

THE EVALUATION OF THE CHAIN LINK METHOD
OF MEASURING THE AREA OF CORALS.

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ABSTRACT i

I evaluated the chain link method of measurements on coral species located on 5 transects in Greater Lameshur Bay, St. John, USVI. I found that there was a source of error between transects B and C. There was also significant difference between the percent of Montastrea annularis between transects and in the absolute length of Montastrea annularis between transects.

INTRODUCTION i

In Greater Lameshur Bay, St. John, USVI line transects have been set up to have an accurate measure of the coral species in that area. They have been used by students and the Virgin Islands National Park biologist, Dr. Caroline Rogers, to do a long term evaluation of the reef system. Through the use of line transects coral species diversity and complexity can be determined.

A previous study has been done on these particular line transects. In July 1986, SFS students and faculty set up 5 line transects in the bay, with the permission of Dr. Caroline Rogers. They used Rogers chain-link method to measure the coral species on the transects.

Greater and Lesser Lameshur Bays are situated on the south-east shore of the V.I. National Park. The bays are used by students and researchers to perform long and short term studies. Due to the fact that it is a national park, no one may manipulate the environment without a permit.

A further study of the transects has currently been completed by Fall-term, 1986 SFS students and faculty. This was undertaken to observe how the coral reef system changes over a period of time.

MATERIALS AND METHODS i

The 5 line transects in Greater Lameshur Bay are 10m long, and approximately 5m apart.

We used the chain-link method, developed by Rogers, to measure the area of the corals. Each chain-link is approximately

1.3cm. We learned this procedure from C. Lott. The chain is draped on top of the coral directly beneath the transect line. The measurement along the transect of the different coral species were recorded on mylar sheets.

The procedure of evaluating the chain-link method was accomplished through replicates. 3 replicates of the 5 transects were completed by the Fall SFS students. 2 additional replicates were obtained by Rhea Hoch and I with SCUBA.

For these 5 replicates the students and faculty hung washers from the transect lines and nails were laid on the substrate to improve the accuracy of the measurements.

This data was then analyzed by Supercalc 3. This gave the links and percentage of species for each transect.

I used Sokal and Rohlf's (1969) arcsine method. Then I applied ANOVA to the arcsine of the chain-link measurements of M. annularis with 5 replicates.

RESULTS i

The results for the 5 replicates of the 5 transects are listed in table 1.

I also disproved my 2 Null Hypotheses. The first stated that there is no significant difference in the percentage of M. annularis between transects. The second stated that there is no significant difference in the absolute length of M. annularis between transects.

DISCUSSION i

In completion of the arcsine and the ANOVA methods, the greatest source of error was found on transect lines B and C. This shows that the chain-link method is very hard to repeat accurately when doing replicates.

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Recognition should be given to Rhea Hoch, who never got cold even though I froze my --- off.

To Dr. Bob, "so-long, and thanks for all the fish!"

REFERENCES i

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Transect A	Replicate 1		Replicate 2		Replicate 3		Replicate 4		Replicate 5	
	links	%	links	%	links	%	links	%	links	%
Dead coral, algae	515	34.70	477	29.89	630	44.09	659	43.56	535	38.82
Sand	371	25.00	508	31.83	279	19.52	367	24.26	343	24.89
M. annularis	572	38.54	582	36.47	494	34.57	487	32.19	500	36.28
A. cervicornis	16	1.08	29	1.82	26	1.82	0	.00	0	.00
A. agaricites	10	.67	0	.00	0	.00	0	.00	0	.00
P. porites	0	.00	0	.00	0	.00	0	.00	0	.00
S. radians	0	.00	0	.00	0	.00	0	.00	0	.00
D. strigosa	0	.00	0	.00	0	.00	0	.00	0	.00
M. cavernosa	0	.00	0	.00	0	.00	0	.00	0	.00
TOTAL	1484	100.00	1596	100.00	1429	100.00	1513	100.00	1378	100.00

