

Supplement A: Additional material on the surface area of *J. fragilis***Text S1. Spatial variation of and the effect of current speed on *J. fragilis* surface area**

The mean surface area of *J. fragilis* differed significantly among sites and depths (Table S1). The surface area of *J. fragilis* was highest at South Pelorus and North Orpheus, which were both situated within a channel, and lowest at Southwest and South Orpheus and North Fantome (Fig. S1). There was a significant positive relationship between *J. fragilis* surface area and current speed ($t = 3.379$, $p = 0.000916$, $n = 559$; Fig. S2). The fastest mean current speed (0.2612 m/s) was at 15 metres depth at North Curacoa where the mean surface area of *J. fragilis* was 669.17cm², which was the second highest mean surface area, the highest mean surface area being 837.29cm² at 10 metres depth at South Orpheus, where the current speed averaged just 0.107 m/s.

Table S1. Statistical output for the two-factor ANOVA for variation in *J. fragilis* surface area versus the factors of depth and site

Source of variation	df	MS	F	P
Depth	1	521610	8.981	0.00316
Site	15	194088	3.342	0.0000681
Interaction	15	120958	2.083	0.01317
Residuals	160	58077		

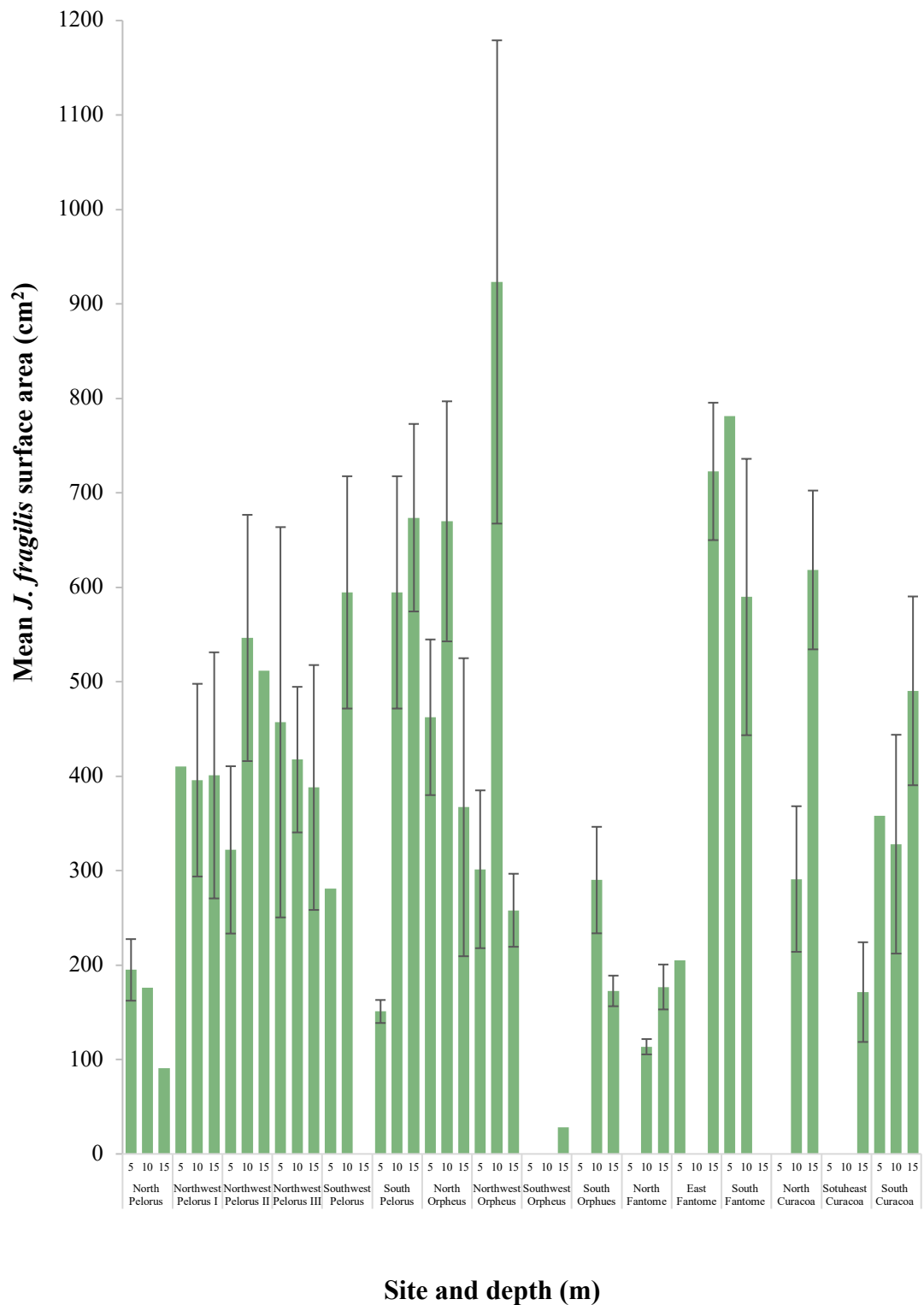


Figure S1. The average surface area (cm²) of *J. fragilis* (\pm SE) per 120 squared metres observed across four replicate transects at the depths of 5, 10 and 15 metres across the 16 sites surveyed within the Palm Island Group, Queensland, Australia

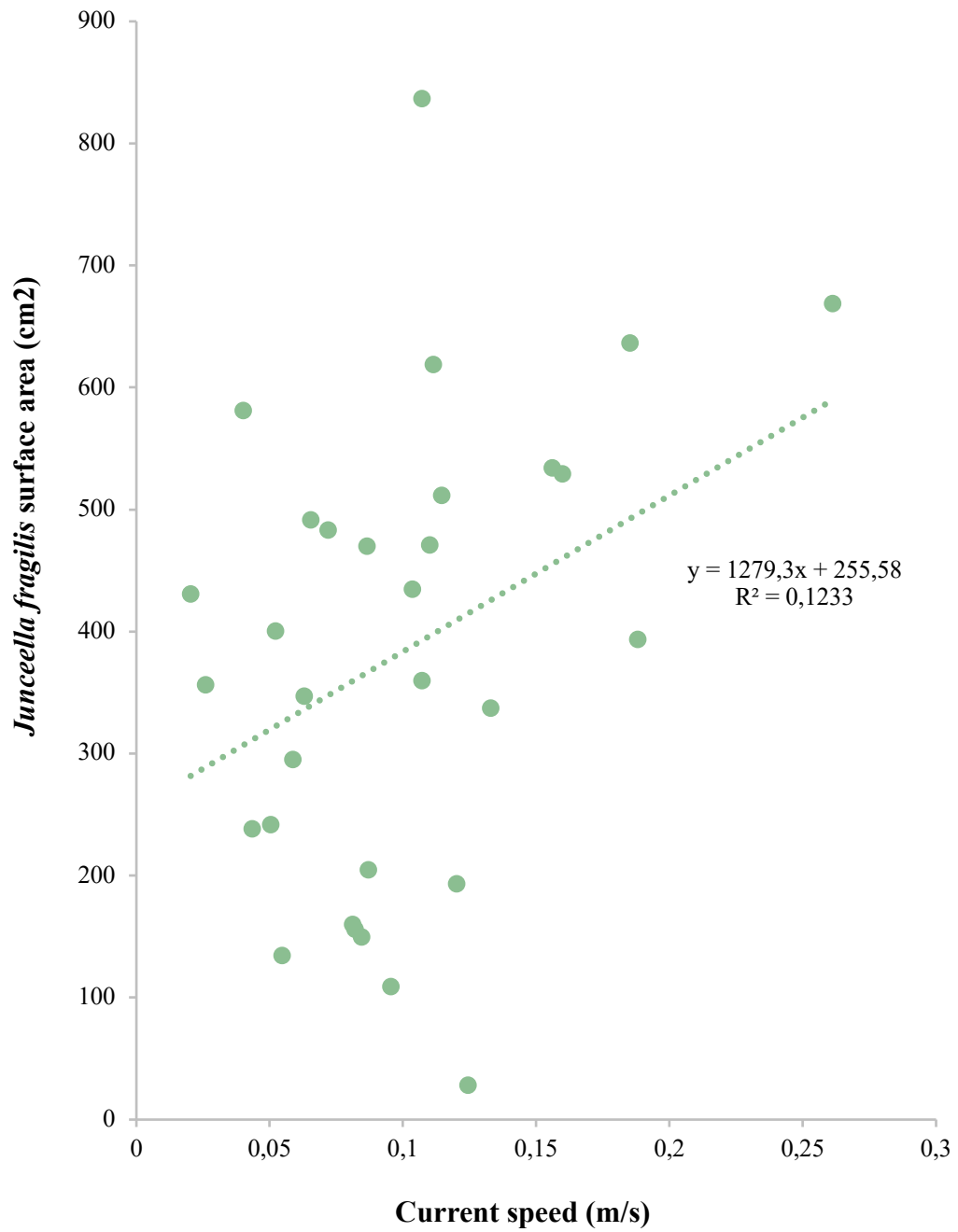


Figure S2. The average current speed (m/s) recorded across the depths of 5, 10 and 15 metres at the sites surveyed and the average surface area (cm²) of *J. fragilis* sea whips at corresponding sites surrounding the Palm Island Group, Queensland, Australia

