

Fishes Collected in Association with Pelagic *Sargassum* in the Northcentral Gulf of Mexico During Surveys Conducted by the Center for Fisheries Research and Development, Gulf Coast Research Laboratory, 1999-2011: A Checklist

Peces Asociados a *Sargazo* Pelagico en el Norte del Golfo de Mejjico em Colecciones del Centro de Investigación y Desarrollo, Laboratorio de Investigación de la Costa de Golfo, 1999-2011: Lista de Verificación

Poissons Collectés en Association avec les *Sargasses* Pélagiques dans le Nord du Golfe du Mexique lors des Campagnes D'échantillonnage Conduites par le Centre pour la Recherche sur les Pêches et le Développement, Gulf Coast Research Laboratory, 1999-2011 : Une Liste de Contrôle

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EXTENDED ABSTRACT

Introduction

Pelagic *Sargassum* (Class Phaeophyta; *Sargassum natans* and *S. fluitans*), found only in the Atlantic Ocean, functions as habitat for diverse assemblages of fishes, invertebrates, and other marine forms, and is considered essential habitat for fishes (SAFMC 1998, 2002), often serving as a nursery for early live stages of multiple species. The checklist provided here is comprised of larval and juvenile fishes collected in association with pelagic *Sargassum* habitat by the University of Southern Mississippi Gulf Coast Research Laboratory (GCRL) during research cruises conducted in the Gulf of Mexico during 1999-2011. This checklist represents an expansion of (and includes) the lists of larval and juvenile fishes collected in association with pelagic *Sargassum* previously published (Comyns et al. 2002; Hoffmayer et al. 2005) and reported (Franks and Gibson 2011) by the authors.

Methodology

Sampling — The study area for sampling fishes associated with pelagic *Sargassum* is shown in Figure 1. Pelagic *Sargassum* features sampled were: mats (large and small), clumps, and ocean frontal zones and windrows (colloquially referred to as weedlines or rips) that contained pelagic *Sargassum*. Larval and juvenile fishes were collected in surface bongo net and neuston net tows as follows:

- i) Bongo nets (0.333 mm mesh) sampled the surface interface (upper 1 m of the water column). Nets were towed for 10 min. at a vessel speed of ~2 knots. Bongo nets were fitted with mechanical flow meter.
- ii) Neuston net (1 m x 2 m frame; 4 m net length, 0.333 and 0.505 mm mesh) sampled the surface interface (upper 1m of the water column); towed for 10 min. at a vessel speed of ~2 knots.
- iii) Neuston net (1 m x 2 m frame; 4 m net length; 3.2 mm mesh) sampled directly through *Sargassum* features.



Figure 1. Map of the Study Area (blue box).

Processing of samples — Fishes were removed from nets onboard and placed in labeled containers with 95% ethanol. Hydrographic and environmental data were recorded for each collection event (not provided here). Individual collections were sorted in the laboratory, and fishes were identified to the lowest possible taxonomic level and enumerated. The majority of specimens were measured to the nearest 0.1mm (larvae in body length; juveniles in standard length). Among the publications and guides used to facilitate fish identifications were McEachran and Fechhelm (1998, 2005), and Richards (2005).

Results and Discussion

A total of 51,093 fish was collected during all cruises combined (Table 1). The checklist is comprised of 77 families represented by 104 genera and 113 identified species. The phylogenetic arrangement of fishes in Table 1 follows Page et al. (2013). For a variety of reasons, numerous specimens were unidentifiable and represented 16% of the total collection. Specimens collected during the Natural Resource Damage Assessment (NRDA) pelagic *Sargassum* study conducted by the GCRL in 2011 were not included in the list.

Table 1. List of larval and juvenile fishes collected in association with pelagic *Sargassum* habitat in the northern Gulf of Mexico by the Gulf Coast Research Laboratory, 1999 - 2011. Size not provided for some taxa.

