Supplementary material

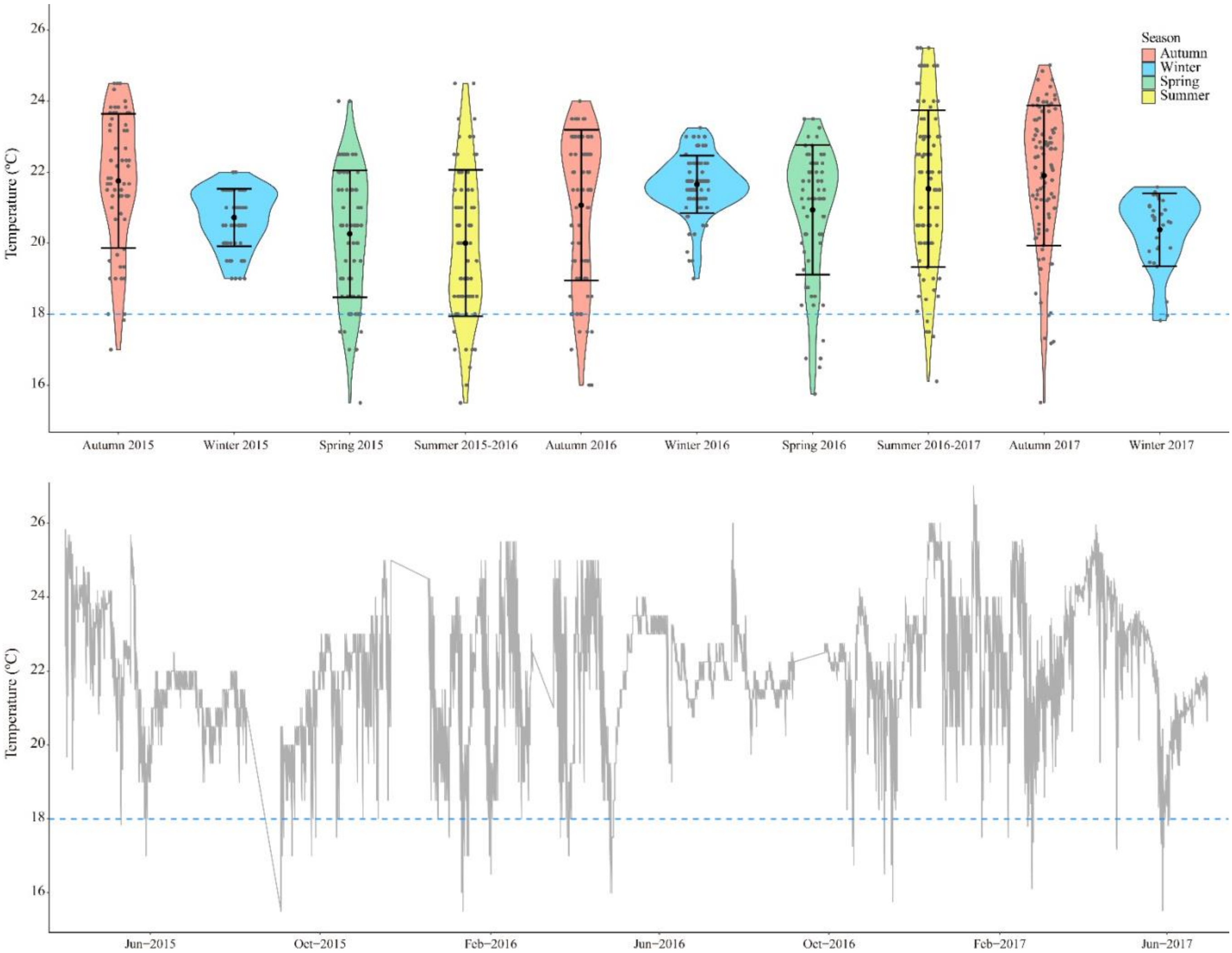

Figure S1: Daily minimum water temperature (°C) recorded in the Arraial do Cabo's embayment during the sampling period (top) and daily sea surface temperature variation over the sampling period (bottom). Similar violin colours indicate the same season in different years. Black centre point and error bars represent mean ± 1 standard deviation. Grey dots represent daily values. Three months were pooled for all seasons (see Methods), except for autumn 2015 (two months; April and May) and winter 2017 (one month; June). From autumn 2015 to spring 2016 data from the sensor deployed at Anequim Bay (22° 58' 49.6" S 41° 59' 01.4" W), and from spring 2016 to winter 2017 data from the sensor deployed at Eastern Tip (22° 58' 42.8" S 41° 58' 47.4" W). Dashed blue lines at 18 ºC indicate the temperature threshold for inferring the occurrence of upwelling events (see Materials and Methods).