Supplement B: Additional material on current speed and direction

Text S2. Current speed and direction at sites and depths surrounding the Palm Island Group

Northern Pelorus comprised average current directions largely flowing north-west at relatively lower speeds (0.06746 m/s), however the frequency of this direction varied across these sites and depths observed. The current direction shifted towards the south and increased in speed (mean = 0.0771 m/s) as it reached the southern end of the island. In the channel between Pelorus and Orpheus the current moved in a south-easterly direction and frequently reached speeds above 0.3 metres/seconds. The same pattern occurred at the Northern end of Orpheus, with the current increasing speed as it entered the channel and shifted into an easterly direction (mean = 0.058965 m/s; mean = 0.1529 m/s). South and southwest Orpheus had relatively slow-moving currents, however at 15 metres depth at southwest Orpheus, the current speed increased to above 0.3 m/s with an average of 0.1245 m/s over the duration of the deployment. North Fantome displayed easterly flowing currents, again with speed increasing at 15 metres depth (mean = 0.1201 m/s, max: > 0.3m/s). The current at East Fantome flowed in both directions of the channel – North and South – while South Fantome had a frequently slow-moving southerly current. At North Curacoa, the current frequently flowed towards the west and increased speed with depth (5 metres: mean = 0.0748 m/s, 10 metres: mean = 0.1330 m/s, 15 metres: mean = 0.2612 m/s) and reached speeds above 0.3 metres per second. South Curacoa had fast-flowing currents that also frequently flowed through the channel at both north-easterly and south-westerly directions.

The direction that currents flowed had no influence on the abundance of *J. fragilis*, the size that the sea whips grew to, or the abundance of *B. amplus* inhabitants. Due to the cylindrical shape of *J. fragilis*, food resources can reach the whip from any direction, inhabitants can visualise surrounding predators from all directions, and they can receive shelter from predation on all areas of the sea whip.

Table S2. The average current speeds (m/s) and directions (degrees from North) recorded from a six-day duration of deployment at 5, 10 and 15 metres depth at 16 sites from four islands, the Palm Island Group, Queensland, Australia

Site	Depth (metres)	Current speed (m/s)	Current direction (° from North)
North Pelorus	5	0.0952	262.0481
	10	0.0845	327.5104
	15	0.0587	254.0808
Northwest Pelorus I	5	0.1034	5.3622
	10	0.0652	79.1475
	15	0.0523	223.5852
Northwest Pelorus II	5	0.0434	36.7163
	10	0.1100	1.0895
	15	0.1145	19.9324
Northwest Pelorus III	5	0.0260	205.4308
	10	0.0204	191.6841
	15	0.0719	2.1906
Southwest Pelorus	10	0.0400	161.3225
	15	0.1142	342.3220
South Pelorus	5	0.0819	108.5664
	10	0.1598	87.7830
	15	0.1852	145.3236
North Orpheus	5	0.1147	253.1046
	10	0.1560	86.0303
	15	0.1880	75.9370
Northwest Orpheus	5	0.0503	32.4924
	15	0.0676	39.9076
Southwest Orpheus	5	0.0403	66.9320
	10	0.0475	332.3958
	15	0.1245	355.9125
South Orpheus	5	0.0207	220.8841
	10	0.1071	322.6436
	15	0.0647	225.2558
North Fantome	5	0.1214	22.4144
	10	0.0955	104.0115
	15	0.1201	92.5980
East Fantome	5	0.0871	14.8432
	10	0.0545	278.3530
	15	0.1114	336.3962
South Fantome	5	0.0635	193.8870
	10	0.0964	150.5548
	15	0.1685	173.7320
North Curacoa	5	0.0748	264.0422
	10	0.1330	254.0808
	15	0.2612	245.6042
Southeast Curacoa	5	0.0676	96.0545
	10	0.0436	141.5925
	15	0.0810	138.4063
South Curacoa	5	0.0836	111.4662
	10	0.0629	238.0378
	15	0.0864	79.1094