Family	Species	Number	Size Range (mm)	
			Min.	Max.
Muraenidae (Moray eels)		59		
Ophichthidae (Snake eels)		29		
Congridae (Conger eels)		2		
Nettastomiidae (Duckbill eels)		2		
Clupeidae (Herrings)		5824		
	<i>Harengula jaguana</i>	191	3.1	10.8
	<i>Sardinia aurita</i>	48	3.1	10.4
	<i>Etrumeus teres</i>	6	4.8	9.4
	<i>Brevoortia</i> sp.	2639	3.8	11.5
	<i>Opisthonema oglinum</i>	14	3.6	21.3
Engraulidae (Anchovies)		45		
	<i>Anchoa hepsetus</i>	1	10.0	
Gonostomatidae (Bristlemouths)		714		
	<i>Cyclothone</i> sp.	37	2.4	10.8
Melanostomiidae (Dragonfishes)		2		
Astronesthidae (Snaggletooths)		1		
Synodontidae (Lizardfishes)		83		
Chlorophthalmidae (Greeneyes)		1		
Paralepidae (Dragontooths)		74		
	<i>Paralepis atlantica</i>	1	15.0	
Myctophidae (Laternfishes)		2684		
	<i>Diaphus</i> sp.	10	3.7	6.0
	<i>Lampanyctus</i> sp.	4	6.3	7.9
	<i>Myctophum</i> sp.	1	7.1	
	<i>Myctophum asperum</i>	1	18.8	
	<i>Myctophum nitidulum</i>	2	11.9	13.8
	<i>Centrobranchus nigroocellatus</i>	2	22.0	36.8
	<i>Lampanyctus noblis</i>	2		
Ophidiidae Cusk eels)		279		
Antennariidae (Frogfishes)				
	<i>Histrio histrio</i>	81	1.7	39.9
Ogcephalidae (Batfishes)		3		
Ceratiidae (Seadevils)		1		
	<i>Cryptosaurus couesii</i>	3	2.4	13.1

The most prominent families in terms of numeric abundance were Carangidae, Clupeidae, Scombridae, Exocoetidae, Myctophidae, Mugilidae, Sphyracidae and Balistidae. Family Carangidae was represented by the greatest number of identifiable species (19), followed by Scombridae (11), Exocoetidae (8), Monacanthidae (8), Paralichthyidae (5), Clupeidae (4), Myctophidae (4), and Balistidae (4). Each of the remaining 69 families was represented by one to three identifiable species. Numerically, *Prognichthys occidentalis*, *Auxis rochei*, *Auxis thazard*, *Mugil curema*, *Caranx crysos*, *Balistes caprisicus*, *Thunnus atlanticus*, *Oxyporamphus micropterus*, and *Euthynnus alletteratus* were the most abundant identifiable species. Many specimens could be identified only to the family level and their numbers are so noted per family.

These collections confirm that pelagic *Sargassum* functions as habitat for a multitude of young fishes in the Gulf of Mexico, many of which as adults contribute significantly to valuable commercial and recreational fisheries. Details of specimens collected by specific gear type are not provided in this checklist. Knowledge of the role of pelagic *Sargassum* in sustaining larval and juvenile fishes in the Gulf of Mexico and throughout the Western Central Atlantic Ocean is paramount to understanding recruitment dynamics. Future studies are required to better understand the complexities of the pelagic *Sargassum* ecosystem and to protect and manage this critical habitat for the benefit of fish populations and other associated organisms. Of increasing interest is the emerging issue of vast amounts of pelagic *Sargassum* inundating coastal

