Supplementary Material

Dataset S1. (A) Salp video specimens analyzed with video specifications, as well as mean morphological and kinematic attributes. (B) Salp specimens used in the respirometry experiments with mean physiological attributes. (Please see attached file.)

Table S1. Summary of numbers of specimens (N), number of measurements (n), and descriptive variable averages per species including both the video speed data and the respiration experiments data.

		Speed Measurements from Videos						Respiration Measurements from Experiments				
Species	Architecture	Mean Number of zooids	Mean zooid length (mm)	Mean Pulsation rate (pulses/s)	Mean swimming speed (mm/s)	N	n	Mean Number of zooids	Mean zooid length (mm)	Mean Colony volume (ml)	N	n
Brooksia rostrata	Bipinnate	26	7.4	2.6	34.4	5	45	20.3	6.5	3.7	16	130
Ritteriella amboinensis	Bipinnate	18	25.6	1.9	42.5	9	77	12.7	22.1	8.0	7	44
Ritteriella sp.	Bipinnate	33	21.3	1.3	43.1	3	49	18.7	34.5	22.5	6	42
Cyclosalpa polae	Cluster	5	17.2	1.2	47.6	2	19	7.0	20.0	4.3	7	55
Cyclosalpa sewelli	Cluster	7	15.0	1.4	26.8	6	52	6.2	19.4	7.2	11	88
Helicosalpa virgula	Helical	60	11.5	3.3	49.9	1	7	66.0	14.0	14.8	2	13
Iasis cylindrica	Linear	43	8.9	3.6	61.1	32	308	26.8	10.5	6.5	15	103
Ihlea punctata	Linear	NA	NA	NA	NA	0	0	68	12	3.7	1	7
Metcalfina hexagona	Linear	18	26.8	2.4	109.6	9	105	16.0	28.0	22.0	1	7
Salpa aspera	Linear	9	28.3	2.1	114.3	7	57	16.2	32.0	9.1	6	42
Salpa fusiformis	Linear	16	17.2	3.0	57.2	8	74	13.0	17.7	2.1	7	47
Salpa maxima	Linear	2	61.6	0.7	55.9	4	34	3.6	87.8	27.8	8	52
Soestia zonaria	Linear	11	13.7	1.9	109.2	4	34	9.1	19.6	4.6	8	23
Thalia sp.	Oblique	29	3.5	4.5	5.8	1	28	18.6	5.9	0.3	7	53
Pegea sp.	Transversal	12	31.0	1.7	20.3	2	18	13.1	43.2	29.2	13	91
Cyclosalpa affinis	Whorl	5	33.0	1.4	24.5	2	15	6.7	37.9	23.4	10	65
Cyclosalpa bakeri	Whorl	7	7.0	2.6	10.4	7	63	6.9	14.6	3.0	7	57
Cyclosalpa quadriluminis	Whorl	8	27.1	1.3	25.3	1	6	8.3	24.5	12.7	6	36

Table S2. Tukey's post-hoc pairwise comparisons estimated using marginal means from a linear random-effects mixed model on (A) swimming speed and (B) COT across different colonial architectures reporting magnitude of difference and p-values.

A.		Speed (mm/s)		Speed (zooids/pulse)	
Architecture		**Difference**	**p-value**	**Difference**	**p-value**
Bipinnate	Cluster	12.296	0.972	0.037	1.000
Bipinnate	Linear	-42.268	0.130	-0.729	0.669
Bipinnate	Transversal	24.833	0.788	1.157	0.641
Bipinnate	Whorl	21.371	0.802	0.882	0.716
Cluster	Linear	-54.564	0.079	-0.765	0.720
Cluster	Transversal	12.537	0.982	1.120	0.709
Cluster	Whorl	9.074	0.992	0.846	0.790
Linear	Transversal	67.101	0.030	1.885	0.134
Linear	Whorl	63.638	0.018	1.611	0.129
Transversal	Whorl	-3.463	1.000	-0.274	0.998

Color key:

Faster than
Slower than
$p < 0.05$
$p > 0.05$

B.

