MZ		FB
Scorpaena brasiliensis	MZ		
Scorpaena brasiliensis			FB
Scorpaena elachys			FB
Scorpaena grandicornis	CS, MZ		FB
Scorpaena inermis	CA		FB
Scorpaena plumieri	CS, MZ		FB
Scorpaenodes caribbaeus	CS	ST	FB
Scorpaenodes tenuis	MZ	ST	
tredecimspinosus			
DACTYLOPTERIDAE			
Dactylopterus volitans	CS, MZ		FB
TRIGLIDAE			
Prionotus beanii			FB
Prionotus punctatus	MZ		FB
Prionotus roseus			FB
Prionotus stearnsi			FB
CENTROPOMIDAE			
Centropomus ensiferus			FB
Centropomus pectinatus			FB
Centropomus undecimalis	CS, MZ		FB
SERRANIDAE			
Alphestes afer	WN CS,		FB
Caranx crysos	MZ		FB
Caranx hippos	CS, MZ		FB
Caranx latus	CS		FB
Cyphosis sinnilis	CS		FB
Chloroscombrus chrysurus	MZ		FB
Decapterus macarellus	LV		FB
Decapterus punctatus	LV, MZ		FB
Decapterus tabl		ST	
Elagatis bipinnulata	LV, CS		FB
Hemicaranx amblyrhynchus			FB
Naucrates ductor	LV		FB
Oligoplites saliens			FB
Oligoplites saurus saurus	MZ		FB
Selar crumenophthalmus	LV, MZ		FB
Selene browni			FB
Selene setapinnis	CS		FB
Selene vomer	CS, MZ		FB
Seriola dumerili			FB
Seriola fasciata	CS		
Seriola rivoliana	CS		FB
Seriola zonata			FB
Trachinotus carolinus			FB
Trachinotus falcatus			
Trachinotus goodei	MZ		FB
Urapsis secunda			FB
CORYPHAENIDAE			
Coryphaena equiselis	LV, MZ		FB
Coryphaena hippurus	LV, MZ		FB
LUTJANIDAE			
Etelis oculatus			FB
Lutjanus analis	WN CS,		FB
Lutjanus apodus	WN CS,		FB
Lutjanus buccanella	WN CS,		FB
Lutjanus chrysurus	MZ		
Lutjanus cyanopterus	CS		FB
Lutjanus griseus	WN CS,		FB
Lutjanus jocu	WN CS,		FB
Lutjanus mahogoni	WN CS,MZ		FB
Lutjanus purpureus	WN		FB
Lutjanus synagris	WN CS,		FB
Lutjanus vivanus	WN MZ		FB
Ocyurus chrysurus	WN CS		FB
Pristipomoides aquilonaris			FB
Pristipomoides freemani			FB
Rhomboplites aurorubens	WN MZ		FB
LOBOTIDAE			
Lobotes surinamensis	LV, CSA		FB
GERREIDAE			
Diapterus auratus			FB
Diapterus rhombeus	MZ		FB
Eucinostomus argenteus	CS		FB
Eucinostomus gula	CS		FB
Eucinostomus harengulus	MZ	ST	
Eucinostomus havana			FB
Eucinostomus jonesii	MZ		
Eucinostomus lefroyi	MZ		
Eucinostomus melanopterus			FB
Eugerres brasilianus	MZ		
Eugerres plumieri			FB
Gerres cinereus	CS, MZ		FB
HAEMULIDAE			
Anisotremus moricandi	CS		
Anisotremus surinamensis	CS, MZ		FB
Anisotremus virginicus	MZ		FB
Conodon nobilis			FB
Genyatremus luteus			FB
Haemulon album	CS		FB
Haemulon aurolineatum	CS, MZ		FB
Haemulon bonariense	MZ		FB
Haemulon boschmae	MZ		FB
Haemulon carbonarium	CS, MZ		FB
Haemulon chrysargyreum	CS, MZ		FB
Haemulon flavolineatum	CS, MZ		FB
Haemulon macrostomum	CS		FB
Haemulon melanurum	CS, MZ		FB
Haemulon parra	CS, MZ		FB
Haemulon plumieri	CS		FB
Haemulon sciurus	CS, MZ		FB
Haemulon steindachneri	CS		FB
Haemulon striatum	MZ		FB
Orthopristis ruber			FB
Pomadasys corvinaeformis			FB
Pomadasys crocro			FB
INERMIIDAE			
Inermia vittata	CS, CA		FB
SPARIDAE			
Archosargus probatocephalus			FB
Archosargus rhomboidalis	CS, MZ		FB
Calamus bajonado	CS, MZ		FB
Calamus calamus	CS		FB
Calamus penna			FB
Calamus pennatula			FB
Diplodus argenteus argenteus			FB
