SUPPLEMENTARY INFORMATION

TABLES.

Table S2.1. The speed of gait transition for each individual before and after the loss of sensory feedback.

	Individual	Control	Transection	
	2	5.5	4	
	3	4.5	3	
	4	5	4	
	5	5	3	
	6	4	3	
		4.8 ± 0.57	3.4 ± 0.55	
	t-test *p-value*	0.00417822		

Table S2.2. Summary of leading edge pectoral fin ray kinematics before and the loss of sensory feedback.

CONTROL											
	LE Angle			LE Ang. Vel.			LE Ang. Acc.			LE curvature	
	MIN	MAX		MIN	MAX		MIN	MAX		MIN	MAX
AVG.	42.7668	98.9118		-0.807	0.82471		-0.032	0.02517		0.00992	0.02759
STDEV	4.588	8.0377		0.3412	0.30185		0.0244	0.0162		0.00354	0.0049
TRANSECTION											
AVG.	36.0610	103.923		-1.0895	1.1667		-0.046	0.03633		0.0069	0.0245
STDEV	9.118	15.554		0.30952	0.26377		0.0231	0.01265		0.00246	0.0052

LE = Leading edge; Ang. Vel. = Angular velocity; Ang. Acc. = Angular acceleration

Table S2.3. Summary of muscle activity variables.

		Control trials across three speeds						
Muscle	Speed	ONSET %F	OFFSET %F	DUR %F	PEAK %F	RIA	Onset CV	Dur. CV
ARV	1	-11.75 ± 7.36	14.37 ± 9.08	26.13 ± 9.55	0.56 ± 5.50	46.21 ± 37.36	63.63 ± 24.50	27.11 ± 21.80
	2	-15.18 ± 7.97	21.04 ± 11.35	36.22 ± 14.07	2.66 ± 7.57	55.35 ± 38.70	41.40 ± 25.50	19.34 ± 5.55
	3	-17.30 ± 6.11	30.58 ± 7.58	47.89 ± 12.99	3.52 ± 5.41	93.27 ± 60.12	10.95 ± 8.40	7.36 ± 3.93
ABP	1	-9.22 ± 4.60	16.44 ± 8.83	25.66 ± 10.43	1.67 ± 5.11	26.56 ± 14.00	51.50 ± 22.96	27.80 ± 20.42
	2	-11.48 ± 5.69	22.43 ± 11.59	33.91 ± 12.21	3.97 ± 10.61	49.62 ± 35.43	48.48 ± 28.53	28.93 ± 20.16
	3	-15.42 ± 5.43	33.87 ± 15.70	49.29 ± 13.76	9.24 ± 16.10	61.14 ± 29.43	13.66 ± 6.42	8.80 ± 5.16
ABS	1	-4.75 ± 7.95	21.47 ± 12.75	26.22 ± 14.39	4.37 ± 7.57	33.96 ± 22.94	200.04 ± 180. 00	52.40 ± 21.82
	2	-7.63 ± 4.56	26.93 ± 10.46	34.56 ± 11.63	1.55 ± 6.68	42.82 ± 27.64	104.83 ± 140.44	22.56 ± 23.19
	3	-14.74 ± 5.36	33.00 ± 8.98	47.74 ± 10.30	3.28 ± 5.78	58.80 ± 26.63	12.89 ± 7.77	9.67 ± 3.78
ARD	1	37.91 ± 7.93	66.67 ± 8.65	28.75 ± 12.37	51.60 ± 7.79	58.17 ± 30.30	15.27 ± 12.14	31.27 ± 17.22
	2	35.04 ± 7.86	70.79 ± 11.13	35.76 ± 11.04	52.81 ± 6.73	83.47 ± 55.36	15.21 ± 12.44	14.85 ± 9.64
	3	30.47 ± 4.36	77.00 ± 6.03	46.54 ± 6.88	52.70 ± 5.79	105.62 ± 43.3	10.36 ± 6.31	7.71 ± 2.91
ADP	1	40.43 ± 7.38	66.71 ± 8.60	26.28 ± 8.86	54.38 ± 7.95	26.83 ± 17.21	9.48 ± 4.77	23.99 ± 20.06
	2	36.69 ± 6.91	67.53 ± 4.84	30.84 ± 8.33	52.78 ± 5.69	38.44 ± 20.66	12.00 ± 9.43	18.23 ± 16.72
	3	32.74 ± 3.93	73.13 ± 4.538	40.39 ± 5.12	51.52 ± 7.11	54.80 ± 17.38	9.32 ± 6.62	7.89 ± 3.49
ADS	1	42.29 ± 6.71	68.67 ± 5.04	26.38 ± 6.02	54.89 ± 6.31	49.68 ± 19.79	9.52 ± 3.03	16.50 ± 8.94
	2	40.44 ± 12.07	71.23 ± 7.08	30.79 ± 7.31	56.22 ± 9.65	54.08 ± 23.29	21.46 ± 18.47	17.69 ± 10.48
	3	34.51 ± 4.60	72.79 ± 6.43	38.28 ± 6.42	51.51 ± 7.82	70.40 ± 21.95	8.91 ± 6.12	9.31 ± 3.23
		Transection trials and *p*-values						
ARV	T - 2	-20.31 ± 9.09	40.98 ± 12.72	61.29 ± 16.65	-2.33 ± 7.15	118.6 ± 113.2	28.01 ± 9.71	20.10 ± 9.41
	p	0.02004	1.1×10^{-08}	1.8×10^{-08}	0.0087	0.005	0.257	0.352
ABP	T – 2	-15.10 ±	47.73 ±	57.82 ±	4.51 ±	119.4 ±	42.93 ±	25.24 ±

		6.69	14.34	14.88	12.36	110.1	29.38	17.01
	p	0.0239	$5.7x10^{-08}$	$2.4x10^{-09}$	0.853	0.0015	0.747	0.490
ABS	T – 2	-12.71 ± 8.62	49.69 ± 13.84	62.40 ± 14.78	10.62 ± 19.35	88.33 ± 64.70	135.19 ± 238.079	22.07 ± 16.12
	p	0.005	$5.5x10^{-10}$	$1.2x10^{-11}$	0.0177	0.0007	0.793	0.835
ARD	T – 2	32.74 ± 7.69	87.37 ± 13.03	54.64 ± 13.88	50.64 ± 8.68	151.96 ± 86.1	19.65 ± 6.45	23.54 ± 7.32
	p	0.242	$9.8x10^{-07}$	$1.3x10^{-07}$	0.273	0.0004	0.456	0.108
ADP	T – 2	33.12 ± 9.23	84.46 ± 13.22	51.34 ± 16.59	51.56 ± 13.68	98.48 ± 129.9	22.77 ± 9.61	28.61 ± 16.45
	p	0.088	$9.5x10^{-09}$	$7.0x10^{-08}$	0.652	0.015	0.078	0.028
ADS	T - 2	32.30 ± 10.55	82.80 ± 12.92	50.50 ± 13.92	54.31 ± 12.74	110.88 ± 88.9	20.91 ± 16.17	25.62 ± 8.89
	p	0.005	$5.0x10^{-05}$	$2.7x10^{-09}$	0.505	0.0012	0.957	0.142

Table S2.4. Linear regression results for different EMG variables by speed.

Variable	Muscle	r^2	Slope	F-value	*p*-value
Onset (s)	ARV	0.0052	-0.0014	0.4331	0.5123
	ABP	0.0446	-0.0028	3.8785	0.0522
	ABS	0.1914	-0.0076	19.643	<0.0001
	ARD	0.3199	-0.0177	39.037	<0.0001
	ADP	0.3728	-0.0186	49.336	<0.0001
	ADS	0.2339	0.23387	25.336	<0.0001
Offset (s)	ARV	0.1257	0.01007	11.9370	0.0009
	ABP	0.1096	0.01294	10.217	0.002
	ABS	0.0328	0.00507	2.8163	0.0971
	ARD	0.0664	-0.009761	5.9071	0.0172
	ADP	0.1301	-0.012552	12.4143	0.0007
	ADS	0.1394	-0.015813	13.4403	0.0004
Dur. (s)	ARV	0.1056	0.01147	9.7996	0.0024
	ABP	0.1500	0.01573	14.6495	0.0003
	ABS	0.1559	0.01264	15.3321	0.0002
	ARD	0.0697	0.00795	6.3162	0.0146
	ADP	0.0614	0.00602	5.4267	0.0223
	ADS	0.0303	0.00372	2.5968	0.1109
Onset (% F. c.)	ARV	0.0899	-2.77014	8.2010	0.0053
	ABP	0.1871	-3.10278	19.106	<0.0001
	ABS	0.3074	-5.00625	36.8328	<0.0001
	ARD	0.1619	-3.7269	16.0388	0.0001
	ADP	0.2018	-3.84691	20.9924	<0.0001
	ADS	0.1217	-3.90517	11.5044	0.0011
Offset (% F. c.)	ARV	0.3263	8.1148	40.2018	<0.0001
	ABP	0.2480	8.73536	27.3687	<0.0001
	ABS	0.1602	5.767	15.8349	0.0001
	ARD	0.1839	5.1778	18.7058	<0.0001
	ADP	0.1488	3.2243	14.5086	0.0003
	ADS	0.0672	2.059	5.9826	0.0166
Dur. (% F. c.)	ARV	0.3394	10.88499	42.6464	<0.0001
	ABP	0.3811	11.8381	51.1179	<0.0001
	ABS	0.3418	10.7729	43.1008	<0.0001
	ARD	0.3299	8.90474	40.8699	<0.0001
	ADP	0.3602	7.07126	46.7248	<0.0001
	ADS	0.3488	5.9641	44.4483	<0.0001

Peak (%. F. c.)	ARV	0.0356	1.474664	3.0605	0.0839
	ABP	0.0671	3.79203	5.9725	0.0166
	ABS	0.0041	-0.530774	0.3397	0.5616
	ARD	0.0043	0.546339	0.3578	0.5514
	ADP	0.0276	-1.428769	2.3601	0.1283
	ADS	0.0281	-1.710171	2.3985	0.1253
RIA	ARV	0.1447	23.62346	14.0464	0.0003
	ABP	0.1998	17.2493	20.7243	<0.0001
	ABS	0.1336	12.4445	12.798	0.0006
	ARD	0.1592	23.71799	15.7116	0.0002
	ADP	0.2754	14.0005	31.5553	<0.0001
	ADS	0.1304	10.3946	12.4499	0.0007
Activity onset CV	ARV	0.5364	-26.3391	16.1953	0.0013
	ABP	0.3293	-18.9198	6.8744	0.0201
	ABS	0.2824	-90.3316	5.5094	0.0341
	ARD	0.0375	-2.45418	0.5457	0.4723
	ADP	9.4×10^{-5}	-0.08344	0.0013	0.9715
	ADS	0.0004	-0.30705	0.0054	0.9426
Activity dur. CV	ARV	0.3138	-9.87712	6.4018	0.0240
	ABP	0.1759	-9.50052	2.9877	0.1059
	ABS	0.4060	-20.77844	9.5678	0.0079
	ARD	0.4403	-11.78162	11.0124	0.0051
	ADP	0.1742	-8.05465	2.9526	0.1078
	ADS	0.1147	-3.59337	1.8140	0.1994

Table S2.5. Summary statistics for the amount of activity overlap between antagonistic muscles.