Architecture		COT per mm		COT per zooid length	
		Difference	p-value	Difference	p-value
Bipinnate	Cluster	-0.558	1.000	17.301	1.000
Bipinnate	Linear	0.109	1.000	18.606	0.999
Bipinnate	Oblique	-46.132	0.002	-155.555	0.377
Bipinnate	Transversal	-4.999	0.973	-100.580	0.713
Bipinnate	Whorl	-0.180	1.000	0.717	1.000
Cluster	Linear	0.667	1.000	1.305	1.000
Cluster	Oblique	-45.574	0.002	-172.856	0.180
Cluster	Transversal	-4.441	0.940	-117.882	0.424
Cluster	Whorl	0.378	1.000	-16.584	0.999
Linear	Oblique	-46.241	0.002	-174.160	0.129
Linear	Transversal	-5.108	0.851	-119.186	0.341
Linear	Whorl	-0.289	1.000	-17.888	0.995
Oblique	Transversal	41.134	0.016	54.974	0.947
Oblique	Whorl	45.952	0.003	156.272	0.206
Transversal	Whorl	4.819	0.880	101.298	0.489

Color key:

More efficient than
Less efficient than
$p < 0.05$
$p > 0.05$

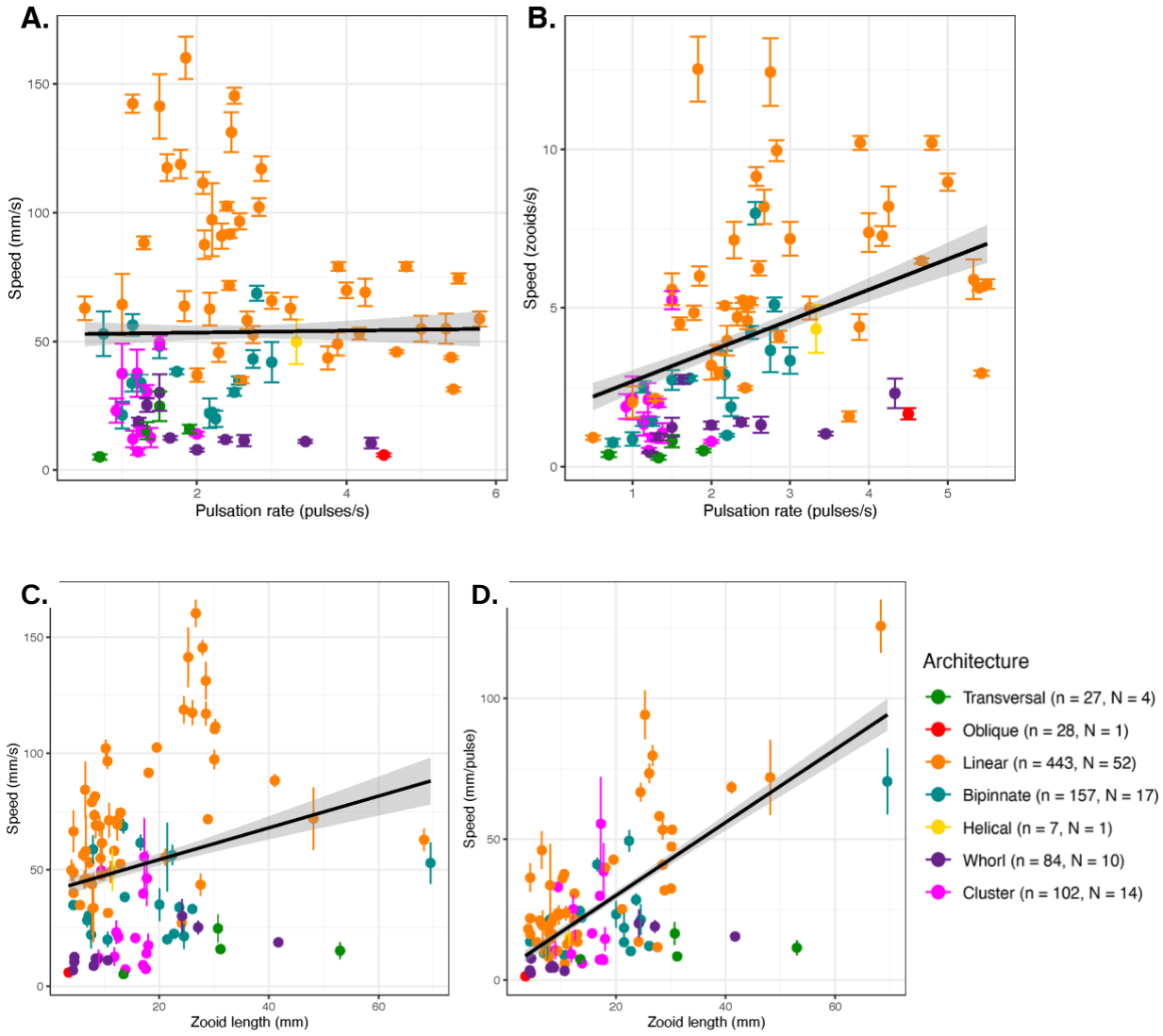

Figure S1. Salp swimming speeds. Distribution of salp colony absolute (A) and zooid size-corrected (B) swimming speed across pulsation rates. Distribution of salp colony absolute (C) and pulsation rate-corrected (D) swimming speed (specimen means with standard errors) across zooid sizes. Lines represent linear regressions with a 95% confidence interval shaded in grey.

