The following supplement accompanies the article

Functional richness and turnover patterns reveal assembly rules structuring marine fish communities on the continental shelf of French Guiana

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Table S1. List of the 115 taxa collected during both surveys with information on their two ecological traits considered in analyses.

	Species	**Trophic group**	**Habitat**
1	*Acanthostracion quadricornis* (Linnaeus, 1758)	Invertivorous	Demersal
2	*Achirus achirus* (Linnaeus, 1758)	Omnivorous	Benthic
3	*Albula vulpes* (Linnaeus, 1758)	Omnivorous	Demersal
4	*Aluterus monoceros* (Linnaeus, 1758)	Invertivorous	Demersal
5	*Anchoa spinifer* (Valenciennes, 1848)	Omnivorous	Pelagic
6	*Anchovia surinamensis* (Bleeker, 1865)	Planktivorous	Pelagic
7	*Anchoviella lepidentostole* (Fowler, 1911)	Planktivorous	Pelagic
8	*Antennarius striatus* (Shaw, 1794)	Omnivorous	Benthic
9	*Apionichthys dumerili* Kaup, 1858	Invertivorous	Benthic
10	*Aspistor quadriscutis* (Valenciennes, 1840)	Invertivorous	Demersal
11	*Aspredo aspredo* (Linnaeus, 1758)	Invertivorous	Benthic
12	*Bagre bagre* (Linnaeus, 1766)	Omnivorous	Demersal
13	*Bairdiella ronchus* (Cuvier, 1830)	Omnivorous	Demersal
14	*Balistes capriscus* Gmelin, 1789	Invertivorous	Demersal
15	*Batrachoides manglae,* Cervignón, 1964	Omnivorous	Benthic
16	*Batrachoides surinamensis* (Bloch & Schneider, 1801)	Omnivorous	Benthic
17	*Bothus ocellatus* (Agassiz, 1831)	Omnivorous	Benthic
18	*Brotula barbata* (Bloch & Schneider, 1801)	Omnivorous	Benthic
19	*Caranx crysos* (Mitchill, 1815)	Omnivorous	Pelagic
20	*Caranx hippos* (Linnaeus, 1766)	Omnivorous	Pelagic
21	*Carcharhinus falciformis* (Müller & Henle, 1839)	Piscivorous	Pelagic
22	*Centropomus ensiferus* Poey, 1860	Omnivorous	Demersal