		Control					
		Arrector		Profundus		Superficialis	
Speed		In cycle	Transition	In cycle	Transition	In cycle	Transition
1		-23.53 ± 13.43	-21.59 ± 10.23	-24.00 ± 13.34	-24.07 ± 9.37	-20.82 ± 14.71	-26.58 ± 8.70
2		-14.00 ± 14.25	-14.03 ± 15.66	-14.26 ± 14.33	-21.00 ± 6.75	-13.51 ± 17.25	21.13 ± 8.64
3		0.12 ± 8.49	-5.70 ± 10.04	1.13 ± 17.44	-11.46 ± 4.41	-1.51 ± 11.71	-12.47 ± 6.47
		Transection					
		Arrector		Profundus		Superficialis	
Speed		In cycle	Transition	In cycle	Transition	In cycle	Transition
2		8.24 ± 15.18	7.69 ± 13.77	9.61 ± 18.26	-0.45 ± 15.75	17.38 ± 15.31	-4.49 ± 13.33
p		1.034×10^{-07}	1.626×10^{-07}	2.823×10^{-07}	9.499×10^{-09}	2.027×10^{-10}	2.090×10^{-07}

p-values are from the t-test between overlap data from control and transection trials.
In cycle refers to overlap occurring within the fin beat cycle that would occur around the time of peak abduction.
Transition refers to overlap that would occur around the time of peak adduction between consecutive fin strokes.

Table S3.1. Exponential regression results for flexural stiffness by fin ray position per individual

Individual	Fin ray	rate	y-intercept	F-value	*P*-value
G. varius 1	LE	-0.045442	0.870682	396.9	0.03193
	M1	-0.0514672	0.643965	16600	0.00156
	M2	-0.039883	-0.974682	175.7	0.04794
	TE	-0.043390	-1.882728	432.8	0.03058
G. varius 2	LE	-0.060604	1.033618	167.1	0.04914
	M1	-0.044211	-0.085760	341.3	0.03443
	M2	-0.032878	-1.530729	768.4	0.02296
	TE	-0.022970	-3.867003	165.7	0.04935
G. varius 3	LE	-0.066482	1.611075	201.5	0.04478
	M1	-0.065613	1.354578	211.8	0.04368
	M2	-0.102649	0.803323	400.0	0.03181
	TE	-0.050679	-1.465586	3964	0.01011
G. varius 4	LE	-0.053479	1.061512	1581	0.01601
	M1	-0.049265	0.146139	211.7	0.04369
	M2	-0.0426729	-0.994213	13870	0.00541
	TE	-0.0101537	-2.793375	222.6	0.04261
G. varius 5	LE	-0.05073	0.33211	23.42	0.1297
	M1	-0.062527	0.206581	275.0	0.03835
	M2	-0.034264	-0.518556	486.7	0.02884
	TE	-0.10567	-0.22733	20.03	0.1399
G. varius 6	LE	-0.053265	0.268485	111.2	0.06019
	M1	-0.0476789	-0.310265	2734	0.01217
	M2	-0.041051	-1.333287	573.1	0.02658
	TE	-0.043153	-3.261613	276.4	0.03825
G. varius 7	LE	-0.048092	-0.360463	266.4	0.03896
	M1	-0.037995	-1.317742	407.3	0.03152
	M2	-0.032931	-1.702513	358.5	0.03359
	TE	-0.035807	-4.071944	138.9	0.05388
H. bivittatus 1	LE	-0.035448	-1.694814	315.3	0.03581
	M1	-0.038302	-2.547252	57.97	0.08314
	M2	-0.034227	-3.249776	57.67	0.08335
	TE	-0.02467	-4.597415	276.9	0.03821
H. bivittatus 2	LE	-0.0215082	-3.106869	859.5	0.02171
	M1	-0.025971	-4.023381	201.8	0.04474
	M2	-0.02811	-4.36824	6.963	0.2306
	TE	-0.041080	-4.312195	212.4	0.04361
H. bivittatus 3	LE	-0.040263	-1.715560	401.8	0.03173
	M1	-0.039437	-2.877594	336.7	0.03466
	M2	-0.032808	-3.139755	68.32	0.07665
	TE	-0.04206	-4.41016	167.5	0.04909
H. bivittatus 4	LE	-0.028554	-1.750345	42.77	0.09659
	M1	-0.026736	-2.641608	807.2	0.0224
	M2	-0.006243	-4.333	42150	0.00099
	TE	-0.025179	-3.626061	192.9	0.04575

H. bivittatus 5	LE	-0.027991	-1.635846	243.8	0.04072
	M1	-0.018791	-2.391191	324.6	0.0353
	M2	-0.026014	-2.764832	177.5	0.04769
	TE	-0.0082143	-5.392597	84.20	0.0691
H. bivittatus 6	LE	-0.05265	-0.87963	37.3	0.1033
	M1	-0.041233	-1.938832	348.5	0.03407
	M2	-0.0186658	-3.889812	972.2	0.02041
	TE	-0.0107425	-5.592737	571.3	0.02662
H. bivittatus 7	LE	-0.036120	-0.788057	605.6	0.02586
	M1	-0.046704	-0.821175	3019	0.01158
	M2	-0.053770	-0.698855	216.4	0.04321
	TE	-0.01883	-3.90073	1091	0.01926
H. bivittatus 8	LE	-0.020005	-0.360266	1002	0.02011
	M1	-0.027700	-0.419597	150.6	0.05177
	M2	-0.042796	-0.754719	161.5	0.04999
	TE	-0.037295	-2.909709	1054	0.01961

All P-values were significant to a level of 0.05.

Table S3.2. Exponential regression results for flexural stiffness by fin ray position using pooled individual data.

Species	Fin ray	rate	y-intercept	F-value	r^2	*p*-value	t-test p-values Intercept	t-test p-values Slope
G. varius	LE	-0.054013	0.688145	163.9	0.8906	<0.0001	<0.0001*	0.0105*
H. bivittatus	LE	-0.032817	-1.491423	24.09	0.501	<0.0001		
G. varius	M1	-0.047213	-0.012520	126.5	0.8625	<0.0001	0.000169*	0.13784
H. bivittatus	M1	-0.03311	-2.20758	15.84	0.3921	0.0006		
G. varius	M2	-0.050656	-0.789360	60.44	0.7482	<0.0001	0.00054*	0.04616
H. bivittatus	M2	-0.030329	-2.899930	16.64	0.4048	0.0005		
G. varius	TE	-0.04455	-2.50994	19.57	0.4814	0.0003	0.00852*	0.11920
H. bivittatus	TE	-0.026009	-4.342700	19.73	0.4488	0.0002		

*Significant at the alpha=0.05 with a bonferonni correction: p=0.0125

Table S3.3. *p*-values for y-intercept and slope t-tests for all possible ray comparisons within each species.

		t-test *p*-values	
Species	**Fin rays**	**Intercept**	**Slope**
G. varius	LE, M1	0.04549844	0.26039751
G. varius	LE, M2	0.00186845	0.6678265
G. varius	LE, TE	<0.0001	0.3913602
G. varius	M1, M2	0.08635674	0.65945345
G. varius	M1, TE	0.00026528	0.80820614
G. varius	M2, TE	0.01606239	0.61344427
H. bivittatus	LE, M1	0.2448897	0.9782997
H. bivittatus	LE, M2	0.01726931	0.80462123
H. bivittatus	LE, TE	<0.0001	0.4477198
H. bivittatus	M1, M2	0.2816453	0.8043744
H. bivittatus	M1, TE	0.0006208	0.48889586
H. bivittatus	M2, TE	0.01036972	0.65026443

Table S3.4. Linear regression results for leading edge fin ray stiffness at 50% fin ray length by body mass and for fin ray stiffness at 50% fin ray length by fin ray length.

Regression	**Species**	**slope**	**y-intercept**	**F-value**	r^2	***p*-value**
LES x mass	*G. varius*	0.00450	0.05767	77.450	0.9394	0.0003
	H. bivittatus	0.00388	-0.01782	93.078	0.9394	<0.0001
FRS x ray length	*G. varius*	0.01042	-0.077185	147.08	0.8498	<0.0001
	H. bivittatus	0.00960	-0.099248	51.131	0.6302	<0.0001

*Significant at the alpha=0.05 with a bonferonni correction: p=0.025
LES = leading edge stiffness at 50% fin ray length
FRS = fin ray stiffness at 50% fin ray length

Table S4.1. Summary of second moment of area data per species

	Fin ray:		LE			M1			M2			TE	
Species	Fin position:	16.65	50.00	83.34	16.65	50.00	83.34	16.65	50.00	83.34	16.65	50.00	83.34
GV		1.32E-14 ± 2.26E-15	2.14E-15 ± 7.27E-16	7.05E-17 ± 2.83E-17	4.60E-15 ± 3.25E-15	1.02E-15 ± 1.01E-15	5.55E-17 ± 2.28E-17	1.34E-15 ± 1.62E-15	2.30E-16 ± 2.82E-16	1.73E-17 ± 1.10E-17	1.44E-16 ± 8.02E-17	4.44E-17 ± 1.67E-17	1.31E-17 ± 1.41E-17
HB		1.71E-15 ± 6.01E-16	5.25E-16 ± 4.15E-16	4.54E-17 ± 3.14E-17	6.53E-16 ± 5.40E-16	1.95E-16 ± 1.00E-16	2.91E-17 ± 2.13E-17	5.11E-16 ± 5.90E-16	1.16E-16 ± 5.87E-17	1.15E-17 ± 1.18E-17	2.77E-17 ± 1.02E-17	9.80E-18 ± 2.09E-18	2.21E-18 ± 1.54E-18
	p-value	<0.0001	0.0012	0.2013	0.0159	0.0749	0.0786	0.269	0.359	0.428	0.0067	0.0008	0.0879

Bonferroni corrected alpha = 0.0167

Highlighted p-values are significant after Bonferroni correction.

Table S4.2. Material property summary data and statistics for *G. varius* and *H. bivittatus*.