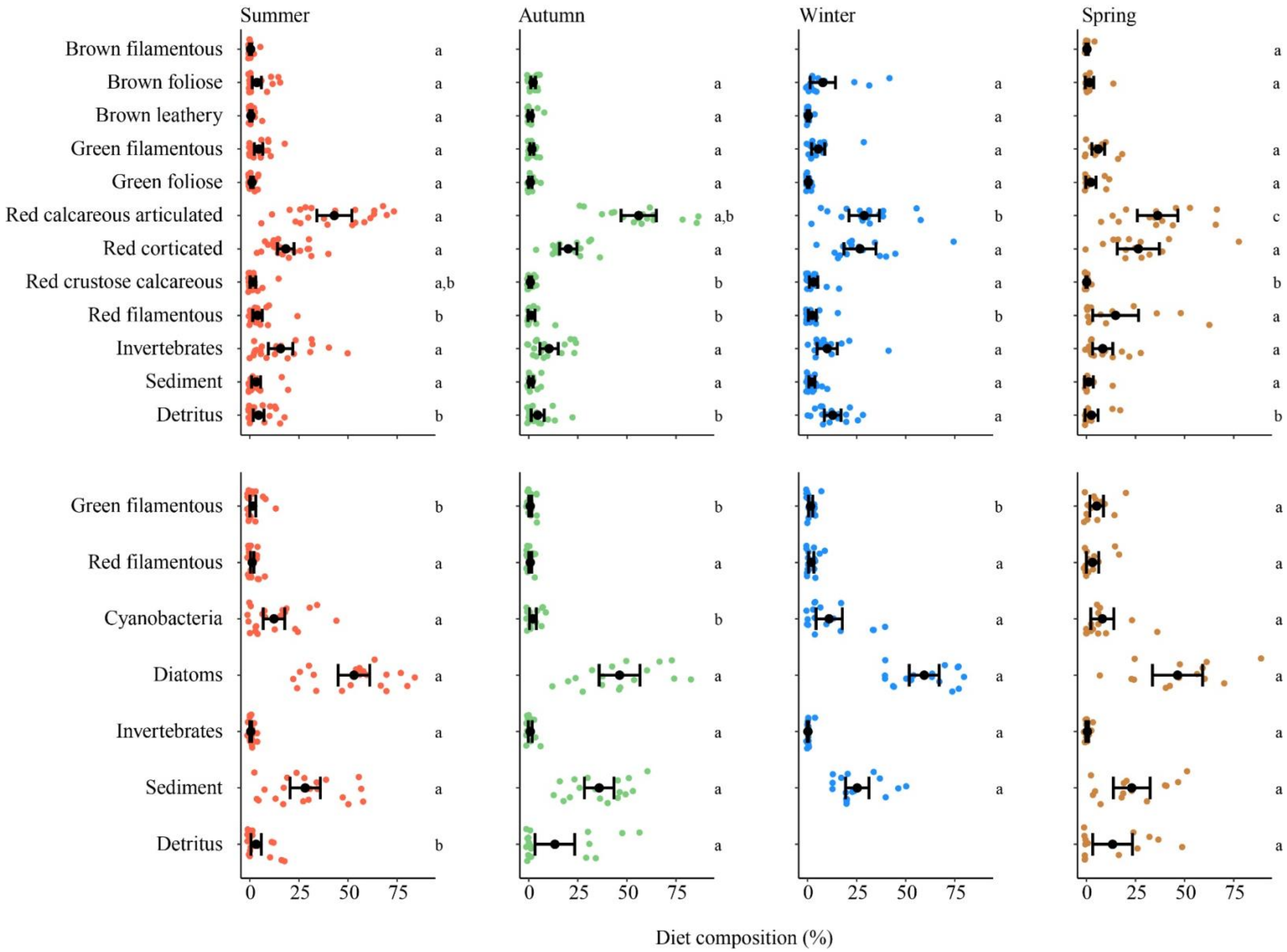

Figure S2: Comparison of *Acanthurus chirurgus* diet among the four seasons: summer, autumn, winter, and spring – colours correspond to each season. Results from macro- (upper panel), and micro-analysis (lower panel). For each item, different lower-case letters indicate significant differences (PERMANOVA: α > 0.05) among seasons, with a > b > c. Mean (± 95% C.I.) diet composition values (%) are shown.