23	*Chaetodipterus faber* (Broussonet, 1782)	Invertivorous	Demersal
24	*Chaetodon ocellatus* Bloch, 1787	Invertivorous	Demersal
25	*Chaetodon sedentarius* Poey, 1860	Invertivorous	Demersal
26	*Chilomycterus antillarum* Jordan & Rutter, 1897	Invertivorous	Demersal
27	*Chloroscombrus chrysurus* (Linnaeus, 1766)	Omnivorous	Pelagic
28	*Colomesus psittacus* (Bloch & Schneider, 1801)	Invertivorous	Demersal
29	*Conodon nobilis* (Linnaeus, 1758)	Omnivorous	Demersal
30	*Ctenosciaena gracilicirrhus* (Metzelaar, 1919)	Invertivorous	Demersal
31	*Cyclopsetta chittendeni* Bean, 1895	Omnivorous	Benthic
32	*Cynoscion acoupa* (Lacepède, 1801)	Omnivorous	Demersal
33	*Cynoscion similis* Randall & Cervigón, 1968	Omnivorous	Demersal
34	*Cynoscion sp*	Omnivorous	Demersal
35	*Cynoscion virescens* (Cuvier, 1830)	Omnivorous	Demersal
36	*Dactylopterus volitans* (Linnaeus, 1758)	Omnivorous	Benthic
37	*Diapterus auratus* Ranzani, 1842	Omnivorous	Demersal
38	*Diapterus rhombeus* (Cuvier, 1829)	Omnivorous	Demersal
39	*Diplectrum formosum* (Linnaeus, 1766)	Omnivorous	Demersal
40	*Diplectrum radiale* (Quoy & Gaimard, 1824)	Omnivorous	Demersal
41	*Diplectrum sp*	Omnivorous	Demersal
42	*Echeneis naucrates* Linnaeus, 1758	Omnivorous	Pelagic
43	*Eucinostomus argenteus* Baird & Girard, 1855	Invertivorous	Demersal
44	*Fontitrygon geijskesi* (Boeseman, 1948)	Omnivorous	Benthic
45	*Gymnothorax funebris* Ranzani, 1839	Omnivorous	Benthic
46	*Gymnachirus nudus* Kaup, 1858	Omnivorous	Benthic
47	*Gymnothorax ocellatus* Agassiz, 1831	Omnivorous	Benthic
48	*Gymnura micrura* (Bloch & Schneider, 1801)	Omnivorous	Benthic
49	*Haemulon aurolineatum* Cuvier, 1830	Omnivorous	Demersal
50	*Haemulon plumierii* (Lacepède, 1801)	Omnivorous	Demersal
51	*Haemulon steindachneri* (Jordan & Gilbert, 1882)	Omnivorous	Demersal
52	*Harengula jaguana* Poey, 1865	Planktivorous	Demersal
53	*Hypanus americanus* (Hildebrand & Schroeder, 1928)	Omnivorous	Benthic
54	*Hypanus guttatus* (Bloch & Schneider, 1801)	Omnivorous	Benthic
55	*Hyporthodus niveatus* (Valenciennes, 1828)	Omnivorous	Demersal

56	*Isopisthus parvipinnis* (Cuvier, 1830)	Invertivorous	Demersal
57	*Lagocephalus laevigatus* (Linnaeus, 1766)	Omnivorous	Demersal
58	*Larimus breviceps* Cuvier, 1830	Invertivorous	Demersal
59	*Lonchopisthus higmani* Mead, 1959	Omnivorous	Demersal
60	*Lonchurus elegans* (Boeseman, 1948)	Invertivorous	Demersal
61	*Lonchurus lanceolatus* (Bloch, 1788)	Omnivorous	Demersal
62	*Lutjanus purpureus* (Poey, 1866)	Omnivorous	Demersal
63	*Lutjanus synagris* (Linnaeus, 1758)	Omnivorous	Demersal
64	*Macrodon ancylodon* (Bloch & Schneider, 1801)	Omnivorous	Demersal
65	*Menticirrhus americanus* (Linnaeus, 1758)	Invertivorous	Demersal
66	*Micropogonias furnieri* (Desmarest, 1823)	Omnivorous	Demersal
67	*Mustelus higmani* Springer & Lowe, 1963	Omnivorous	Demersal
68	*Narcine brasiliensis* (Olfers, 1831)	Omnivorous	Benthic
69	*Nebris microps* Cuvier, 1830	Omnivorous	Demersal
70	*Notarius grandicassis* (Valenciennes, 1840)	Invertivorous	Demersal
71	*Odontognathus mucronatus* Lacepède, 1800	Planktivorous	Demersal
72	*Ogcocephalus nasutus* (Cuvier, 1829)	Omnivorous	Benthic
73	*Oligoplites saliens* (Bloch, 1793)	Omnivorous	Pelagic
74	*Opisthonema oglinum* (Lesueur, 1818)	Omnivorous	Pelagic
75	*Orthopristis ruber* (Cuvier, 1830)	Omnivorous	Demersal
76	*Paralonchurus brasiliensis* (Steindachner, 1875)	Invertivorous	Demersal
77	*Pellona harroweri* (Fowler, 1917)	Planktivorous	Pelagic
78	*Peprilus paru* (Linnaeus, 1758)	Omnivorous	Demersal
79	*Polydactylus oligodon* (Günther, 1860)	Omnivorous	Demersal
80	*Pomacanthus paru* (Bloch, 1787)	Invertivorous	Demersal
81	*Pomadasys corvinaeformis* (Steindachner, 1868)	Omnivorous	Demersal
82	*Porichthys plectrodon* Jordan & Gilbert, 1882	Omnivorous	Benthic
83	*Priacanthus arenatus* Cuvier, 1829	Omnivorous	Demersal
84	*Prionotus punctatus* (Bloch, 1793)	Omnivorous	Benthic
85	*Pseudauchenipterus nodosus* (Bloch, 1794)	Omnivorous	Demersal
86	*Pseudobatos percellens* (Walbaum, 1792)	Omnivorous	Benthic
87	*Rhinoptera bonasus* (Mitchill, 1815)	Invertivorous	Demersal
88	*Rhizoprionodon porosus* (Poey, 1861)	Piscivorous	Demersal

