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 from an ANOVA on (A) swimming speed and (B) COT across different colonial architectures reporting magnitude of difference and adjusted p-values.

A.		Speed (mm/s)		Speed (zooids/pulse)	
Architecture		**Difference**	**p-value adj.**	**Difference**	**p-value adj.**
Cluster	Bipinnate	-12.900	0.005	0.082	0.991
Linear	Bipinnate	33.971	0.000	0.896	0.000
Transversal	Bipinnate	-22.314	0.002	-0.969	0.009
Whorl	Bipinnate	-25.559	0.000	-0.774	0.001
Linear	Cluster	46.871	0.000	0.814	0.000
Transversal	Cluster	-9.415	0.570	-1.050	0.006
Whorl	Cluster	-12.659	0.028	-0.856	0.000
Transversal	Linear	-56.286	0.000	-1.864	0.000
Whorl	Linear	-59.530	0.000	-1.670	0.000
Whorl	Transversal	-3.245	0.987	0.195	0.972

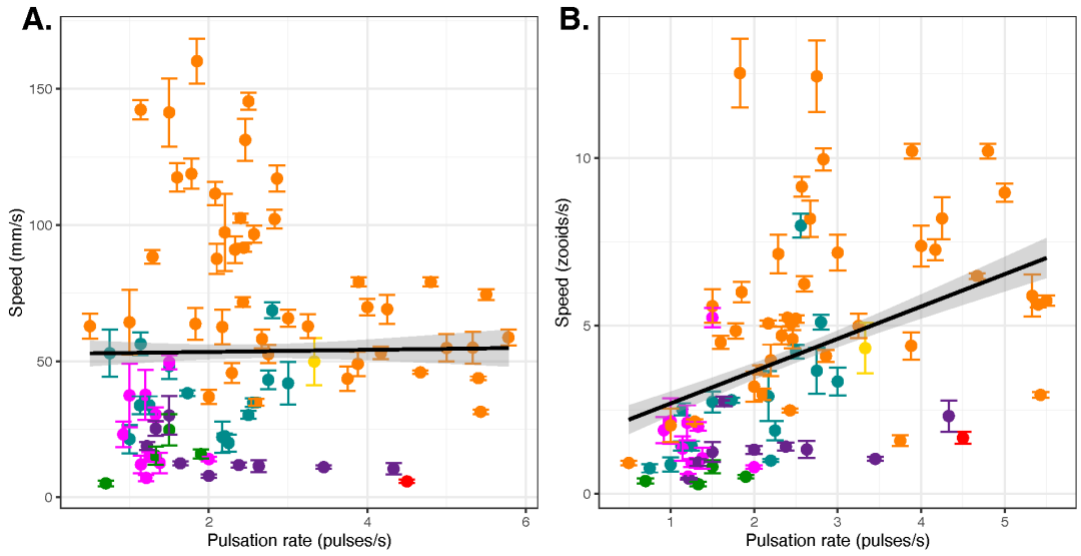
Color key:

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

B.		COT per mm		COT per zooid length	
Architecture		Difference	p-value adj.	Difference	p-value adj.
Cluster	Bipinnate	0.558	1.000	-16.055	1.000
Linear	Bipinnate	-0.109	1.000	-19.013	0.999
Oblique	Bipinnate	46.132	0.000	155.555	0.099
Transversal	Bipinnate	4.999	0.979	100.580	0.429
Whorl	Bipinnate	0.180	1.000	-9.487	1.000
Linear	Cluster	-0.667	1.000	-2.958	1.000
Oblique	Cluster	45.574	0.000	171.610	0.005
Transversal	Cluster	4.441	0.954	116.636	0.049
Whorl	Cluster	-0.378	1.000	6.568	1.000
Oblique	Linear	46.241	0.000	174.567	0.001
Transversal	Linear	5.108	0.857	119.593	0.010
Whorl	Linear	0.289	1.000	9.526	0.999
Transversal	Oblique	-41.134	0.000	-54.974	0.849
Whorl	Oblique	-45.952	0.000	-165.042	0.003
Whorl	Transversal	-4.819	0.890	-110.067	0.026

Color key:

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



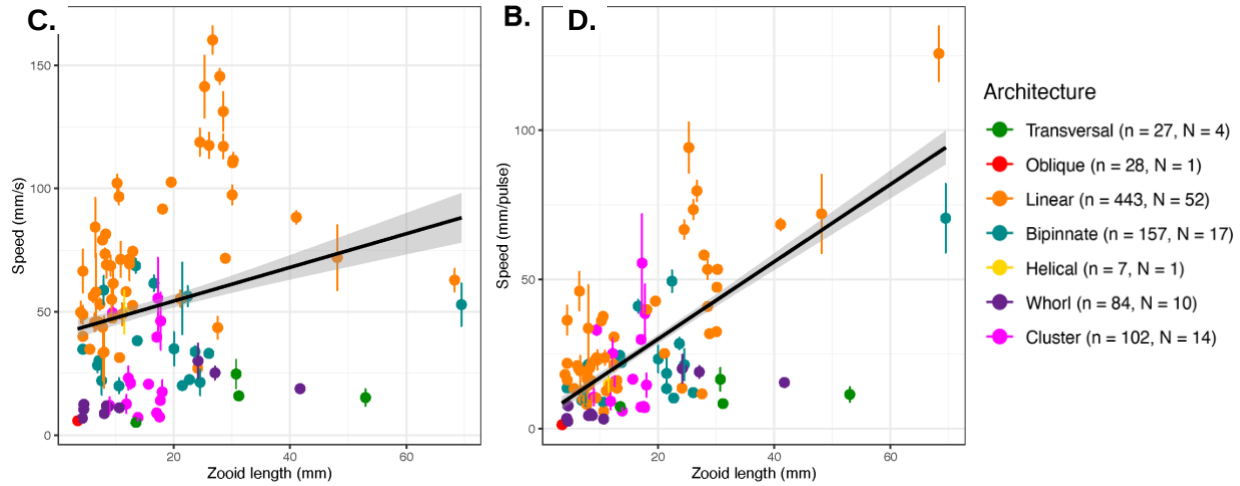
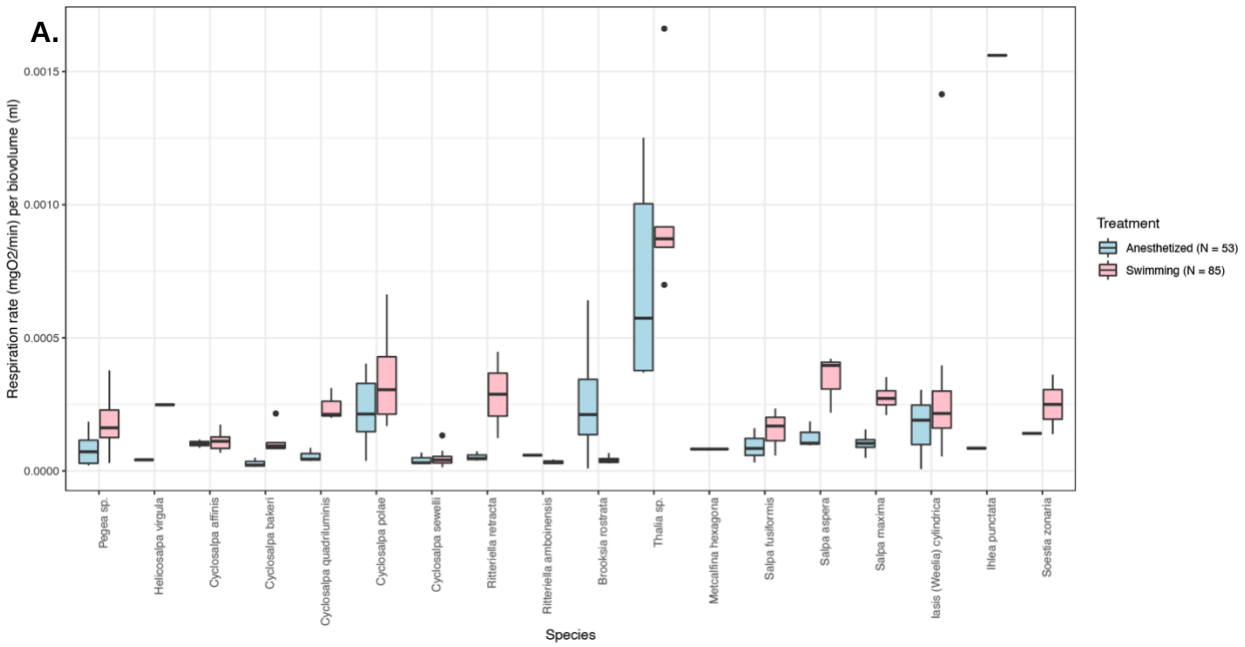