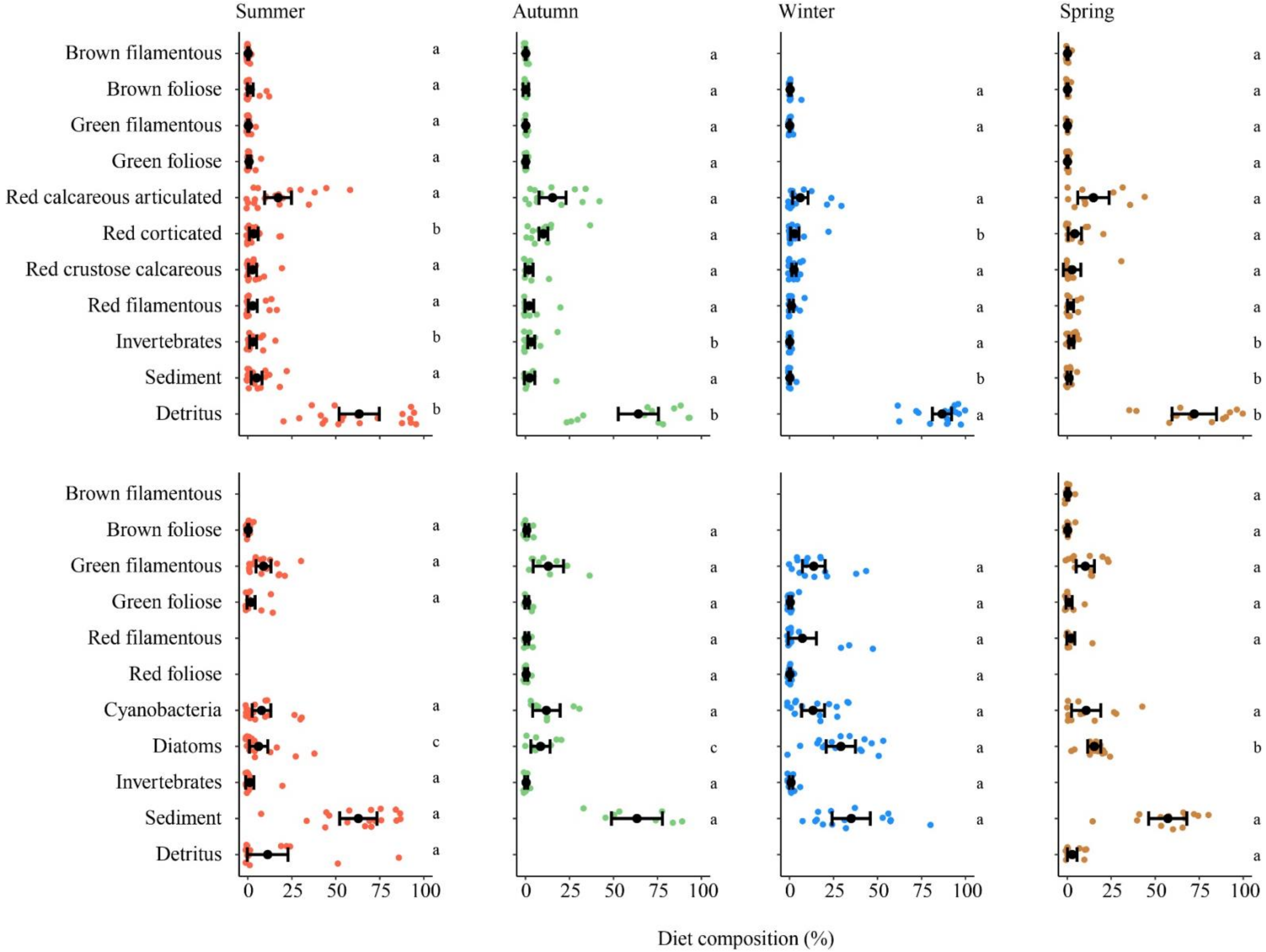

Figure S3: Comparison of *Sparisoma axillare* diet among the four seasons: summer, autumn, winter, and spring – colours correspond to each season. Results from macro- (upper panel), and micro-analysis (lower panel). For each item, different lower-case letters indicate significant differences (PERMANOVA: α > 0.05) among seasons, with a > b > c. Mean (± 95% C.I.) diet composition values (%) are shown.