89	*Rhomboplites aurorubens* (Cuvier, 1829)	Omnivorous	Demersal
90	*Sciades parkeri* (Traill, 1832)	Omnivorous	Demersal
91	*Sciades proops* (Valenciennes, 1840)	Omnivorous	Demersal
92	*Scomberomorus brasiliensis* Collette, Russo & Zavala-Camin, 1978	Omnivorous	Pelagic
93	*Scorpaena brasiliensis* Cuvier, 1829	Omnivorous	Benthic
94	*Scorpaena isthmensis* Meek & Hildebrand, 1928	Omnivorous	Benthic
95	*Selar crumenophthalmus* (Bloch, 1793)	Omnivorous	Pelagic
96	*Selene brownii* (Cuvier, 1816)	Omnivorous	Demersal
97	*Selene vomer* (Linnaeus, 1758)	Omnivorous	Demersal
98	*Serranus atrobranchus* (Cuvier, 1829)	Omnivorous	Demersal
99	*Sparisoma chrysopterum* (Bloch & Schneider, 1801)	Invertivorous	Demersal
100	*Sphoeroides dorsalis* Longley, 1934	Invertivorous	Demersal
101	*Sphoeroides testudineus* (Linnaeus, 1758)	Invertivorous	Demersal
102	*Sphyraena guachancho* Cuvier, 1829	Omnivorous	Pelagic
103	*Sphyrna tudes* (Valenciennes, 1822)	Omnivorous	Demersal
104	*Stellifer microps* (Steindachner, 1864)	Invertivorous	Demersal
105	*Stellifer rastrifer* (Jordan, 1889)	Invertivorous	Demersal
106	*Stephanolepis setifer* (Bennett, 1831)	Invertivorous	Demersal
107	*Styracura schmardae* (Werner, 1904)	Invertivorous	Benthic
108	*Syacium papillosum* (Linnaeus, 1758)	Omnivorous	Benthic
109	*Symphurus plagusia* (Bloch & Schneider, 1801)	Omnivorous	Benthic
110	*Synodus foetens* (Linnaeus, 1766)	Omnivorous	Benthic
111	*Trachinotus cayennensis* Cuvier, 1832	Omnivorous	Pelagic
112	*Trachinotus falcatus* (Linnaeus, 1758)	Omnivorous	Pelagic
113	*Trichiurus lepturus* Linnaeus, 1758	Omnivorous	Demersal
114	*Upeneus parvus* Poey, 1852	Invertivorous	Demersal
115	*Uraspis secunda* (Poey, 1860)	Piscivorous	Pelagic

Table S2. List of the 13 morphological traits from 14 measures taken from lateral view pictures of fishes. The 14th morphological trait is the logarithm of the maximum standard length. These traits have been selected as a consensus choice based on a literature review (Dumay et al. 2004, Micheli & Halpern 2005, Mouillot et al. 2006, Violle et al. 2007, Mason et al. 2008, Reecht 2009, Villéger et al. 2010, Pessanha et al. 2015, Silva-Júnior et al. 2016)