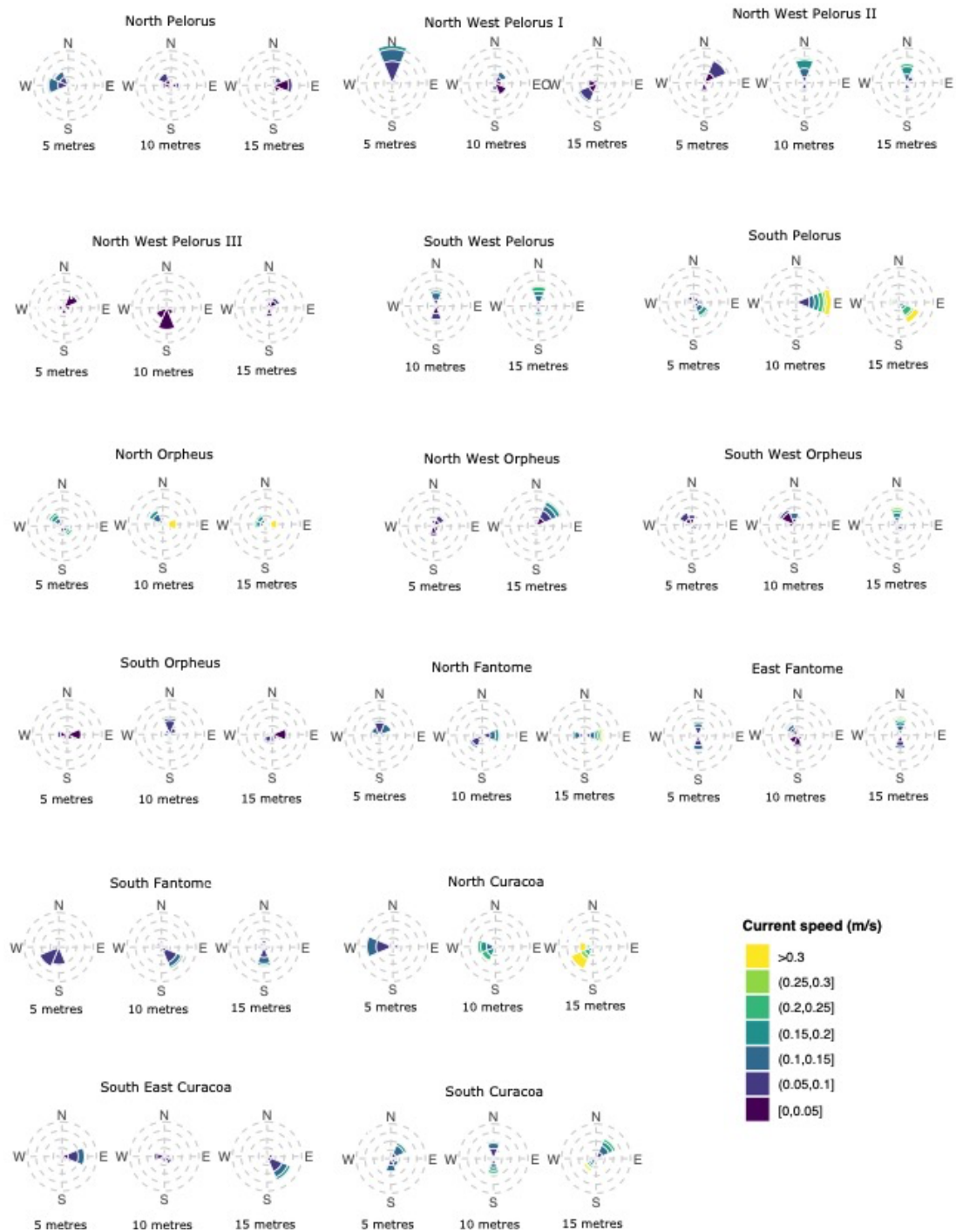


Figure S3. The frequency of current speeds at each direction (0%, 20%, 40%, 60%, 80% from centre point of rose plot) recorded at 5, 10 and 15 metres across 16 sites within the Palm Islands of Pelorus (a-f), Orpheus (g-j), Fantome (k-m) and Curacao (n-p) over a duration of 6 days during April 2021