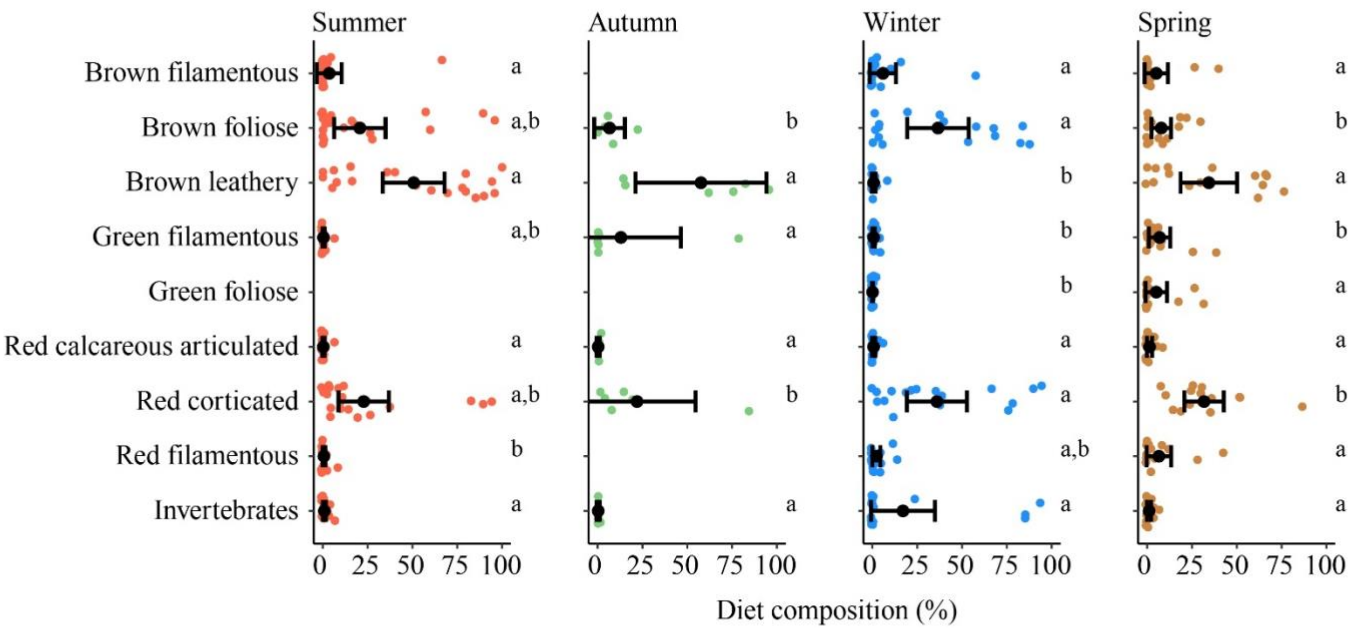

Figure S4: Comparison of *Kyphosus vaigiensis* diet among the four seasons: summer, autumn, winter, and spring – colours correspond to each season. For each item, different lower-case letters indicate significant differences (PERMANOVA: α > 0.05) among seasons, with a > b > c. Mean (± 95% C.I.) diet composition values (%) are shown.

Table S1: Permutational analysis of variance (PERMANOVA) results testing diet composition among species in both macro- and micro-analysis scales. Significance ($p < 0.001$) is highlighted in bold.

	df	MS	Pseudo-*F*	*P* (perm)
Macro-analysis				
Species	2	39082	105.58	**0.0001**
Seasons	3	2133.9	5.765	**0.0001**
Species x Season	6	15.647	4.227	**0.0001**
Residuals	181	370.16		
Micro-analysis				
Species	1	5699.2	66.355	**0.0001**
Seasons	3	425.68	4.956	**0.0002**
Species x Season	3	255.26	2.972	**0.0023**
Residuals	118	85.891		

Table S2: Pairwise results (Pseudo-*t*) of the permutational analysis of variance (PERMANOVA) testing diet composition among species in both macro- and micro-analysis scales. Significance ($p < 0.001$) is highlighted in bold.