	Fin ray:		LE			M1			M2			TE	
Species	Fin location:	16.65	50.00	83.34	16.65	50.00	83.34	16.65	50.00	83.34	16.65	50.00	83.34
GV		0.08059 ± 0.018126	0.093289 ± 0.035363	0.420847 ± 0.216191	0.221713 ± 0.201351	0.235906 ± 0.213846	0.486344 ± 0.253044	0.385301 ± 0.289985	0.403586 ± 0.263249	0.588141 ± 0.430729	0.393568 ± 0.120185	0.431156 ± 0.211381	0.680971 ± 0.232086
One-way anova	p-value	0.0016*			0.1522			0.5869			0.1291		
	F-ratio	11.5502			2.2114			0.5572			2.5917		
TK-HSD	83-16	0.003*			0.1898			0.6181			0.146		
	83-50	0.004*			0.2212			0.6696			0.2174		
	50-16	0.9863			0.9945			0.9959			0.9597		
HB		0.064875 ± 0.02739	0.164042 ± 0.205345	0.426304 ± 0.27307	0.092356 ± 0.028248	0.099142 ± 0.076942	0.317049 ± 0.208616	0.076816 ± 0.032577	0.125062 ± 0.047899	0.609915 ± 0.313991	0.324676 ± 0.148731	0.453569 ± 0.355951	0.820682 ± 0.230621
One-way anova	p-value	0.0177*			0.0132*			0.0002*			0.0129*		
	F-ratio	5.3432			5.853			15.3494			5.9019		
TK-HSD	83-16	0.0167*			0.0227*			0.0004*			0.0124*		
	83-50	0.0874			0.0271*			0.001*			0.0658		
	50-16	0.6679			0.9955			0.8937			0.6725		
Inter-specific t-test	p-value	0.3024	0.4698	0.972	0.1503	0.1757	0.254	0.0281	0.0303	0.9248	0.4638	0.9135	0.3765

*significant difference ($p<0.05$)
Shaded rows contain the average and standard deviation of E.

Table S4.3. Segmentation summary data for *G. varius* and *H. bivittatus*.

	Individual	Fin ray:	LE	M1	M2	TE
% unsegmented	GV01		23.81322957	17.31197152	28.77984085	18.66527633
	GV02		35.07596068	16.65682221	15.82852432	9.047619048
	GV03		32.32689211	21.32132132	14.74617244	25.13904338
	GV04		60.83969466	25.74879227	27.20257235	22.07527976
	AVG		38.01394425	20.25972683	21.63927749	18.73180463
	STDEV		15.95461781	4.200277981	7.376034263	6.976613571
	***p*-value**		**0.993898058**	**0.018373969**	**0.209943813**	**0.060611296**
	HB03		36.62321539	25.77319588	25.49800797	26.82154171
	HB05		37.0508982	28.05084746	21.43569292	27.25968436
	HB09		40.80779944	37.64921947	36.71497585	34.95670996
	HB11		37.31764706	36.87299893	30.72983355	24.37858509
	AVG		37.94989002	32.08656543	28.59462757	28.35413028
	STDEV		1.926623063	6.055265485	6.616609377	4.580598853
# seg/TFL	GV01		7.392996109	10.68090788	11.27320955	18.76955162
	GV02		5.361930295	11.22268163	15.66364386	20.23809524
	GV03		5.233494364	11.01101101	15.31023368	18.90989989
	GV04		2.290076336	8.212560386	10.28938907	15.25940997
	AVG		5.069624276	10.28179023	13.13411904	18.29423918
	STDEV		2.100495151	1.397384058	2.750117785	2.128671317
	***p*-value**		**0.30759022**	**0.877582061**	**0.682292382**	**0.246882245**
	HB03		6.207324643	12.51840943	14.34262948	16.89545935
	HB05		6.736526946	10.16949153	14.9551346	18.65136298
	HB09		5.571030641	9.182736455	9.661835749	14.06926407
	HB11		6.588235294	8.537886873	10.24327785	16.25239006
	AVG		6.275779381	10.10213107	12.30071942	16.46711911
	STDEV		0.520023671	1.745000944	2.733257487	1.892988292
ASL (%TL)	GV01		4.010±0.159	3.445±0.119	4.189±0.091	4.519±0.321
	GV02		5.410±0.092	4.386±0.101	4.430±0.167	5.350±0.437
	GV03		5.206±0.095	3.576±0.188	4.487±0.317	4.404±0.139
	GV04		6.527±0.285	4.368±0.207	4.550±0.293	5.195±0.244
	avg±stdev		5.288±1.031	3.944±0.503	4.414±0.158	4.866±0.475
	***p*-value**		**0.265994455**	**0.106047264**	**0.285517324**	**0.916874618**
	HB03		6.338±0.159	4.366±0.188	4.139±0.213	4.574±0.283
	HB05		6.994±0.265	5.996±0.211	5.238±0.246	5.595±0.420
	HB09		7.399±0.268	6.235±0.291	6.329±0.375	5.003±0.228
	HB11		4.477±0.151	3.945±0.220	4.329±0.304	4.448±0.383
	avg±stdev		6.302±1.292	5.136±1.148	5.009±1.002	4.905±0.518

# of seg / TFL = the size corrected number of segments (number of segments / total fin ray length); ASL = average segment length.

Table S4.4. Summary of fin ray branching variables and statistics for *G. varius* and *H. bivittatus*.

	Fin ray:	M1		M2		TE	
	Individual	Branch nodes per TL	BI	Branch nodes per TL	BI	Branch nodes per TL	BI
G.v	1	3.387	2.223	1.957	2.228	2.257	1.867
	2	0.903	2.432	1.559	2.550	0.898	1.899
	3	2.905	2.304	2.164	2.129	3.928	2.006
	4	3.463	2.342	5.371	2.276	4.899	2.229
	5	2.687	1.871	4.551	1.997	3.697	1.818
	Average ± Stdev	2.667 ± 1.038	2.234 ± 0.216	3.120 ± 1.719	2.236 ± 0.205	3.05 ± 1.460	1.964 ± 0.163
T-test	p-value	0.012	0.003	0.039	0.007	0.040	0.001
H.b	1	0.792	1.409	0.939	1.401	1.435	1.409
	2	0.920	1.775	1.517	1.919	1.635	1.542
	3	1.505	1.773	1.147	1.811	1.646	1.565
	4	1.430	1.864	1.647	1.895	1.519	1.626
	5	0.494	1.331	0.561	1.304	0.773	1.394
	Average ± Stdev	1.028 ± 0.431	1.630 ± 0.242	1.277 ± 0.504	1.665 ± 0.291	1.402 ± 0.362	1.507 ± 0.102

BI = branching index; Branch nodes per TL = number of branch nodes divided by fin ray total length.
G. v = *Gomphosus varius*; *H. b* = *Halichoeres bivittatus*.

Table S4.5. Summary of fin ray branching variables and statistics for *G. varius* and *H. bivittatus*.

	Fin ray:	M1			M2			TE		
	Individual	1°	2°	3°	1°	2°	3°	1°	2°	3°
G.v	1	57.199	91.087	95.543	39.645	66.174	X	45.803	64.922	X
	2	50.461	66.025	82.975	39.182	64.971	83.401	40.953	64.372	X
	3	51.012	71.781	88.795	43.443	70.326	X	51.564	73.437	X
	4	40.748	67.415	95.189	45.388	71.406	X	36.834	68.531	X
	5	49.263	81.023	X	66.092	X	X	44.769	71.111	X
	Average ± Stdev	49.737 ± 5.892	75.466 ± 10.517	90.626 ± 5.969	46.750 ± 11.120	68.219 ± 3.126	X	43.985 ± 5.516	68.475 ± 3.906	X
T-test	p-value	0.221	0.645	X	0.081	**0.006**	X	**0.031**	**0.0005**	X
H.b	1	58.636	X	X	59.852	X	X	53.795	X	X
	2	45.790	74.098	X	52.718	75.949	X	57.676	85.621	X
	3	52.311	84.238	X	55.983	80.355	X	55.592	84.740	X
	4	54.218	77.723	X	53.845	77.254	X	43.080	91.098	X
	5	66.411	X	X	69.213	X	X	60.477	X	X
	Average ± Stdev	55.473 ± 7.665	78.686 ± 5.138	X	58.322 ± 6.669	77.853 ± 2.263	X	54.124 ± 6.656	87.153 ± 3.445	X

X denotes a nonexistent branch.
Significant p-values are **bolded**.
G. v = *Gomphosus varius*; *H. b* = *Halichoeres bivittatus*.

Table S4.6. Bivariate linear regression results for fin stiffness vs morphology variables.