Figure S1. Salp swimming speeds. Distribution of salp colony absolute (A) and zooid size-corrected (B) swimming speed across pulsation rates. Distribution of salp colony absolute (C) and pulsation rate-corrected (D) swimming speed (specimen means with standard errors) across zooid sizes. Lines represent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



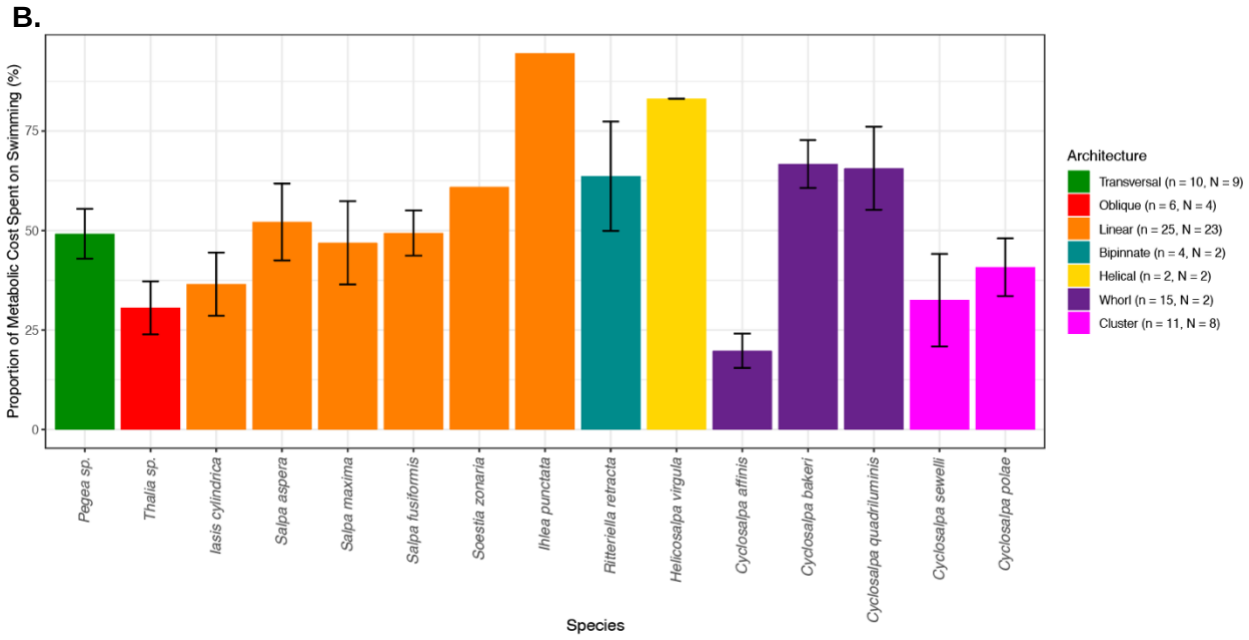
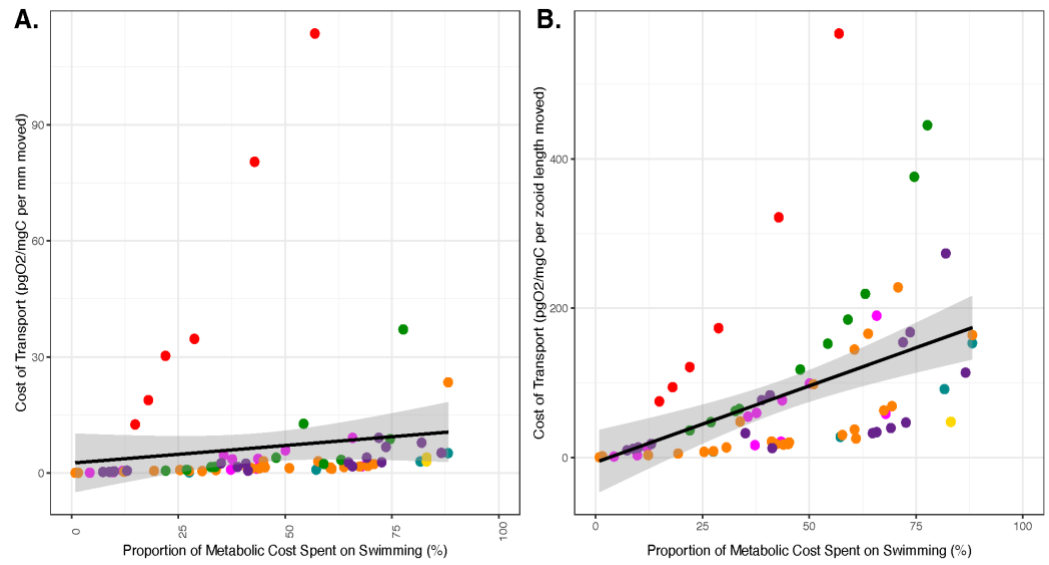