Diplodus argenteus caudimacula			FB
Lagodon rhomboides	MZ		
Pagrus pagrus			FB
SCIAENIDAE			
Bairdiella ronchus			FB
Bairdiella batabana			FB
Ctenoscianna gracilicirrhus			FB
Cynoscion acoupa			FB
Cynoscion jamaicensis			FB
Cynoscion leiarchus			FB
Cynoscion microlepidotus			FB
Cynoscion nothus			FB
Cynoscion virescens			FB
Equetus lanceolatus	CS		FB
Equetus punctatus	CS		FB
Isopisthus parvipinnis			FB
Larimus breviceps			FB
Lonchurus elegans			FB
Lonchurus lanceolatus			FB
Macrodon ancylodon			FB
Menticirrhus americanus			FB
Menticirrhus littoralis			FB
Micropogonias furnieri	MZ		FB
Nebris microps			FB
Odontoscion dentex	CS		FB
Ophioscion punctatissimus			FB
Paralonchurus brasiliensis			FB
Pareques acuminatus	CS, MZ		FB
Pareques lanceolatus	MZ		
Pareques umbrosus			FB
Protosciaena trewavasae			FB
Sciaena bathytatos			FB
Stellifer griseus			FB
Stellifer microps			FB
Stellifer rastrifer			FB
Umbrina broussonnetii			FB
Umbrina coroides			FB
POLYNEMIDAE			
Polydactylus virginicus	MZ, CS		FB
MULLIDAE			
Mullodichthys martinicus	CS, MZ		FB
Mullus auratus			FB
Pseudupeneus maculatus	CS, MZ,		FB
Upeneus parvus			FB
PEMPHERIDAE			
Pempheris poeyi	CS		FB
Pempheris schomburgki	CS		FB
KYPHOSIDAE			
Kyphosus elegans	MZ		
Kyphosus incisor			FB
Kyphosus sectatrix	CS		FB
CHAETODONTIDAE			
Chaetodon capistratus	CS, MZ		
Chaetodon ocellatus	CS, MZ		FB
Chaetodon sedentarius	CS		FB
Chaetodon striatus	CS, MZ		FB
Prognathodes aculeatus	CS	ST	FB
POMACANTHIDAE			
Centropyge argi	CS		FB
Centropyge aurantonotus	CS		FB
Holacanthus ciliaris	CS		FB
Holacanthus isabelita	CS		
Holacanthus tricolor	CS, MZ	ST	FB
Pomacanthus arcuatus	CS, MZ		FB
Pomacanthus paru	CS, MZ		FB
POMACENTRIDAE			
Abudefduf saxatilis	CS,MZ, LA	ST	FB
Abudefduf taurus	CS, MZ		FB
Chromis cyanea	CS		FB
Chromis enchrysura	CS		FB
Chromis insolata	CS		
Chromis multilineata	CS, MZ		FB
Chromis scotti	CS, MZ		FB
Microspathodon chrysurus	CS, MZ		FB
Stegastes adustus	CS		FB
Stegastes diencaeus	CS		FB
Stegastes leucostictus	CS, MZ		FB
Stegastes partitus	CS		FB
Stegastes planifrons	CS		FB
Stegastes variabilis	CS		FB
LABRIDAE			
Bodianus pulchellus	CS		FB
Bodianus rufus	CS, MZ		FB
Clepticus parrae	CS, MZ		FB
Decodon puellaris	CS, MZ		FB
Doratonotus megalepis	MZ		
Halichoeres bivittatus	CS, MZ		FB
Halichoeres cyanocephalus	CS		FB
Halichoeres garnoti	CS, MZ		FB
Halichoeres maculipinna	CS, MZ		FB
Halichoeres pictus	CS		FB
Halichoeres poeyi			FB
Halichoeres radiatus	CS, MZ		FB
Lachnolaimus maximus	CS, MZ		FB
Thalassoma bifasciatum	CS, MZ		FB
Xyrichtys martinicensis	CS		FB
Xyrichtys novacula	CS		FB
Xyrichtys splendens	CS		FB
Elacatinus randalli	CS		FB
Elacatinus xanthiporra			FB
Evermannichthys MZ1	JM		FB
Evermannichthys sp. A		ST	
Evermannichthys spongicola	NM, MZ		
Evorthodus lyricus	DB		
Ginsburgellus novemlineatus	CS	ST	FB
Gnathologis thompsoni	CS, LA	ST	FB
Gobioneillus oceanicus	MZ, LA		
Gobulus myersi			FB
Lophogobius cyprinoides	CS, MZ	ST	
Lythrypnus mowbrayi	MZ		
Lythrypnus nesiotes		ST	
Lythrypnus phorellus		ST	
Microgobius meeki	CS?		