Variable	Fin position	Species	Slope	y-intercept	r^2	*F*-ratio	*p*-value
I	16.65	*G. varius*	77216731	$1.5062 \cdot 10^{-7}$	0.84792	94.783	<0.0001
		H. bivittatus	78084530	$3.1228 \cdot 10^{-9}$	0.79676	86.247	<0.0001
	50.00	*G. varius*	59527892	$4.3441 \cdot 10^{-8}$	0.70494	40.616	<0.0001
		H. bivittatus	62424199	$6.8106 \cdot 10^{-9}$	0.79974	87.855	<0.0001
	83.34	*G. varius*	354480553	$3.6654 \cdot 10^{-9}$	0.67988	36.105	<0.0001
		H. bivittatus	214772172	$1.9374 \cdot 10^{-9}$	0.73518	61.074	<0.0001
E	16.65	*G. varius*	$-1.2167 \cdot 10^{-6}$	$8.6255 \cdot 10^{-7}$	0.31814	7.9318	0.0119
		H. bivittatus	$-1.3632 \cdot 10^{-7}$	$7.8837 \cdot 10^{-8}$	0.06898	1.6299	0.2150
	50.00	*G. varius*	$-1.7599 \cdot 10^{-7}$	$1.4705 \cdot 10^{-7}$	0.30074	7.3112	0.0151
		H. bivittatus	$-1.7125 \cdot 10^{-8}$	$2.3611 \cdot 10^{-8}$	0.04536	1.0454	0.3177
	83.34	*G. varius*	$2.1466 \cdot 10^{-9}$	$1.6862 \cdot 10^{-8}$	0.00215	0.0365	0.8507
		H. bivittatus	$-8.0387 \cdot 10^{-9}$	$1.1043 \cdot 10^{-8}$	0.15810	4.1313	0.0543
% unsegmented	16.65	*G. varius*	$2.2611 \cdot 10^{-8}$	$5.452 \cdot 10^{-9}$	0.27140	5.2148	0.0385
		H. bivittatus	$7.0628 \cdot 10^{-9}$	$-1.546 \cdot 10^{-7}$	0.29374	5.8227	0.0301
	50.00	*G. varius*	$3.4908 \cdot 10^{-9}$	$8.9115 \cdot 10^{-9}$	0.28222	5.5046	0.0342
		H. bivittatus	$2.3652 \cdot 10^{-9}$	$-5.324 \cdot 10^{-8}$	0.44102	11.046	0.0050
	83.34	*G. varius*	$4.283 \cdot 10^{-10}$	$7.2602 \cdot 10^{-9}$	0.13158	2.1212	0.1673
		H. bivittatus	$8.831 \cdot 10^{-10}$	$-2.081 \cdot 10^{-8}$	0.57906	19.259	0.0006
Segments / total fin ray length	16.65	*G. varius*	$-7.9488 \cdot 10^{-8}$	$1.4927 \cdot 10^{-6}$	0.67513	29.094	<0.0001
		H. bivittatus	$-1.2154 \cdot 10^{-8}$	$2.0679 \cdot 10^{-7}$	0.40801	9.6491	0.0077
	50.00	*G. varius*	$-1.2075 \cdot 10^{-8}$	$2.3622 \cdot 10^{-7}$	0.67974	29.714	<0.0001
		H. bivittatus	$-3.8298 \cdot 10^{-9}$	$6.5066 \cdot 10^{-8}$	0.54241	16.595	0.0011
	83.34	*G. varius*	$-1.6612 \cdot 10^{-9}$	$3.7249 \cdot 10^{-8}$	0.39848	9.2745	0.0001
		H. bivittatus	$-1.26 \cdot 10^{-9}$	$2.145 \cdot 10^{-8}$	0.55293	17.315	0.0010
Avg seg length	16.65	*G. varius*	$1.1581 \cdot 10^{-5}$	$-3.491 \cdot 10^{-7}$	0.67398	28.941	<0.0001
		H. bivittatus	$2.2054 \cdot 10^{-6}$	$-7.945 \cdot 10^{-8}$	0.36162	7.9307	0.0137
	50.00	*G. varius*	$1.7381 \cdot 10^{-6}$	$-4.286 \cdot 10^{-8}$	0.64492	25.428	0.0002
		H. bivittatus	$7.2563 \cdot 10^{-7}$	$-2.721 \cdot 10^{-8}$	0.52411	15.419	0.0015
	83.34	*G. varius*	$2.1989 \cdot 10^{-7}$	$3.81 \cdot 10^{-10}$	0.31973	6.5800	0.0224
		H. bivittatus	$2.375 \cdot 10^{-7}$	$-8.824 \cdot 10^{-9}$	0.52879	15.711	0.0014

I = second moment of area; *E* = Young's modulus; Avg seg L = average segment length.

Table S4.7. Results of multiple regression models.

	16.65 % fin ray length				50.00 % fin ray length				83.34 % fin ray length			
MODEL 1	***G. varius***		***H. bivittatus***		***G. varius***		***H. bivittatus***		***G. varius***		***H. bivittatus***	
r^2	0.942		0.926		0.905		0.887		0.907		0.911	
p-value	<0.0001		<0.0001		<0.0001		0.0002		<0.0001		<0.0001	
	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value
I	0.677	**0.0027**	1.207	**<0.0001**	0.550	**0.0044**	0.644	**0.0004**	5.028	**<0.0001**	2.844	**0.0005**
E	-0.148	0.6583	0.058	0.3759	0.091	0.2068	0.015	0.2849	0.020	**0.0032**	0.0082	**0.0365**
Unsegmented L	-0.225	0.3934	0.002	0.9774	-0.084	0.1562	0.001	0.9502	0.010	0.2646	0.0081	0.2760
Avg. seg. L	-0.196	0.7069	-0.395	**0.0068**	0.192	0.1054	-0.072	0.1125	-0.005	0.7211	-0.001	0.8944
# seg/TFL	-0.684	0.0974	-0.215	0.0776	0.010	0.9068	-0.070	0.0777	0.003	0.8092	-0.003	0.7789

MODEL 2	***G. varius***		***H. bivittatus***		***G. varius***		***H. bivittatus***		***G. varius***		***H. bivittatus***	
r^2	0.942		0.926		0.905		0.887		0.907		0.911	
p-value	<0.0001		<0.0001		<0.0001		0.0002		<0.0001		<0.0001	
	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value
I	4.903	**<0.0001**	1.1495	**<0.0001**	3.1353	**<0.0001**	1.9191	**<0.0001**	6.1074	**<0.0001**	5.7314	**<0.0001**
E	3.106	**<0.0001**	0.8144	**<0.0001**	0.8589	**<0.0001**	0.23941	**<0.0001**	0.0368	**<0.0001**	0.0234	**<0.0001**
Unsegmented L	0.004	0.186	-0.0007	0.1854	-0.0007	0.1334	0.00009	0.424	-0.0001	0.0893	<0.0001	0.9324
Avg. seg. L	-0.002	0.729	-0.0042	**0.0073**	0.0011	0.2293	-0.00002	0.920	<0.0001	0.5509	<0.0001	0.1058
# seg/TFL	-0.002	0.613	-0.0025	**0.0234**	0.0004	0.4385	-0.00001	0.851	-0.0001	0.7561	<0.0001	0.1820
I x *E*	3.038	**<0.0001**	3.0230	**<0.0001**	3.0364	**<0.0001**	3.03657	**<0.0001**	3.0495	**<0.0001**	3.0387	**<0.0001**

Significant p-values are presented in bold.
Model 1 = Standard Least Squares with no added effects
Model 2 = Standard Least Squares with *I* and *E* crossed to account for interaction effects.
I = second moment of area; *E* = Young's modulus; Unsegmented L = Unsegmented length; Avg. seg L = average segment length; # of seg / TFL = the size corrected number of segments (number of segments / total fin ray length).

Table S5.1. The ancestral likelihood of the each character state per node.

	Ancestral likelihood		
NODE	LOW AR	INT. AR	HIGH AR
1	0.470967865	0.291516018	0.237516118
2	0.422339098	0.350851354	0.226809548
3	0.422999451	0.357875276	0.219125273
4	0.420663042	0.371727882	0.207609075
5	0.155390901	0.429839916	0.414769183
6	0.422626893	0.375992739	0.201380369
7	0.420029934	0.379721402	0.200248664
8	0.379444526	0.438784134	0.18177134
9	0.753424253	0.134868441	0.111707306
10	0.988259988	0.005969994	0.005770019
11	0.79078778	0.111601859	0.097610361
12	0.066987073	0.881928015	0.051084912
13	0.04539617	0.914034916	0.040568914
14	0.035405419	0.931591794	0.033002787
15	0.036475632	0.928762637	0.034761731
16	5.76E-06	0.999988503	5.73E-06
17	0.049351551	0.91005143	0.040597019
18	0.047534159	0.912763651	0.03970219
19	0.047945424	0.910093619	0.041960958
20	0.056529995	0.89096486	0.052505145
21	0.811073038	0.150797242	0.038129721
22	0.619029206	0.356324248	0.024646547
23	0.840274494	0.133985418	0.025740088
24	0.834077178	0.132055214	0.033867608
25	0.695042503	0.28309112	0.021866377
26	0.85019265	0.127897303	0.021910047
27	0.872225654	0.107711688	0.020062658
28	0.901466751	0.090693988	0.007839261
29	0.891180166	0.101513562	0.007306272
30	0.962381151	0.035678595	0.001940254
31	0.945347661	0.052734353	0.001917986
32	0.803889257	0.186373959	0.009736783
33	0.800142012	0.18970486	0.010153128
34	0.58100389	0.402833789	0.016162322
35	0.257211312	0.727416811	0.015371876
36	0.987053008	0.011177933	0.001769059
37	0.980043756	0.017071351	0.002884893
38	0.919335429	0.072718263	0.007946307
39	0.998315479	0.001065115	0.000619406
40	0.994691965	0.004010794	0.001297241
41	0.994308683	0.003752619	0.001938697
42	0.493915226	0.2759448	0.230139975
43	0.496360484	0.267531786	0.23610773
44	0.911981161	0.044136868	0.043881971
45	0.957666419	0.021216951	0.02111663
46	0.990849977	0.004575925	0.004574098
47	0.999950552	2.47E-05	2.47E-05
48	0.999999963	1.84E-08	1.84E-08
49	0.96624305	0.016911179	0.01684577
50	0.996398903	0.001800903	0.001800194
51	0.998339915	0.000830145	0.00082994
52	0.984610153	0.007698144	0.007691703
53	0.999638834	0.000180607	0.000180559
54	0.999621033	0.000189504	0.000189463
55	0.999950847	2.46E-05	2.46E-05
56	0.999967019	1.65E-05	1.65E-05
57	0.999957868	2.11E-05	2.11E-05
58	0.491260026	0.264158814	0.244581159
59	0.986815162	0.006621578	0.006563259
60	0.993312366	0.003347026	0.003340608
61	0.996724326	0.001638525	0.00163715
62	0.998227924	0.000886126	0.00088595
63	0.999123281	0.000438366	0.000438353

64	0.993016814	0.003519071	0.003464115
65	0.991359721	0.004325609	0.00431467
66	0.998824713	0.000587792	0.000587495
67	0.999255071	0.000372475	0.000372454
68	0.999175638	0.000412199	0.000412163
69	0.999989304	5.35E-06	5.35E-06
70	0.997966107	0.001191385	0.000842508
71	0.995797332	0.002144408	0.002058259
72	0.997170761	0.002027876	0.000801363
73	0.992184664	0.006113992	0.001701344
74	0.859041399	0.139417421	0.00154118
75	0.605910497	0.15585312	0.238236383
76	0.711592581	0.124998162	0.163409256
77	0.753936308	0.112987845	0.133075848
78	0.844898864	0.125492089	0.029609047
79	0.832389862	0.139191375	0.028418763
80	0.814667728	0.093212903	0.092119369
81	0.839819308	0.080344958	0.079835733
82	0.862779882	0.106768205	0.030451913
83	0.844363495	0.126445748	0.029190757
84	0.545215824	0.401049943	0.053734233
85	0.532846461	0.381441828	0.085711712
86	0.250601381	0.514224209	0.235174409
87	1.67E-15	3.18E-15	1
88	0.082772293	0.166626453	0.750601254
89	0.020325825	0.926933441	0.052740734
90	0.039068861	0.073975741	0.886955398
91	0.007593806	0.009334654	0.98307154
92	0.002855144	0.004462888	0.992681967
93	0.000273788	0.00028473	0.999441482
94	3.54E-05	3.55E-05	0.999929077
95	3.02E-06	3.07E-06	0.999993907
96	1.64E-05	1.64E-05	0.999967267
97	3.90E-05	3.90E-05	0.999921917
98	8.35E-07	8.35E-07	0.999998331
99	2.70E-06	2.71E-06	0.999994591
100	4.37E-05	4.37E-05	0.999912634
101	1.23E-05	1.23E-05	0.999975471
102	4.89E-06	4.89E-06	0.999990216
103	4.82E-06	4.82E-06	0.999990358
104	5.71E-06	5.71E-06	0.999988574
105	0.000168851	0.000236243	0.999594906
106	0.00010761	0.000124107	0.999768284
107	0.000120462	0.000125553	0.999753986
108	0.000226513	0.000228157	0.99954533
109	7.34E-05	7.34E-05	0.999853164
110	0.00017851	0.000178511	0.999642978
111	4.28E-05	4.28E-05	0.999914481
112	9.63E-05	9.63E-05	0.999807482
113	5.82E-05	5.88E-05	0.999882989
114	0.000292588	0.000292604	0.999414808
115	8.16E-06	8.16E-06	0.999983685
116	9.99E-06	1.01E-05	0.99997995
117	1.13E-05	1.13E-05	0.999977459
118	0.000303669	0.000303669	0.999392662
119	3.83E-05	3.83E-05	0.999923489
120	2.13E-05	2.13E-05	0.999957377
121	5.20E-06	5.20E-06	0.9999896
122	4.94E-05	4.94E-05	0.99990126
123	5.81E-05	5.81E-05	0.999883711
124	1.26E-05	1.26E-05	0.999974874
125	2.62E-05	2.62E-05	0.999947611
126	1.78E-05	1.78E-05	0.999964447
127	3.42E-05	3.42E-05	0.999931659
128	1.66E-05	1.66E-05	0.999966785
129	1.20E-05	1.21E-05	0.99997588