Functions of interest	**Functional trait**	**Formula**	**Ecological meaning**
Food acquisition	Eye size (Es)	$\frac{Ed}{Hd}$	Visual acuity
	Mouth position (Mp)	$\frac{Mo}{Hd}$	Feeding method in the water column
	Maxillary length (Ml)	$\frac{Jl}{Hd}$	Size and strength of jaw
Habitat use	Eye position (Ep)	$\frac{Eh}{Hd}$	Vertical position of fish in the water column
	Elongation (El)	$\frac{Bl}{Bd}$	Vertical position of fish in the water column and hydrodynamism
Locomotion	Body lateral shape (Bls)	$\frac{Hd}{Bd}$	Relative depth of the head compared to the body
	Pectoral fin position (Pfp)	$\frac{PFi}{PFb}$	Pectoral fin use for maneuverability
	Pectoral fin aspect ratio (Pfar)	$\frac{PFl^2}{PFs}$	Pectoral use for propulsion
	Pectoral fin size (Pfs)	$\frac{PFl}{Bl}$	Relative size of the pectoral fin compared to the body
	Caudal peduncle throttling (Cpt)	$\frac{CFd}{CPd}$	Caudal propulsion efficiency through reduction of drag
	Caudal fin aspect ratio (Cfar)	$\frac{CFd^2}{CFs}$	Caudal fin use for propulsion and/or direction
	Fins surface ratio (Fsr)	$\frac{2 \text{ x } PFs}{CFs}$	Fin use / surface of propulsion
	Relative fin surface (Rfs)	$\frac{\text{PFs} + \text{CFs}}{\text{Bl x Bd}}$	Fin total surface compared to the body lateral surface

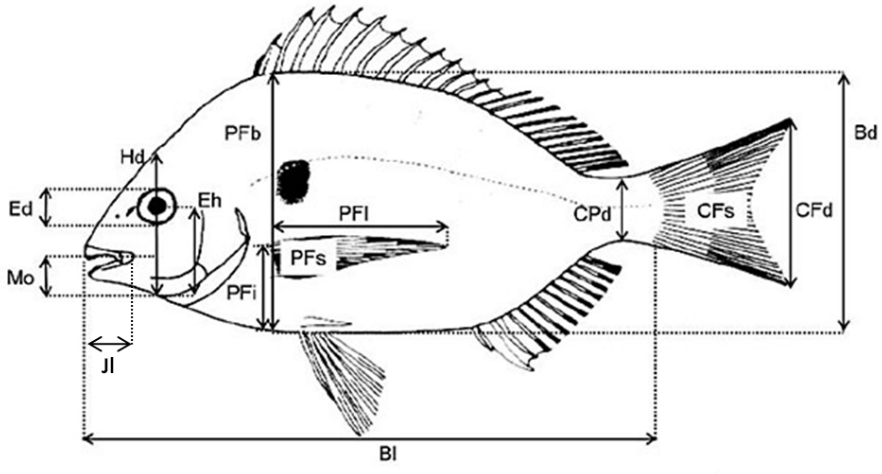

Fig. S1. Representation of the 14 morphological measurements used to compute morphological traits (modified from Villéger et al. 2010). *Bl* body standard length, *Bd* body depth, *CPd* caudal peduncle minimal depth, *CFd* caudal fin depth, *CFs* caudal fin surface, *PFi* distance between the insertion of the pectoral fin to the bottom of the body, *PFb* body depth at the level of the pectoral fin insertion, *PFl* pectoral fin length, *PFs* pectoral fin surface, *Hd* head depth along the vertical axis of the eye, *Ed* eye diameter, *Eh* distance between the center of the eye to the bottom of the head, *Mo* distance from the top of the mouth to the bottom of the head along the head depth axis, Jl jaw length.