Figure S2. Respiration rates across salp species. (A) Biovolume-normalized respiration rates of swimming (red) and anesthetized (blue) salp colonies across different species. (B) Percentage of the swimming respiration rates matched by the mean anesthetized respiration rate for each salp species. Bars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



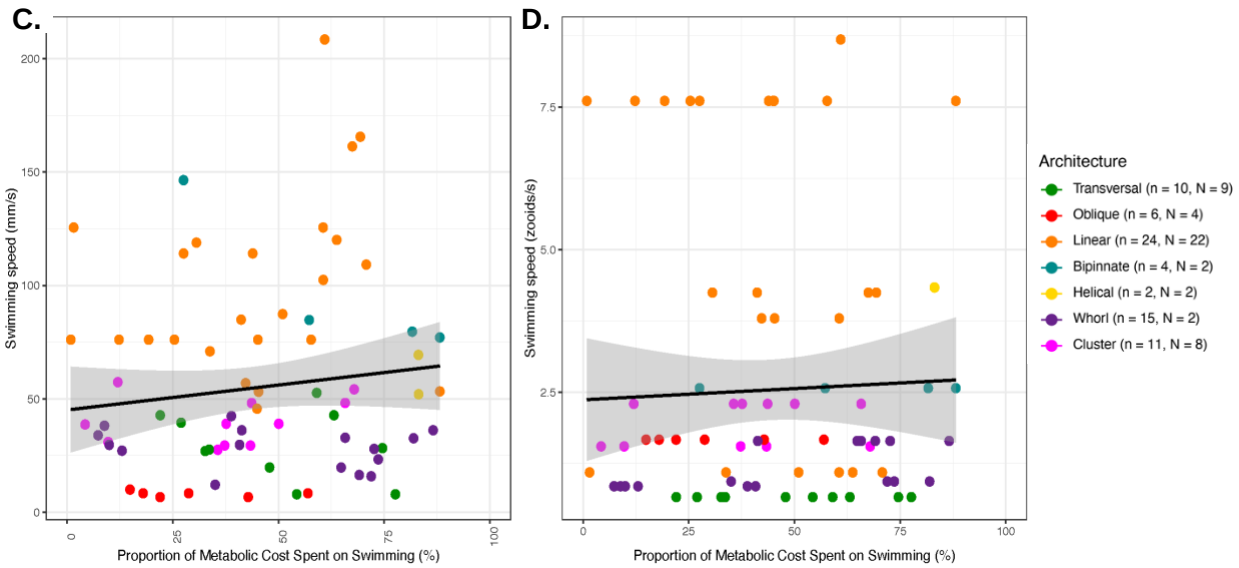


Figure S3. Proportion of metabolic cost spent on swimming. (A and B) Cost of transport (per mm in A, per zooid length in B) for each salp species across their percent swimming respiration rate matched by the species' mean anesthetized respiration rate. (C and D) Swimming speed (in mm/s in A, and zooids/s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