130	5.17E-06	5.23E-06	0.999989592
131	3.72E-06	4.90E-06	0.999991384
132	8.83E-06	1.55E-05	0.99997571
133	4.55E-05	0.00099795	0.998956537
134	0.000214184	0.017904713	0.981881103
135	3.35E-06	3.35E-06	0.999993302
136	4.10E-05	4.10E-05	0.999917931
137	2.48E-05	2.48E-05	0.999950394
138	9.69E-06	9.69E-06	0.999980619
139	5.28E-06	5.28E-06	0.999989442
140	2.11E-05	2.11E-05	0.999957796
141	4.14E-05	4.14E-05	0.999917223
142	3.13E-06	3.13E-06	0.999993732
143	2.39E-05	2.39E-05	0.999952177
144	4.98E-06	4.98E-06	0.99999004
145	1.09E-05	1.09E-05	0.999978129
146	4.31E-06	4.31E-06	0.999991376
147	0.565298159	0.247345563	0.187356278
148	0.527054807	0.291336665	0.181608527
149	0.9201116	0.040735679	0.039152721
150	0.996321341	0.001854836	0.001823823
151	0.999999375	3.13E-07	3.12E-07
152	0.463678939	0.407868211	0.128452849
153	0.877193293	0.087549985	0.035256721
154	0.90807916	0.070883514	0.021037327
155	0.90628713	0.073935318	0.019777552
156	0.884426274	0.091691352	0.023882374
157	0.330598052	0.553575944	0.115826004
158	0.069794689	0.782874739	0.147330571
159	0.022174667	0.739320748	0.238504585
160	0.000172775	0.999031977	0.000795248
161	0.002850547	0.289504714	0.707644739
162	0.000412272	0.306912856	0.692674872
163	0.247723845	0.682878571	0.069397584
164	0.989183031	0.007081194	0.003735775
165	0.012250008	0.983682532	0.004067459
166	0.002943346	0.994942599	0.002114056
167	0.002943525	0.994792261	0.002264214
168	0.009529123	0.987384931	0.003085945
169	0.030917827	0.963023166	0.006059006
170	0.073378105	0.917457883	0.009164012
171	0.001551481	0.995697531	0.002750988
172	0.001007146	0.995426584	0.00356627
173	0.007066789	0.947898415	0.045034796
174	0.001441471	0.996336407	0.002222122
175	0.640849563	0.191932954	0.167217484
176	0.614866644	0.204774054	0.180359302
177	0.441696434	0.303602656	0.25470091
178	0.457880117	0.378043409	0.164076474
179	0.389889259	0.294267422	0.315843318
180	0.337322887	0.357705268	0.304971845
181	0.440762311	0.145052971	0.414184718
182	0.371812727	0.281334169	0.346853105
183	0.471483073	0.421767371	0.106749556
184	0.097290878	0.018418256	0.884290866
185	0.101695458	0.013310311	0.884994231
186	0.014522525	0.002872668	0.982604806
187	0.734965206	0.13144547	0.133589323
188	0.901037246	0.051539912	0.047422842
189	0.899573001	0.051445746	0.048981254
190	0.970533639	0.021501585	0.007964777
191	0.998561948	0.000809622	0.00062843
192	0.99909253	0.000496255	0.000411215
193	0.999805701	9.77E-05	9.66E-05
194	0.963568801	0.033141497	0.003289702
195	0.939538114	0.057578897	0.002882989

196	0.942734577	0.055118417	0.002147005
197	0.900304891	0.096112161	0.003582948
198	0.547856973	0.448194577	0.00394845
199	0.543426815	0.455624813	0.000948372
200	0.726930076	0.124601127	0.148468798
201	0.0712035	0.066662237	0.862134262
202	0.022130545	0.057310619	0.920558835
203	0.009508466	0.164030347	0.826461187
204	0.00022231	0.000358961	0.99941873
205	1.53E-05	1.95E-05	0.999965142
206	0.756494774	0.123362742	0.120142484
207	0.870348333	0.034037551	0.095614116
208	0.879180426	0.035245631	0.085573943
209	0.82022199	0.025485381	0.154292629
210	0.684915734	0.018579447	0.296504819
211	0.683502042	0.009093836	0.307404121
212	0.651977112	0.008973501	0.339049386
213	0.707553297	0.005111846	0.287334858
214	0.700138192	0.005784196	0.294077612
215	0.001797422	0.000229963	0.997972615
216	0.447201187	0.038330338	0.514468475
217	0.175857095	0.207206249	0.616936656
218	0.749985167	0.13253682	0.117478013
219	0.695264691	0.15383156	0.15090375
220	0.716648422	0.177034368	0.10631721
221	0.99969048	0.000161569	0.000147951
222	0.700255871	0.19825422	0.101489909
223	0.711565118	0.212873475	0.075561407
224	0.830698526	0.137255746	0.032045728
225	0.83332267	0.140380815	0.026296515
226	0.934535359	0.05076908	0.014695561
227	0.242657008	0.412757824	0.344585169
228	0.136491008	0.4624057	0.401103292
229	0.274166218	0.395119299	0.330714483
230	0.061762905	0.505083059	0.433154036
231	2.31E-05	0.999851335	0.000125537
232	0.662379101	0.162079786	0.175541113
233	0.554036734	0.382451803	0.063511462
234	0.637358725	0.165879454	0.196761821
235	0.012725479	0.582652902	0.404621618
236	0.006356072	0.74282433	0.250819598
237	0.00545611	0.716127423	0.278416467
238	0.00574541	0.554238754	0.440015836
239	0.004850215	0.045347449	0.949802336
240	0.004701549	0.56803394	0.427264511
241	0.002012552	0.781022747	0.216964702
242	0.003868198	0.768096216	0.228035586
243	0.003163495	0.946786842	0.050049663
244	0.007525213	0.986483905	0.005990882
245	0.048963155	0.948843468	0.002193377
246	0.080729885	0.039825739	0.879444376
247	0.000893489	0.000607547	0.998498964
248	0.000272468	0.00081539	0.998912143
249	0.000293908	0.000454207	0.999251886
250	0.000967662	0.001009689	0.998022649
251	0.000279548	0.000281465	0.999438987
252	0.002963077	0.019088339	0.977948584
253	0.001298306	0.004572322	0.994129372
254	0.000427924	0.000311037	0.999261039
255	0.00022236	0.00022133	0.99955631
256	0.000220394	0.00022016	0.999559446
257	0.000101654	0.000101615	0.999796731
258	6.61E-06	6.61E-06	0.999986785
259	2.37E-07	2.37E-07	0.999999525
260	1.22E-07	1.22E-07	0.999999757
261	8.69E-07	8.69E-07	0.999998263

262	0.000700603	0.000630724	0.998668673
263	0.000355961	0.000368375	0.999275664
264	6.36E-05	0.00010072	0.999835723
265	0.000142368	0.000144063	0.999713569
266	5.84E-05	0.00062314	0.999318421
267	0.001135068	0.020834309	0.978030623
268	2.12E-05	4.60E-05	0.999932802
269	2.62E-05	2.85E-05	0.99994531
270	0.745726379	0.141313657	0.112959964
271	0.56042971	0.195736229	0.243834061
272	0.786221944	0.166280879	0.047497177
273	0.963641959	0.027150502	0.009207539
274	0.982013633	0.012903703	0.005082664
275	0.223042043	0.264398992	0.512558965
276	1.36E-05	1.43E-05	0.999972177
277	0.095469515	0.334978761	0.569551725
278	0.040501249	0.525568414	0.433930337
279	0.008755175	0.939717811	0.051527014
280	0.000112669	0.99955825	0.000329081
281	0.041879581	0.329114275	0.629006144
282	0.018975906	0.593972153	0.38705194
283	0.018730547	0.591989611	0.389279842
284	1.55E-05	0.999923406	6.11E-05
285	0.009845369	0.140799364	0.849355268
286	0.007528584	0.148343044	0.844128372
287	0.001526368	0.015444654	0.983028978
288	0.004076804	0.074620798	0.921302398
289	0.00149049	0.189317728	0.809191783
290	0.002195394	0.016538407	0.981266198
291	0.747680055	0.155995687	0.096324258
292	0.56273362	0.324963871	0.112302509
293	0.549797515	0.375030736	0.075171749
294	0.373599426	0.424447033	0.201953541
295	0.545773205	0.064652204	0.389574592
296	0.750076353	0.174432401	0.075491247
297	0.203704134	0.491594552	0.304701315
298	0.012067266	0.972241916	0.015690818
299	0.796915457	0.172489572	0.030594971
300	0.682043706	0.251908456	0.066047838
301	0.685905224	0.160217856	0.153876921
302	0.636410162	0.322029613	0.041560225
303	0.293275254	0.695919835	0.010804911
304	0.277064935	0.714283666	0.008651399
305	0.287642734	0.702048006	0.01030926
306	0.23746831	0.74144467	0.02108702
307	0.286813026	0.7086416	0.004545374
308	0.064879313	0.78283584	0.152284848
309	0.808544754	0.171633681	0.019821565
310	0.224030335	0.758247651	0.017722014
311	0.018885182	0.979140452	0.001974367
312	0.002390572	0.996236572	0.001372856
313	0.007888155	0.991154758	0.000957086
314	0.002971198	0.996409919	0.000618883
315	0.001866944	0.997087262	0.001045794
316	5.81E-06	0.99998856	5.63E-06
317	0.842581541	0.145398736	0.012019723
318	0.857799231	0.133814163	0.008386606
319	0.878190551	0.113173048	0.008636401
320	0.821052076	0.165479173	0.013468751
321	0.795894396	0.196372513	0.007733091
322	0.687026107	0.304795133	0.00817876
323	0.663599334	0.326665503	0.009735164
324	0.866862707	0.124146016	0.008991277
325	0.907127788	0.085840121	0.007032091
326	0.889728007	0.105374411	0.004897583
327	0.824704916	0.169197608	0.006097476