Family	Species	Number	Size Range (mm)	
			Min.	Max.
Mugilidae (Mulletts)		1		
	<i>Mugil cephalus</i>	8	4.7	20.1
	<i>Mugil curema</i>	775	5.3	13.5
	<i>Mugil sp.</i>	108	3.2	17.9
Bregmacerotidae (Codlets)		9		
	<i>Bregmacerous cantori</i>	1		
	<i>Bregmacerous sp.</i>	5	7.9	9.5
Atherinidae (Silversides)		17		
Exocoetidae (Flyingfishes)		1303		
	<i>Exocoetus obtusirostris</i>	144	1.0	29.1
	<i>Parexcocoetus branchypterus</i>	87	2.2	27.4
	<i>Oxyporamphus micropterus</i>	495	2.4	20.6
Exocoetidae (cont.)	<i>Prognichthys occidentalis</i>	2765	1.4	109.0
	<i>Hirundichthys affinis</i>	147	3.1	16.5
	<i>Cheilopogon melanurus</i>	21	6.8	21.5
	<i>Cheilopogon exsiliens</i>	177	1.5	33.4
	<i>Cheilopogon furcatus</i>	128	2.5	13.5
	<i>Cheilopogon sp.</i>	10	7.1	16.0
Hemiramphidae (Halfbeaks)		195		
	<i>Hemiramphus balao</i>	1	42.1	
Belonidae (Needlefishes)		12		
	<i>Platybelone argalus</i>	1		
Phycidae (Phycid hakes)				
	<i>Urophycis sp.</i>	136		
	<i>Urophycis cirratus</i>	262	1.6	24.5
Pomacanthidae (Anglefishes)				
	<i>Holocanthus sp.</i>	4	4.0	7.6
Holocentridae (Squirrelfishes)		51		
	<i>Holocentrus sp.</i>	59	2.3	6.1
Syngnathidae (Pipefishes)				
	<i>Syngnathus pelagicus</i>	10	27.2	108.9
	<i>Syngnathus louisianae</i>	20	60.9	153.0
	<i>Acentronura dendritica</i>	1	28.5	

regions of many Caribbean island countries on an annual basis. Probable ‘drivers’ of such massive bloom and transport into the Caribbean region (since 2011) are under investigation, e.g. Franks et al. (2016). Surveys of young fishes and other organisms associated with these massive blooms along Caribbean coastlines have not been conducted.

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KEYWORDS: Pelagic *Sargassum*, fishes, Gulf of Mexico,

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Family	Species	Number	Size Range (mm)	
			Min.	Max.
	<i>Fistularia</i> sp.	1		
Macroramphosidae (Snipefishes)	<i>Macroramphosus scolopax</i> .	1	6.0	
Labridae (Wrasses)		1		
Caproidae (Boarfishes)				
	<i>Antigonia</i> sp.	7	2.0	
	<i>Antigonia capros</i>	29	1.8	5.2
	<i>Antigonia combatia</i>	4		
Scorpaenidae (Scorpion Fishes)		172		
Triglidae (Sea Robbings)		11		
Dactylopteridae (Flying gurnards)				
	<i>Dactylopterus volitans</i>	1	4.2	
Nomeidae (Driftfishes)		2		
	<i>Cubiceps</i> sp.	3	2.5	5.6
	<i>Cubiceps pauciradiatus</i>	23	2.7	4.4
	<i>Nomeus gronovii</i>	3	10.9	11.6
	<i>Psenes</i> sp.	9	4.4	39.0
	<i>Psenes cyanophrys</i>	2	16.3	18.8
Stromateidae (Butterfishes)		18		
	<i>Peprilus</i> sp.	24	2.3	12.4
	<i>Peprilus burti</i>	8	4.4	9.8
Serranidae (Sea Basses)		18		
	<i>Hemanthias vivanus</i>	3	3.1	3.7
	<i>Serranus</i> sp.	4	3.0	8.5
	<i>Anthias</i> sp.	5	4.4	5.5
	<i>Pristipomoides aquilonaris</i>	6	3.8	6.8
	<i>Epinephelus</i> sp.	3		
	<i>Mycteroperca bonaci</i>	1		
Priacanthidae (Bigeyes)		112		
	<i>Priacanthus arenatus</i>	1		
	<i>Heteropriacanthus cruentatus</i>	1	44.9	
Apogonidae (Cardinafishes)		1		
Carangidae (Jacks)		7181		
	<i>Seriola dumerili</i>	3	13.8	15.0
	<i>Seriola fasciata</i>	2	20.6	23.3
	<i>Seriola rivoliana</i>	11	2.4	66.7
	<i>Seriola zonata</i>	1	3.0	
	<i>Seriola</i> sp.	71	1.3	13.8
	<i>Decapterus punctatus</i>	230	1.3	31.3
	<i>Decapterus</i> sp.	431	1.9	6.9