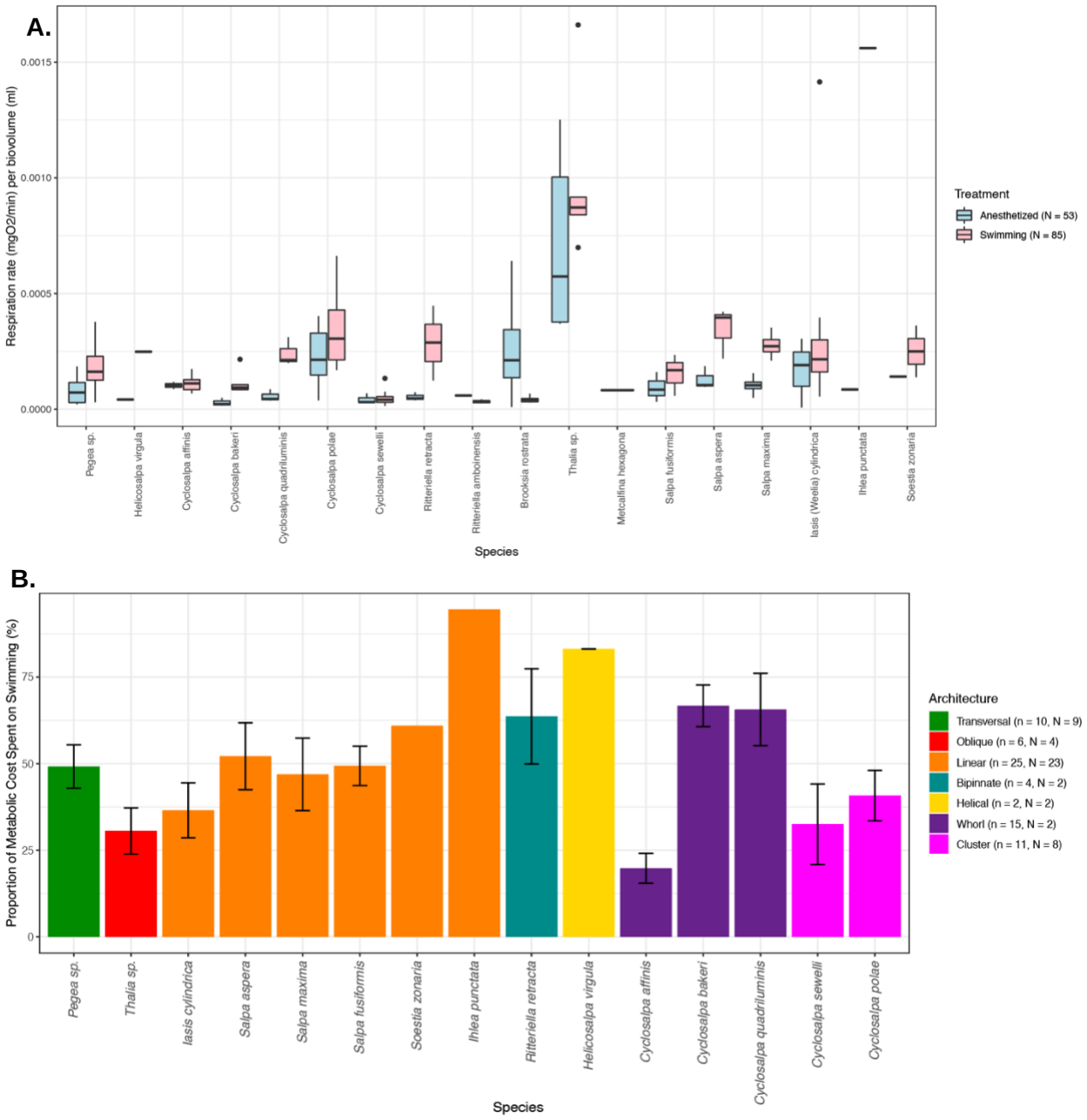

Figure S2. Respiration rates across salp species. (A) Biovolume-normalized respiration rates of swimming (red) and anesthetized (blue) salp colonies across different species. (B) Percentage of the swimming respiration rates matched by the mean anesthetized respiration rate for each salp species. Bars represent species means with black lines representing standard errors. Colors indicate colonial architecture.