	Summer		Autumn		Winter		Spring	
	Micro-analysis		Micro-analysis		Micro-analysis		Micro-analysis	
	A. chirurgus	*S. axillare*	*A. chirurgus*	*S. axillare*	*A. chirurgus*	*S. axillare*	*A. chirurgus*	*S. axillare*
A. chirurgus		**5.744**		**4.119**		**3.374**		**3.998**
S. axillare	**7.138**		**7.169**		**10.44**		**6.270**	
K. vaigiensis	**4.995**	**5.868**	**4.973**	**4.381**	**2.745**	**7.092**	**3.525**	**6.269**
	Macro-analysis		Macro-analysis		Macro-analysis		Macro-analysis	

Table S3: Pairwise comparisons of diet macro- (below diagonal) and micro-analysis (above diagonal) scales (PERMANOVA pseudo-t values) among each study species. Acronyms represent seasons: SM – summer, AU – autumn, WT – winter, and SP – spring. Bold values denote significative differences: $p < 0.05$. "–" not tested (see methods).

	Acanthurus chirurgus				*Sparisoma axillare*				*Kyphosus vaigiensis*			
	Micro-analysis				Micro-analysis				Micro-analysis			
	SM	AU	WT	SP	SM	AU	WT	SP	SM	AU	WT	SP
SM		**1.799**	0.915	1.338		0.957	**3.207**	1.212		–	–	–
AU	1.721		**2.423**	1.241	0.671		**2.704**	0.914	0.755		–	–
WT	**2.099**	**3.280**		**1.834**	**3.250**	**2.954**		**2.350**	**2.892**	**2.460**		–
SP	**1.601**	**2.384**	**1.636**		0.934	0.842	**2.213**		1.316	1.222	**2.511**	
	Macro-analysis				Macro-analysis				Macro-analysis			

Table S4: Seasonal diet overlap (Shoener' Index) between each pair of seasons within species (A), and between each pair of species within seasons (B).

A)	***A. chirurgus***			***S. axillare***			***K. vaigiensis***		
	Summer	Autumn	Winter	Summer	Autumn	Winter	Summer	Autumn	Winter
Autumn	0.790			0.903			0.842		
Winter	0.721	0.715		0.780	0.768		0.419	0.307	
Spring	0.754	0.740	0.773	0.900	0.912	0.854	0.682	0.707	0.522

B)	**Summer**		**Autumn**		**Winter**		**Spring**	
	A. chirurgus	*S. axillare*	*A. chirurgus*	*S. axillare*	*A. chirurgus*	*S. axillare*	*A. chirurgus*	*S. axillare*
S. axillare	0.396		0.431		0.409		0.386	
K. vaigiensis	0.154	0.048	0.162	0.081	0.311	0.035	0.318	0.066

Table S5: Seasonal pairwise comparisons of stable isotopes signatures of carbon ($\delta^{13}C$ – above diagonal) and nitrogen ($\delta^{15}N$ – below diagonal) for the three studied fish species (PERMANOVA pseudo-t). Acronyms represent seasons: SM – Summer, AU – Autumn, WT – Winter, and SP – Spring. Bold values denote significative differences: $p < 0.05$. "–" not tested (see Methods).

	Acanthurus chirurgus				*Sparisoma axillare*				*Kyphosus vaigiensis*			
	$\delta^{13}C$				$\delta^{13}C$				$\delta^{13}C$			
	SM	AU	WT	SP	SM	AU	WT	SP	SM	AU	WT	SP
SM		0.458	1.552	**2.389**		0.387	0.538	1.163		**2.608**	0.452	0.026
AU	0.173		1.615	**2.269**	0.753		0.989	1.434	**3.656**		2.036	2.011
WT	0.087	0.123		0.941	1.447	1.734		0.773	0.843	**3.339**		0.345
SP	1.871	1.777	**2.115**		1.777	1.925	0.305		0.197	**5.648**	0.704	
	$\delta^{15}N$				$\delta^{15}N$				$\delta^{15}N$			

Table S6: Seasonal comparisons for stable isotopes signatures of carbon and nitrogen ($\delta^{13}C$ and $\delta^{15}N$, respectively) for algae species (including 'Turf'). Bold values highlight significative differences: $p < 0.05$.

	df	MS	Pseudo-*F*	*P* (perm)
Seasons	4	21.603	0.472	0.6302
Algae species	4	711.60	15.55	**0.0001**
Seasons x Algae species	5	44.304	0.968	0.3614
Residuals	62	45.772		

Table S7: Pairwise tests among seasons within algae species for stable isotopes signatures of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$). Bold values highlight significative differences: $p < 0.05$ between species.