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Family	Species	Number	Size Range (mm)	
			Min.	Max.
	<i>Caranx crysos</i>	773	1.7	81.7
	<i>Caranx ruber</i>	40	16.8	28.4
	<i>Caranx hippos</i>	15	6.9	20.0
	<i>Caranx bartholomaei</i>	12	4.3	29.5
	<i>Caranx</i> sp.	3479	1.4	12.8
	<i>Chloroscombrus chrysurus</i>	71	2.3	10.8
	<i>Trachurus lathami</i>	195	1.9	7.4
	<i>Elegatis bipinnulata</i>	83	2.7	33.0
	<i>Trachinotus carolinus</i>	16	4.4	9.6
	<i>Selar crumenophthalmus</i>	122	2.3	17.3
	<i>Oligoplites saurus</i>	118	2.5	5.0
	<i>Selene</i> sp.	6	2.8	3.8
	<i>Selene vomer</i>	1	5.6	
	<i>Hemicaranx amblyrhynchus</i>	1	9.4	
	<i>Naucrates doctor</i>	4	3.0	
	<i>Caranx latus</i>	181	3.0	
Rachycentridae (Cobia)	<i>Rachycentron canadum</i>	5	1.6	3.8
Echeinidae (Remoras)		14		
	<i>Remora</i> sp.	3	27.5	31.1
Lobotidae (Tripletail)	<i>Lobotes surinamensis</i>	119		
Coryphaenidae (Dolphinfishes)		39		
	<i>Coryphaena equisetis</i>	35	1.7	18.1
	<i>Coryphaena hippurus</i>	130	1.7	38.1
Lutjanidae (Snappers)		89		
	<i>Lutjanus campechanus</i>	6	3.7	4.1
	<i>Lutjanus</i> sp.	1		
	<i>Rhomboplites aurorubens</i>	3	4.1	
	<i>Pristipomoides aquilonaris</i>	1		
Geridae (Mojarras)		8		
Sparidae (Porgies)				
	<i>Lagodon rhomboides</i>	22	2.9	10.3
Mullidae (Goatfishes)		105	1.9	5.1
	<i>Upeneus parvus</i>	16	3.6	10.3
Kyphosidae (Sea Chubs)		29		
	<i>Kyphosis incisor</i>	148	8.5	25.6
	<i>Kyphosus</i> sp.	207	3.4	17.7
Chaetodontidae (Butterflyfishes)		20		
Pomacanthidae (Anglefishes)	<i>Chaetodon</i> sp.	1	3.0	
	<i>Holocanthus bermudensis</i>	1		
Pomacentridae (Damselfishes)	<i>Abudefduf saxatilis</i>	101	2.9	28.8
Polynemidae (Threadfishes)				
	<i>Polydactylus oligodon</i>	1	34.8	
Scaridae (Parrotfishes)		49		
Blennidae (Blennies)		100		
	<i>Hypsoblennies</i> sp.	12	8.8	15.0
	<i>Hyppleurochilus germinatus</i>	2	8.8	9.0
Gobiidae (Gobies)		335		
Microdesmidae (Wormfishes)		3		
Callionymidae (Dragonets)		4		