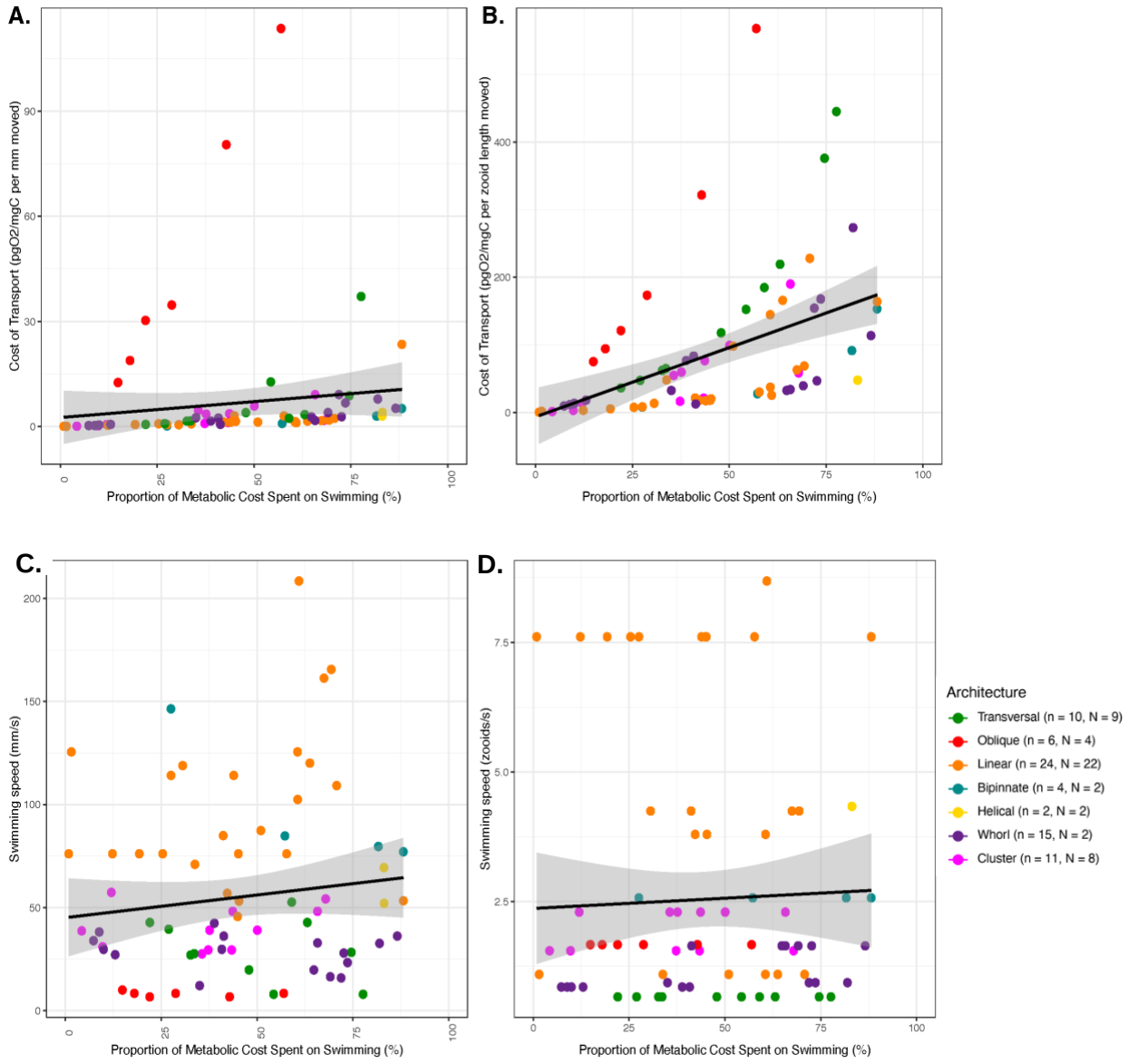

Figure S3. Proportion of metabolic cost spent on swimming. (A and B) Cost of transport (per mm in A, per zooid length in B) for each salp species across their percent swimming respiration rate matched by the species' mean anesthetized respiration rate. (C and D) Swimming speed (in mm/s in A, and zooids/s in B) for each salp species across their percent swimming respiration rate matched by the species mean anesthetized respiration rate. Point color indicates colonial architecture.