Microgobius signatus	CS, MZ	ST	FB
Nes longus	CS		FB
Ovjunchthys stigmalophius	AK		
Priolepis hipoliti	CS, LA	ST	FB
Priolepis robinsi		ST	
Psilotris celsus		FB	
Risor ruber	CA	ST	FB
MICRODESMIDAE			
Cerdale floridana		FB	
PTERELEOTRIDAE			
Pterveleotris calliurus			FB
Pterveleotris helenae	CS	ST	FB
BOTHIDAE			
Bothus lunatus	CS, MZ		FB
Bothus maculiferus	MZ		FB
Bothus ocellatus	MZ, CS	ST	FB
Chascanopsetta lugubris	CS, MZ		FB
Monolene sessilicauda	CS, MZ		FB
Trichopsetta caribbaea			FB
ACHIRIDAE			
Achirus lineatus	NM, MZ		FB
Gymnachirus nudus			FB
Trinectes inscriptus	CS, MZ		FB
Trinectes paulistanus			FB
CYNOGLOSSIDAE			
Symphurus arawak	NM, TM	ST	FB
Symphurus diomedianus			FB
Symphurus ommaspilus	TM		FB
Symphurus plagiusa			FB
Symphurus plagiusa			FB
Symphurus rhytisma	TM		FB
BALISTIDAE			
Balistes capriscus	CS		FB
Balistes vetula	CS, MZ		FB
Canthidermis maculatus	LV, CS		
Canthidermis sufflamen	LV, CS		FB
Melichthys niger	CS		FB
Xanthichthys ringens	MZ, CS		FB
MONACANTHIDAE			
Aluterus schoepfii			FB
Aluterus scriptus	CS		FB
Cantherhines macrocerus	CS		FB
Cantherhines pullus	CS, MZ		FB
Monacanthus ciliatus	CS, MZ		FB
Monacanthus tuckeri	CS	ST	FB
Stephanolepis hispidus			FB
Stephanolepis setifer			FB
OSTRACIIDAE			
Acanthostracion polygonius	CS		FB
Acanthostracion quadricornis	CS, MZ		FB
Lactophrys bicaudalis	CS, MZ		FB
Lactophrys trigonus	CS, MZ		FB
Lactophrys trqueter	CS, MZ	ST	FB
TETRAODONTIDAE			
Canthigaster rostrata	CS, NM,		FB
Lagocephalus laevigatus			FB
Sphoeroides greeleyi			FB
Sphoeroides nephelus			FB
Sphoeroides spengleri	CS, MZ	ST	FB
Sphoeroides testudineus			FB
DIODONTIDAE			
Chilomycterus antennatus			FB
Chilomycterus antillarum	CS		FB
Diodon holocanthus	CS		
Diodon hystrix	CS		FB

TABLE ABREVIATIONS
AK – collected by Annemarie Kramer, 2005-2006
AM – American Museum of Natural History collection
CA – California Academy of Sciences collection
CS – Curaçao Sea Aquarium collection
DB – Debrot, A.O. 2003.
FB – www.fishbase.org estimates of unknown provenance
FB – documented by museum collection data
FM –Florida Museum of Natural History collection
JM – collected by J. Van Tassell and M. Taylor, 2003
JW – Williams, J.T. Mounts, J.H. 2003
LA – Los Angeles County Museum collection
LV – Preliminary list of pelagic fish species occurring around Curaçao and Bonaire.
Anonymous
MZ – Metzelaar, J. 1919.
NM – National Museum of Natural History collection
PH – collected by P. Hoetjes
ST – Smithsonian Tropical Research Institute – Panama collection – Deposited at the American Museum of Natural History; ST – new records
TM – Munroe,T. 1998
WN – Nagelkerken, W.P. 1981.

RESULTS

1.) To date, using rotenone, STRI recorded 25 species of cryptic fishes not previously documented from Curaçao.
2.) The 25 new records are highlighted in the table: 1 Moringuidae, 2 Muraenidae, 1 Antennariidae, 4 Gobiesocidae, 1 Carangidae, 1 Tripterygiidae, 2 Labrisomidae, 3 Chaenopsidae, 1 Blennniidae and 9 Gobiidae.
3.) The STRI collection consists of fishes from 35 families, 69 genera, and 111 species.
4.) Previously documented records from museums, local Curaçao publications, and journal articles, record fishes from 94 families, 237 genera, and 440 species. Metzelaar (1919) contains 179 of the total species.
5.) FishBase lists 101 families, 297 genera, and 553 species of shore fishes, though only 8 of these species are documented by actual collection records.
6.) To date, 6 museums in the United States, with online databases, are included in this poster. We are currently gathering lists from Europe and additional museums.

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