	Den. df	Pseudo-*t*	*P* (perm)
Foliose brown algae			
Dictyota spp.			
Spring vs Autumn	14	1.891	0.077
Spring vs Summer	16	5.676	**0.001**
Autumn vs Summer	20	3.343	**0.003**
Leathery brown algae			
Sargassum spp.			
Autumn vs Summer	6	2.002	0.104
Corticated red algae			
Plocamium brasiliense			
Winter vs Summer	4	1.499	0.290
Gelidium pusilum			
Spring vs Autumn	6	11.26	**0.035**
Turf			
Spring vs Autumn	10	1.437	0.180
Spring vs Winter	12	1.937	0.067
Spring vs Summer	10	2.011	0.055
Autumn vs Winter	12	0.721	0.507
Autumn vs Summer	10	1.476	0.161
Winter vs Summer	12	1.436	0.177

Table S8: Dietary items found in the gut content of the three species of nominally herbivorous fishes: *Acanthurus chirurgus* (*Aca chi*; n = 51), *Kyphosus vaigiensis* (*Kyp vai*; n = 31) and *Sparisoma axillare* (*Spa axi*; n = 32); n.i. refers to "not identified".

Food items	**Group**	**Species**		
		Aca chi	*Kyp vai*	*Spa axi*
Ochrophyta				
Brown filamentous n.i.	Brown filamentous	X	X	X
Fucoid	Brown filamentous		X	
Sphacelaria sp.	Brown filamentous		X	
Brown foliose n.i.	Brown foliose	X		X
Colpomenia sp.	Brown foliose	X		
Dictyopteris justii	Brown foliose		X	
Dictyopteris plagiograma	Brown foliose		X	
Dictyopteris sp.	Brown foliose	X	X	
Dictyota mertensii	Brown foliose		X	
Dictyota sp.	Brown foliose	X	X	X
Padina sp.	Brown leathery	X	X	
Sargassum sp.	Brown leathery	X	X	
Chrlorophyta				
Green filamentous n.i.	Green filamentous	X		X
Bryopsis sp.	Green filamentous	X	X	X
Cladophora sp.	Green filamentous	X	X	
Rhizoclonium sp.	Green filamentous	X		
Enteromorpha flexuosa	Green filamentous	X		
Green foliose	Green foliose	X		X
Ulva sp.	Green foliose	X		
Ulva lactuca	Green foliose	X	X	X
Rhodophyta				
Red corticated n.i.	Red corticated	X	X	X
Gelidiella sp.	Red corticated	X	X	X
Gelidiopsis sp.	Red corticated	X	X	X
Gelidium pusillum	Red corticated	X	X	X
Hypnea spinella	Red corticated	X	X	X
Plocamium brasiliense	Red corticated	X	X	
Red filamentous n.i.	Red filamentous	X		X
Ceramium sp.	Red filamentous	X	X	X

Food items	**Group**	**Species**		
Herposiphonia sp.	Red filamentous	X	X	X
Polysiphonia sp.	Red filamentous	X		X
Amphiroa beauvoisii	Red calcareous articulated	X	X	X
Corallina sp.	Red calcareous articulated	X	X	X
Jania capillacea	Red calcareous articulated	X		X
Tricleocarpa cilindrica	Red calcareous articulated	X		
Calcareous detritus	Red crustose calcareous	X		X
Invertebrates				
Amphipoda	Amphipoda	X	X	
Animal matter n.i.	Animal matter	X		
Arthropoda	Arthropoda	X		
Ascidiacea	Ascidiacea	X		
Barnacle	Arthropoda	X		
Bivalvia	Mollusca	X		X
Brachyura	Arthropoda	X		
Bryozoa	Bryozoa	X		X
Copepoda	Copepoda	X	X	X
Crustacea	Arthropoda	X		X
Didemnum sp.	Ascidiacea	X		
Foraminifera	Foraminifera	X		X
Hydrozoa	Hydrozoa	X	X	X
Mollusca	Mollusca	X	X	
Nematoda	Nematoda		X	X
Polychaeta	Polychaeta		X	
Polyp	Cnidaria		X	
Sea-urchin	Echinodermata	X		X
Shell	Mollusca	X	X	X
Tubicola	Polychaeta	X		
Unidentified egg	Animal matter	X		
Sponge Spicule	Sediment	X		X
Detritus		X		X
Sediment		X		X