328	0.409863229	0.577902826	0.012233945
329	0.854782774	0.133626471	0.011590755
330	0.85920897	0.129099197	0.011691833
331	0.852339162	0.129259074	0.018401764
332	0.758966705	0.200327816	0.040705478
333	0.549378613	0.298978715	0.151642673
334	0.750748598	0.227604604	0.021646798
335	0.993436702	0.005507303	0.001055994
336	0.861249189	0.119930954	0.018819857
337	0.860251661	0.120128857	0.019619482
338	0.871119065	0.094486728	0.034394207
339	0.96555673	0.023532339	0.010910932

Table S5.2. Multiple and linear regression results for log flexural stiffness by fin ray position

Mixed model multiple regression results

Fin type	rate	y-intercept	*P*-value			t-test p-values	
						Intercept	**Slope**
High AR	-0.011	0.8918522	***<0.0001***				
Low AR	-0.002	0.1450732	***<0.0001***			***0.0012***	***<0.0001***

Species level linear regression results

Species	rate	y-intercept	F-value	r^2	*P*-value	t-test p-values: Intercept	t-test p-values: Slope
G. varius	-0.049	2.386861	304.9	0.9651	<0.0001	<0.0001*	0.0046*
H. bivittatus	-0.028	0.09656528	21.47	0.6505	0.00093		
C. parrae	-0.026	0.8063237	256.0	0.9808	<0.0001	0.0016*	0.0003*
B. rufus	-0.044	0.3508109	173.2	0.9399	<0.0001		
S. taeniopterus	-0.038	1.286869	140.3	0.9268	<0.0001	0.0027*	0.0048*
C. fasciatus	-0.053	0.4967025	205.5	0.949	<0.0001		
H. hortulanus	-0.041	1.406843	188.3	0.9445	<0.0001	<0.0001*	0.2322
H. melanurus	-0.032	0.06929379	23.44	0.6711	0.00067		

Values that are both bold and italicized are significant results of the mixed model multiple regression.
*Species-level comparisons are with significance at the alpha=0.05 with a bonferonni correction: p=0.00625

Table S5.3. Linear regression results for burst duration by fin displacement

Mixed-model multiple regression results			
Variable	***F*-ratio**	***P*-value**	**Model r^2**
Burst duration	278.7770	**<0.0001**	0.658383

Individual-level linear regression results						
Species	**Individual**	**Slope**	**y-intercept**	**r^2**	***F*-ratio**	***P*-value**
G. varius	1	0.0326	0.02543	0.515401	19.1441	0.0004
	2	0.0521	-0.07204	0.67678	31.4080	<0.0001
	3	0.0336	0.05764	0.501793	16.1151	0.0010
	4	0.1224	-0.2559	0.557031	40.2398	<0.0001
H. bivittatus	1	0.0839	-0.514423	0.587012	18.4779	0.0009
	2	0.0849	-0.41845	0.468452	11.4569	0.0049
	3	0.0605	-0.29212	0.560234	17.8351	0.0009
	4	0.1057	-0.65027	0.774128	34.2728	0.0002
C. parrae	1	0.0655	-0.08235	0.628877	52.5303	<0.0001
	2	0.1139	-0.19765	0.611066	32.9937	<0.0001
B. rufus	1	0.0427	-0.19113	0.749253	17.9285	0.0055
	2	0.1065	-0.29814	0.580114	9.6712	0.0171
	3	0.0974	-0.29818	0.600051	15.0032	0.0031
	4	0.1582	-0.53026	0.571843	13.3559	0.0044
S. taeniopterus	1	0.0820	-0.15511	0.441679	22.9414	<0.0001
	2	0.3026	-0.09054	0.795176	69.8802	<0.0001
	3	0.0585	-0.05805	0.452002	15.6717	0.0008
	4	0.0642	-0.01439	0.463989	13.8501	0.0019
C. fasciatus	1	0.0325	-0.13244	0.337323	8.6535	0.0091
	2	0.0430	-0.12346	0.50538	10.2175	0.0095
	3	0.0426	-0.19363	0.659944	19.4069	0.0013
	4	0.0378	-0.13632	0.639344	17.7273	0.0018
H. hortulanus	1	0.0562	-0.04682	0.675019	35.3108	<0.0001
	2	0.0694	-0.01649	0.375929	9.6381	0.0068
	3	0.0534	0.02151	0.289885	7.3480	0.0143
	4	0.0690	-0.15089	0.583713	22.4351	0.0002
H. melanurus	1	0.0553	-0.09499	0.90582	38.4722	0.0951
	2	0.0517	-0.17023	0.73012	21.6428	0.0016
	3	0.0819	-0.25553	0.851242	45.7785	0.0001
	4	0.0251	-0.06656	0.556523	20.0786	0.0004

Bold values represent significance in the mixed model multiple regression.
All P-values were significant to a level of 0.05 for individual regressions.

Table S5.4. One way ANOVA results for hold period spike rate by fin displacement

Species	Individual	*F*-ratio	r^2	*P*-value
G. varius	1	3.0160	0.455867	0.0377
	2	19.7495	0.845821	<0.0001
	3	11.2054	0.770728	<0.0001
	4	6.8927	0.674034	<0.0001
H. bivittatus	1	6.8592	0.666734	0.0002
	2	4.0473	0.541379	0.0046
	3	12.2935	0.781926	<0.0001
	4	10.0151	0.744967	<0.0001
C. parrae	1	4.0314	0.547395	0.0018
	2	9.0782	0.80335	<0.0001
B. rufus	1	3.9747	0.524733	0.0132
	2	25.7241	0.877234	<0.0001
	3	33.0633	0.901809	<0.0001
	4	4.9684	0.57985	0.0049
S. taeniopterus	1	5.3527	0.61624	0.0002
	2	13.7908	0.792993	<0.0001
	3	11.7170	0.709391	<0.0001
	4	16.1945	0.818132	<0.0001
C. fasciatus	1	12.3691	0.684004	<0.0001
	2	32.1291	0.903577	<0.0001
	3	4.7063	0.578536	0.0019
	4	2.9562	0.463007	0.0221
H. hortulanus	1	28.7823	0.888828	<0.0001
	2	4.7344	0.568053	0.0062
	3	2.8693	0.455601	0.0252
	4	12.8864	0.781638	<0.0001
H. melanurus	1	7.1907	0.856984	0.0162
	2	8.3144	0.697846	0.0003
	3	8.9904	0.714069	0.0002
	4	5.9442	0.45223	0.0004

All P-values were significant to a level of 0.05.

Table S5.5. Linear regression results for hold period spike rate by fin displacement

Mixed-model multiple regression results			
Variable	***F*-ratio**	***P*-value**	**Model r^2**
Spike rate	195.0840	**<0.0001**	0.244526

Individual-level linear regression results						
Species	**Individual**	**Slope**	**y-intercept**	**r^2**	***F*-ratio**	***p*-value**
G. varius	1	0.2963	0.464354	0.42787	16.4528	0.0005
	2	1.2365	-0.86691	0.705702	52.7542	<0.0001
	3	1.3172	1.7546635	0.517465	40.7508	<0.0001
	4	1.5927	-2.013015	0.550529	46.5439	<0.0001
H. bivittatus	1	0.1294	0.61451	0.157139	5.5931	0.0247
	2	0.6380	-0.835801	0.210878	8.0169	0.0082
	3	1.1497	-0.525434	0.277892	11.5450	0.0019
	4	0.4532	0.0195	0.2795	11.6384	0.0019
C. Parrae	1	0.6816	0.7109357	0.367365	22.0662	<0.0001
	2	7.3817	-4.92044	0.411528	19.5809	0.0001
B. Rufus	1	0.3047	2.47823	0.276504	8.4079	0.0083
	2	3.4694	-3.17007	0.763972	71.2093	<0.0001
	3	7.0527	1.020408	0.74976	65.9155	<0.0001
	4	0.5945	0.1652399	0.499383	21.9458	0.0001
S. Taeniopterus	1	3.2155	0.646619	0.581744	52.8534	<0.0001
	2	4.1721	-0.795252	0.7746	75.6042	<0.0001
	3	1.1471	-0.578463	0.595174	41.1655	<0.0001
	4	1.6759	-0.445532	0.687722	48.4500	<0.0001
C. Fasciatus	1	2.0722	-2.453661	0.549754	56.1663	<0.0001
	2	0.3667	0.0694432	0.36145	16.9814	0.0003
	3	1.8577	-0.7289	0.478656	27.5436	<0.0001
	4	0.1411	0.3713302	0.290464	12.2812	0.0015
H. hortulanus	1	0.9383	-0.690738	0.675647	45.8273	<0.0001
	2	1.5598	-0.144253	0.456171	18.4539	0.0003
	3	1.7751	-0.919535	0.353282	16.3880	0.0003
	4	1.1956	-0.836735	0.462823	18.9548	0.0003
H. melanurus	1	0.4557	0.53741	0.426576	7.4391	0.0213
	2	0.4030	0.99319	0.220212	6.2128	0.0207
	3	1.0121	-0.07744	0.533335	25.1431	<0.0001
	4	0.0955	0.40936	0.202407	10.1509	0.0028

Bold values represent significance in the mixed model multiple regression.
All P-values were significant to a level of 0.05 for individual regressions.