For flatfishes, we followed the same procedure proposed by Villéger et al. (2010). This means that body depth, mouth depth and position, and eye position were measured with respect to the position of the fish in its environment. In other words, the lateralization was not considered. Additionally, as flatfishes have their two eyes on the top of the head, *eye position* was computed as: (2*Ed)/Hd. Flatfishes were considered without functionally pectoral fins, so *Pectoral fin position* and *Pectoral fin aspect ratio* were fixed to 0. Similarly, for species without caudal fin, the *Caudal fin aspect ratio* and *Fins surface ratio* were fixed to 0.

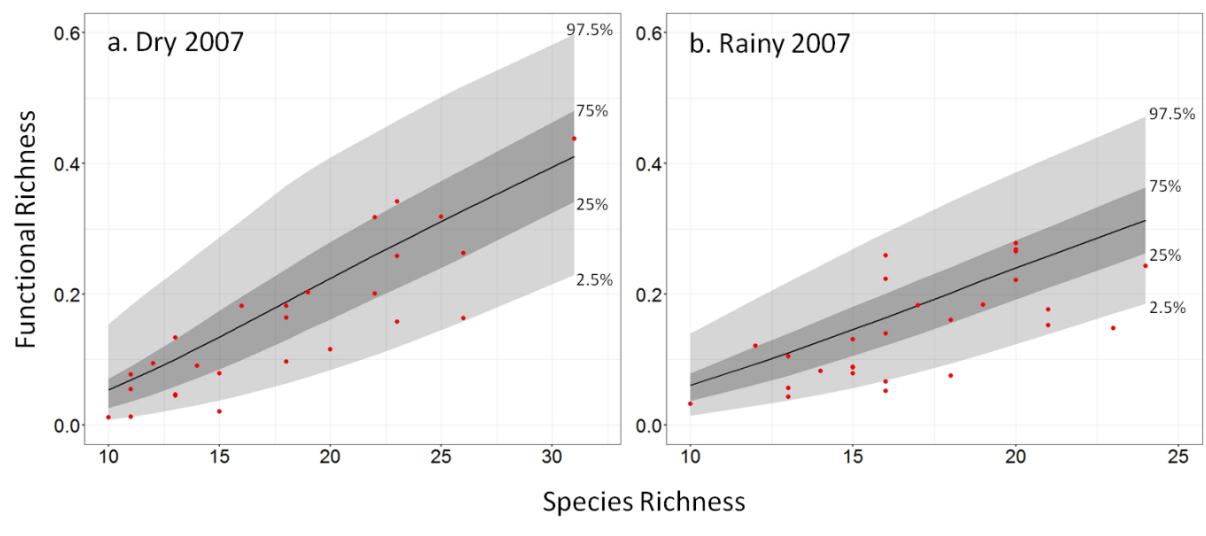

Fig. S2. Observed (dots) and simulated FRic values based on a null model (grey zones) during the dry (a) and the rainy season (b) in 2007. The black line is the mean of 999 random permutations. Areas in dark and light grey are respectively the 50th and the 95th percentiles, smoothed using a generalized additive model (GAM) function.

Results from the 2007 dry season survey were comparable to those obtained for the 2016 and 2017 dry season surveys. They showed that 3 observed values were situated above the 75th percentile, 14 were within the interquartile range and 11 were under the 25th percentile of the null distribution (Fig. S2a). Then, results from the 2007 rainy season survey were also similar to those obtained for dry season surveys from 2007, 2016 and 2017. Indeed, 3 observed values were situated above the 75th percentile, 11 were within the interquartile range and 14 were under the 25th percentile of the null distribution. These results indicated that limiting similarity hypothesis (or interspecific competition) was dominant for only 11% of assemblages, for both seasons from 2007, whereas environmental filtering was the dominant shaping process for 38% of assemblages during the 2007 dry season and for 50% of assemblages during the 2007 rainy season. Results between both seasons are similar and showed the absence of a seasonal effect. The environmental filtering remains the dominant process structuring fish assemblages in French Guiana throughout the year. We note that functional redundancy remains strong in the rainy season as maximum local FRic equals 0.28 (Fig. S2).