Transect B	Replicate 1		Replicate 2		Replicate 3		Replicate 4		Replicate 5	
	links	%	links	%	links	%	links	%	links	%
Dead coral, algae	568	42.29	567	44.12	513	41.01	686	46.73	1133	68.13
Sand	92	6.85	94	7.32	96	7.67	98	6.68	100	6.01
M. annularis	677	50.41	618	48.09	625	49.96	651	44.35	419	25.20
A. cervicornis	0	.00	0	.00	0	.00	0	.00	0	.00
A. agaricites	0	.00	0	.00	11	.88	6	.41	11	.66
P. porites	6	.45	6	.47	6	.48	18	1.23	0	.00
S. radians	0	.00	0	.00	0	.00	9	.61	0	.00
D. strigosa	0	.00	0	.00	0	.00	0	.00	0	.00
M. cavernosa	0	.00	0	.00	0	.00	0	.00	0	.00
TOTAL	1343	100.00	1285	100.00	1251	100.00	1468	100.00	1663	100.00

Transect C	Replicate 1		Replicate 2		Replicate 3		Replicate 4		Replicate 5	
	links	%	links	%	links	%	links	%	links	%
Dead coral, algae	518	36.56	567	44.12	513	41.01	579	36.83	680	48.16
Sand	78	5.50	94	7.32	96	7.67	80	5.09	83	5.88
M. annularis	744	52.51	618	48.09	625	49.96	837	53.24	617	43.70
A. cervicornis	0	.00	0	.00	0	.00	0	.00	0	.00
A. agaricites	6	.42	0	.00	11	.88	0	.00	5	.35
P. porites	71	5.01	6	.47	6	.48	71	4.52	27	1.91
S. radians	0	.00	0	.00	0	.00	0	.00	0	.00
D. strigosa	0	.00	0	.00	0	.00	0	.00	0	.00
M. cavernosa	0	.00	0	.00	0	.00	5	.32	0	.00
TOTAL	1417	100.00	1285	100.00	1251	100.00	1572	100.00	1412	100.00

Transect D	Replicate 1		Replicate 2		Replicate 3		Replicate 4		Replicate 5	
	links	%	links	%	links	%	links	%	links	%
Dead coral, algae	544	41.34	629	50.36	771	49.87	717	50.42	709	54.75
Sand	357	27.13	280	22.42	351	22.70	264	18.57	191	14.75
M. annularis	415	31.53	340	27.22	424	27.43	395	27.78	377	29.11
A. cervicornis	0	.00	0	.00	0	.00	0	.00	0	.00
A. agaricites	0	.00	0	.00	0	.00	28	1.97	11	.85
P. porites	0	.00	0	.00	0	.00	0	.00	0	.00
S. radians	0	.00	0	.00	0	.00	18	1.27	7	.54
D. strigosa	0	.00	0	.00	0	.00	0	.00	0	.00
M. cavernosa	0	.00	0	.00	0	.00	0	.00	0	.00
TOTAL	1316	100.00	1249	100.00	1546	100.00	1422	100.00	1295	100.00

Transect E	Replicate 1		Replicate 2		Replicate 3		Replicate 4		Replicate 5	
	links	%	links	%	links	%	links	%	links	%
Dead coral, algae	219	22.60	397	35.29	285	27.72	415	38.39	417	37.37
Sand	422	43.55	385	34.22	451	43.87	377	34.88	390	34.95
<i>M. annularis</i>	297	30.65	307	27.29	246	23.93	253	23.40	283	25.36
<i>A. cervicornis</i>	0	.00	0	.00	0	.00	0	.00	0	.00
<i>A. agaricites</i>	0	.00	0	.00	0	.00	0	.00	0	.00
<i>P. porites</i>	0	.00	0	.00	0	.00	0	.00	0	.00
<i>S. radians</i>	13	1.34	15	1.33	15	1.46	14	1.30	11	.99
<i>D. strigosa</i>	18	1.86	21	1.87	31	3.02	22	2.04	15	1.34
<i>M. cavernosa</i>	0	.00	0	.00	0	.00	0	.00	0	.00
TOTAL	969	100.00	1125	100.00	1028	100.00	1081	100.00	1116	100.00

Table 1. The link measurements of coral species, dead coral and algae and sand on the transects, and their percentages.
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