Table S5.6. Average ± stdev response threshold per species

Species	**N**	**Average ± Stdev**	***P*-value**
G. varius	4	5.914 ± 0.578	<0.001
H. bivittatus	4	30.665 ± 1.025	
C. parrae	2	08.203 ± 3.029	0.01237
B. rufus	4	19.625 ± 3.054	
S. taeniopterus	4	05.863 ± 0.155	<0.001
C. fasciatus	4	17.840 ± 0.882	
H. hortulanus	4	06.219 ± 1.349	<0.001
H. melanurus	4	25.266 ± 1.068	

Table S5.7. Linear regression results for response threshold by fin ray stiffness

Mixed-model multiple regression results			
Variable	***F*-ratio**	***P*-value**	**Model r^2**
Response threshold	1.7278	0.2447	0.895535
Aspect ratio	49.9174	**0.0008**	

Individual-level linear regression results						
Species	**N**	**Slope**	**y-intercept**	**r^2**	***F*-ratio**	***P*-value**
G. varius	4	-8.37799	7.75035	0.519963	2.1663	0.2789
H. bivittatus	4	-2.91745	30.7431	0.001221	0.0024	0.9651
C. parrae	2	-	-	-	-	-
B. rufus	4	-240.377	29.270	0.7464	5.8869	0.1360
S. taeniopterus	4	0.3163	5.7996	0.011132	0.0225	0.8945
C. fasciatus	4	-69.03047	20.3167	0.80857	8.4478	0.1008
H. hortulanus	4	-27.7578	11.5457	0.43732	1.5544	0.3387
H. melanurus	4	-32.667	25.806	0.11506	0.2600	0.6608
H. bivittatus expanded	6	-22.2259	31.86997	0.35298	2.1822	0.2137

Bold values represent significance in the mixed model multiple regression.

FIGURES:

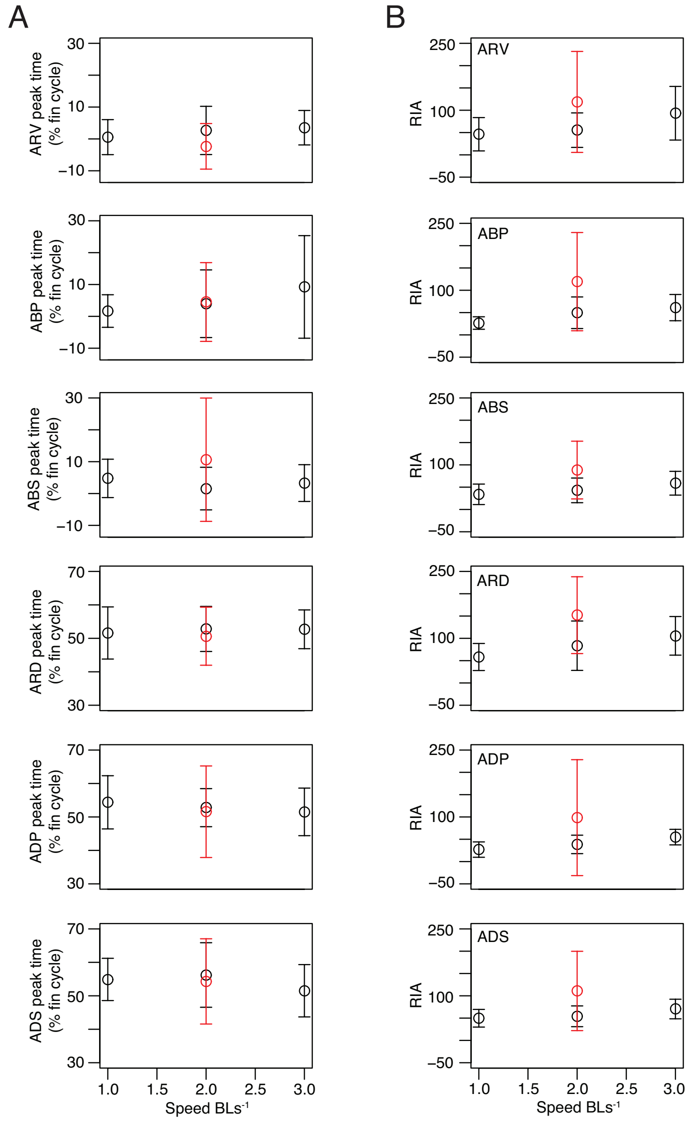

Figure S2.1. The relationship between both the time of peak amplitude (A) and the RIA (B) of activity and speed for each muscle.

(A) In general, the time of peak amplitude is very consistent for each muscle across speeds, and between control (black) and transection (red) trials. (B) There is always a significant and positive relationship between RIA and speed for each muscle, and the RIA of any given muscle is always significantly great in transection trials in comparison to control trials.

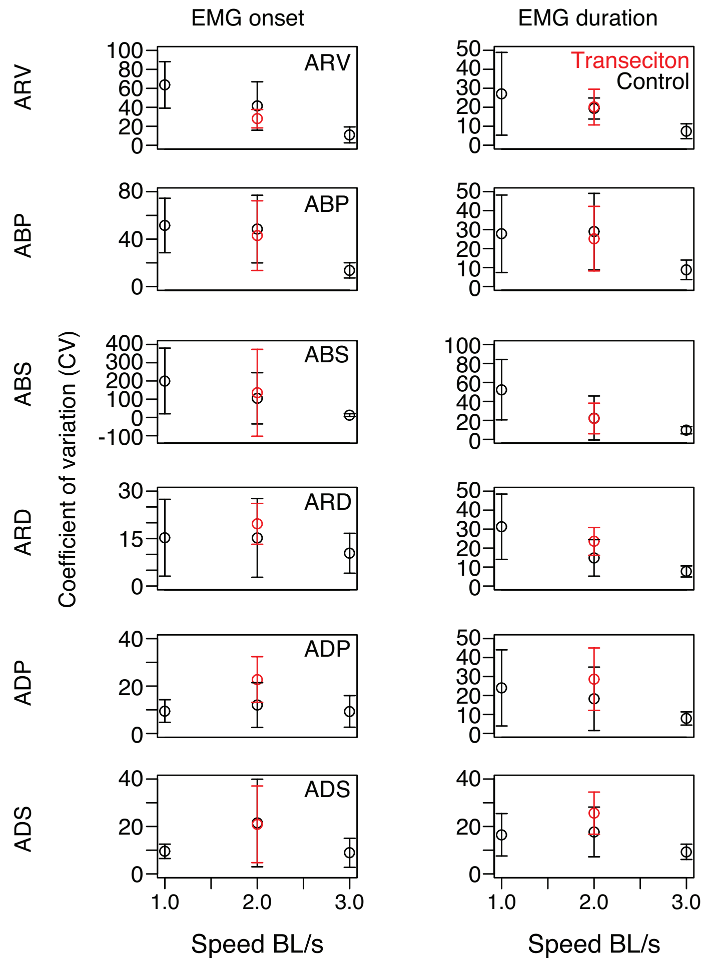

Figure S2.2. CV calculations for the onset and the duration of activity in each muscle.

The coefficient of variation of both activity onset and duration generally decreased as speed increased, and there were no significant differences between control and transection trials for either the CV of activity onset or activity duration in any muscle.

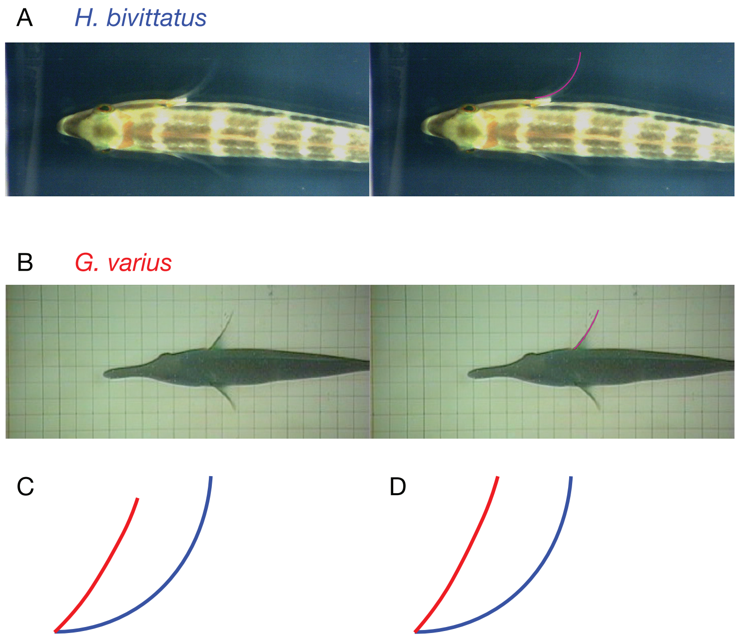

Figure S5.1. A comparison of pectoral fin ray bending during a typical fin between two closely related species employing different aspect ratio fins. (A) The pectoral fins of the low aspect ratio rower, *H. bivittatus*, undergo considering bending throughout their fin stroke, (B) while the pectoral fins of the high aspect ratio flapper, *G. varius*, remain relatively straight through their fin stroke. In the right panel of A and B, the pectoral fin is highlighted. The interspecific differences in fin bending magnitude are highlighted in (C), and, again, after being normalized to the same length, in (D).