Family	Species	Number	Size Range (mm)	
			Min.	Max.
Sphyraenidae (Barracudas)		18		
	<i>Sphyraena barracuda</i>	106	2.1	23.1
	<i>Sphyraena guachancho</i>	7	4.4	
	<i>Sphyraena borealis</i>	13	2.6	12.5
	<i>Sphyraena</i> sp.	531	1.4	17.4
Gempylidae (Snake Mackerels)		65		
	<i>Gempylus serpens</i>	17	3.1	10.5
Trichiuridae (Cutlassfish)		10		
	<i>Trichiurus lepturus</i>	6	9.4	33.8
Scombridae (Mackerels, Tunas)		233		
	<i>Thunnus thynnus</i>	126	2.2	5.7
	<i>Thunnus atlanticus</i>	514	1.8	9.9
	<i>Thunnus albacores</i>	156	2.5	10.7
	<i>Thunnus</i> sp.	250	1.6	7.6
	<i>Auxis thazard</i>	891	1.6	17.7
	<i>Auxis rochei</i>	5064	1.3	41.5
	<i>Auxis</i> sp.	203	3.0	
	<i>Euthynnus alletteratus</i>	464	1.8	10.6
	<i>Scomber colias</i>	3	2.2	3.0
<i>Scomberomorus cavalla</i>	<i>Scomberomorus cavalla</i>	1		
	<i>Scomberomorus maculatus</i>	3	2.8	6.2
	<i>Scomberomorus</i> sp.	2	3.6	4.6
	<i>Acanthocybium solandri</i>	9	3.1	6.8
	<i>Katsuwonus pelamis</i>	1		
Xiphidae (Swordfish)	<i>Xiphias gladius</i>	2		
Istiophoridae (Billfishes)		50		
Centrolophidae (Medusafishes)	<i>Schedophilus</i> sp.	4	3.7	20.7
Paralichthyidae (Sand Flounders)		330		
	<i>Etropus</i> sp.	1	5.4	7.7
	<i>Citharichthys macrops</i>	1	8.0	
	<i>Citharichthys spilopterus</i>	13	6.3	8.1
	<i>Citharichthys</i> sp.	2	3.2	6.2
	<i>Paralichthys albigutta</i>	1	13.2	
	<i>Paralichthys lethostegma</i>	5	7.8	8.8
	<i>Paralichthys</i> sp.	2	5.9	7.0
	<i>Cyclopsetta</i> sp.	5	3.5	5.7
	<i>Cyclopsetta fimbriata</i>	4		
Bothidae	<i>Trichopsetta ventralis</i>	1	6.0	
	<i>Bothus</i> sp.			
Achiridae (Soles)	<i>Gymnachirus</i> sp.	1		
Cynoglossidae (Tonguefish)		1		
	<i>Symphurus</i> sp.	28	2.2	11.9
	<i>Symphurus plagiusa</i>	3		
Balistidae (Triggerfishes)		10		
	<i>Balistes capriscus</i>	604	2.7	127.5
	<i>Canthidermis sufflamen</i>	4	6.5	75.1
	<i>Canthidermis maculata</i>	28	3.8	135.0
	<i>Xanthichys ringens</i>	4	33.2	47.7

<u>Family</u>	<u>Species</u>	<u>Number</u>	<u>Size Range (mm)</u>	
			<u>Min.</u>	<u>Max.</u>
Monacanthidae (Filefishes)		19		
	<i>Monacanthus hispidus</i>	273	7.7	75.0
	<i>Monacanthus setifer</i>	8	18.3	29.5
	<i>Monacanthus ciliatus</i>	7	48.2	49.1
	<i>Cantherhines pullus</i>	2	4.6	14.9
	<i>Cantherhines macrocerus</i>	3	28.0	31.9
	<i>Aluterus heudeloti</i>	1	16.9	
	<i>Aluterus schoepfi</i>	2	57.3	
	<i>Aluterus scriptus</i>	9	29.6	
Ostraciidae (Boxfishes)				
	<i>Lactophrys</i> sp.	1		
Tetraodontidae (Puffers)		68		
	<i>Spheroides</i> sp.	14	4.1	7.0
Diodontidae (Porcupinefishes)		1		
	<i>Diodon hystrix</i>	3		
	<i>Diodon holocanthus</i>	5	47.0	54.0
	<i>Chilomycterus schoepfi</i>	3	14.6	35.4
Unidentified Fish		8,179		