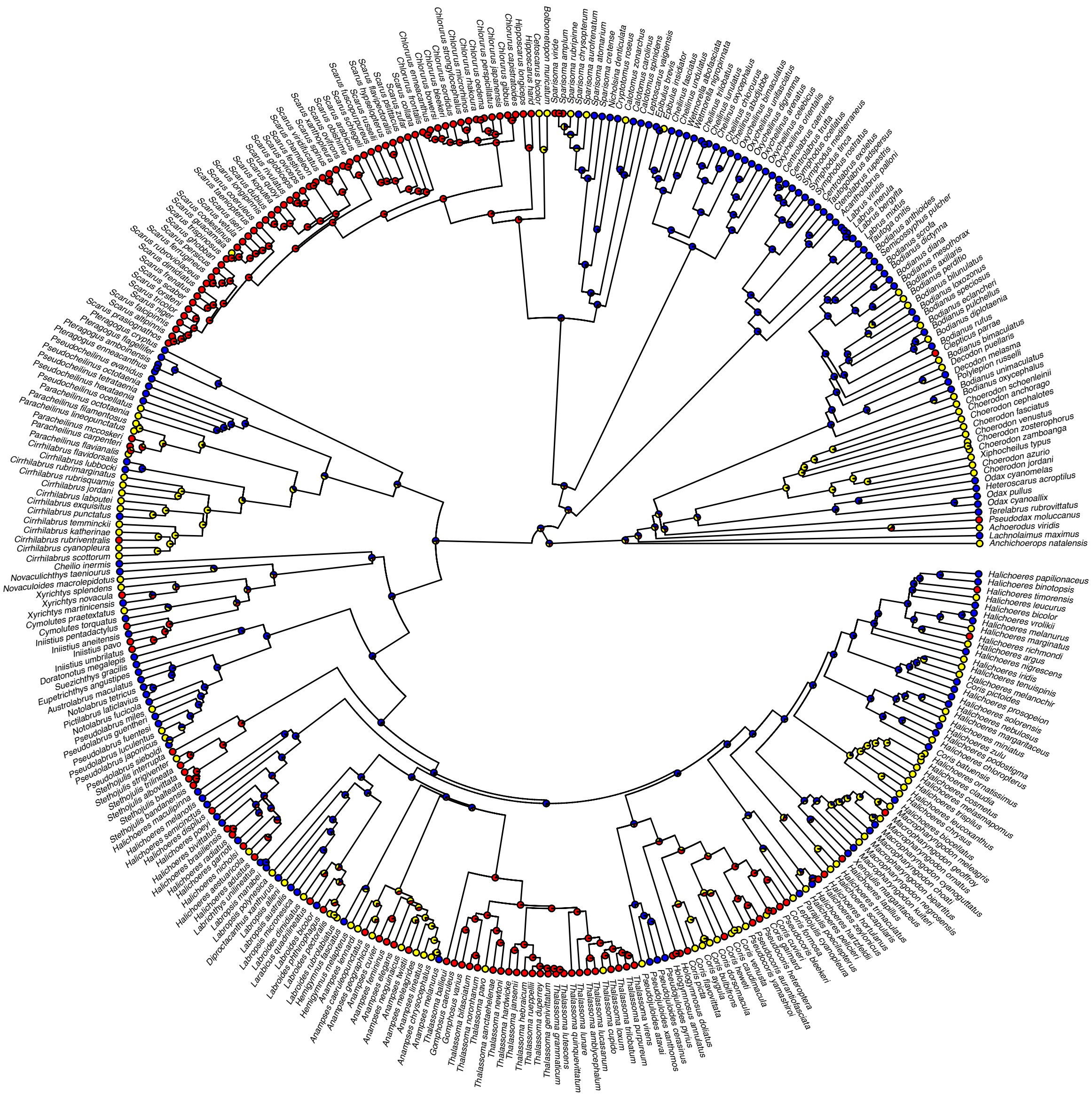

Figure S5.2. The phylogenetic relationships and pectoral fin aspect ratio ancestral state reconstruction of 340 species within the family Labridae. The maximum likelihood reconstruction revealed a most likely ancestral state of low aspect ratio pectoral fins, or the rowing swimming behavior, (low = 0.47, intermediate = 0.29, high = 0.24) and at least 22 independent evolutions of high aspect ratio fins (or the flapping swimming behavior). The node labels and the corresponding likelihood of the ancestral state at each node can be found in Figure

S2 and Table S1, respectively. Red = high aspect ratio, yellow = intermediate aspect ratio, blue = low aspect ratio.

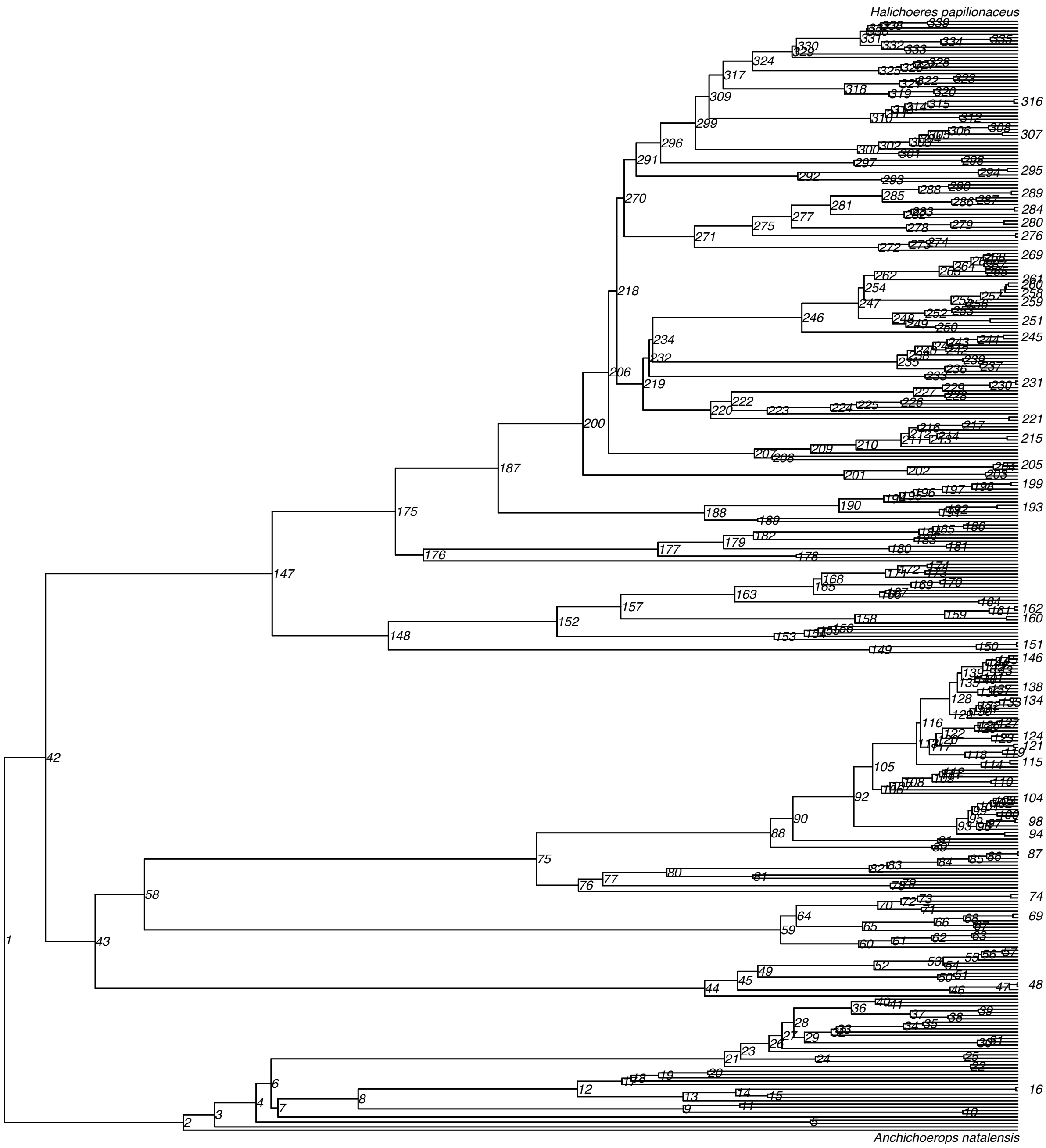

Figure S5.3. The 340 species Labridae phylogeny with all nodes labeled. The corresponding likelihood of the ancestral state at each node can be found in Table S1. The labels for nodes closest to the tip are shown next to the corresponding tips.

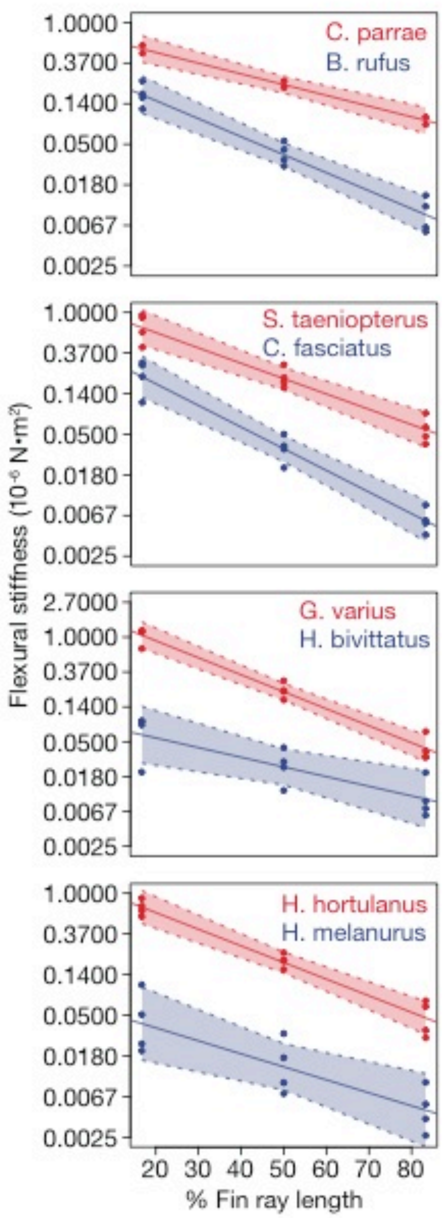

Figure S5.4. A comparison of pectoral fin ray flexural stiffness among the individuals of each species. In all cases, the pectoral fin rays of flappers are significantly stiffer than those of rowers. Exponential curves were fit using least squares to the pooled data for each species. The shaded regions represent the 99% confidence interval around the exponential fit. There is never an overlap of the confidence interval between two species of the same pair. Regression statistics are detailed in Table S1.

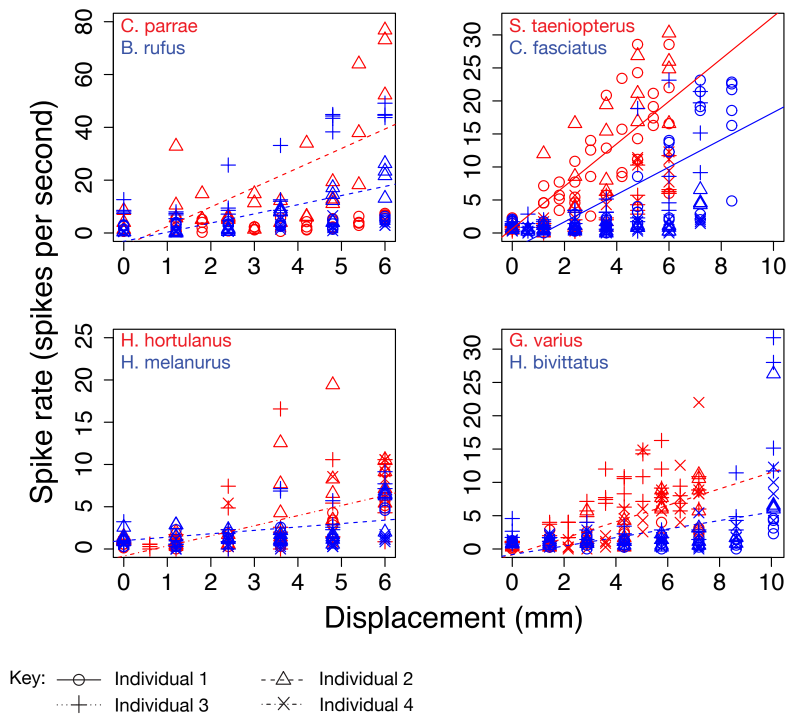

Figure S5.5. Summary of afferent response to fin ray bending during the hold period of step-and-hold stimuli. (A) Bivariate plots of hold period spike rate by fin ray bending magnitude per species. Hold period spike rate is positively and significantly correlated with fin ray bending magnitude. Regression lines are presented for one representative individual of each species, and regression statistics for all individuals are detailed in Table S5.