Title: Application of baited remote underwater video stations to assess benthic coverage in the Persian Gulf[1]

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Abstract

A Baited remote underwater video station (BRUVS) is generally considered an appropriate sampling tools for fish. The applicability of BRUVS to determine the substrate coverage were assessed by comparing stills from BRUVS videos to traditional point intercept transect (PIT) data to estimate percentage covers(PC) of different benthic substrate categories. Mean PCs of hard corals, rock, sand, and coral growth forms yielded statistically identical values with the two survey methods, while PC of motile epibenthic invertebrates were underestimated by BRUVS in areas of both high and moderate relief. Yet, multivariate analyses revealed that the two methods yield similar substrate assemblage in an area of moderate relief. Results of our study suggests that the BRUVS can be effectively used to quantify both presence/absence of a basic set of benthic habitat characteristics and diversity of coral growth forms on coral reefs in the Persian Gulf.

Keywords: remote video; point intercept transect; percentage cover; substrate

1. Introduction

Coral reef fish are highly associated with their surrounding habitat and actively respond to changes in habitat structure (Sale, 1991). As such, accurate information on relationships between habitat structure and reef fish communities seems fundamental to understanding of the effects of natural/ anthropogenic disturbances on coral reef functioning (Jones and Syms, 1998). The main attributes of a marine habitat are structural complexity (topography/rugosity), total biological coverage, and habitat composition (Öhman and Rajasuriya, 1998). Percentage cover (PC) is a widely used metric of habitat structure that can provide estimates of both biological coverage and habitat composition (Hill and Wilkinson, 2004), and is widely used an indicator of ecological change. For example, PC of live corals can be used as an indicator of the health of coral reefs (Hill and Wilkinson, 2004), changes in microalgae algae cover can be monitored to detect coral–algal phase shifts (McManus and Polsenberg, 2004), and changes in PC of abiotic/biotic substrata can be used to predict altered settlement and recruitment in reef fish (Tolimieri, 1995). Accurate information for PC is usually obtained by diver-based survey methods (e.g. Manta tow, line intercept transect, point intercept transect (PIT), and timed swimming) (Hill and Wilkinson, 2004). These methods, however, have certain limitations in terms of the diving time and depth, and the availability of trained divers (Hill and Wilkinson, 2004). Remote systems (e.g., remotely operated vehicles, autonomous underwater vehicles, drop Video systems) have accordingly been developed (Mallet and Pelletier, 2014; Singh et al., 2004).

A baited remote underwater video station (BRUVS) is a drop video system which is usually used for assessing fish populations. Yet, attempts have been made in recent years to make the use of

BRUVS in estimating PCs by point sampling of the stills taken off the video from a BRUVS (Cappo et al., 2011; Dorman et al., 2012). In this case, the BRUVS method can be viewed as a promising alternative to the diver-based methods for determining PC which suffer from SCUBA diving limitations. Additionally, it will provide estimates of both cover and fish abundance (and species richness) in a single observational unit, thereby requiring less labor-intensive operations in the field. Meanwhile, performance of the BRUVS as a tool for determining PC may be affected by general problems associated image analysis and/or point sampling procedures, e.g., detectability issues in complex/ rugose environments (Leonard and Clark, 1993), and accuracy issues related to the way(s) that the photos are examined using different point sampling strategies (Endean et al., 1997). The present study was designed to explore the use of BRUVS still photos for estimating benthic cover on coral reefs in the Persian Gulf. We looked for the accuracy of the method by comparing the estimated mean PCs of different substrate categories with the same measurements taken by performing PIT (a diver-based point sampling survey method) surveys. We tested two main hypotheses: (i) suitability of the BRUV method for determining benthic cover is dependent on the habitat rugosity/complexity (expressed as coral relief; (Carpenter et al., 1981), (ii) reliability of the estimated PC is dependent on the patterns of points overlaid on BRUVS photos.

2. Materials and methods

2.1. Study area

This study was performed in June 2014 as a part of the Nayband Marine Park monitoring program that assessed the fish assemblages of Borkouh Bay (27°18.345′N, 52°40.389′E; an area of high hard coral relief), eastern Nayband Bay (27°24.153′N, 52°35.378′E; an area of moderate hard coral relief), and western Nayband Bay (27°28.205′N, 52°35.921′E; an area of low hard coral relief). Experimental site were selected according to their live hard coral covers which were determined in the previous study (Ghazilou et al., unpublished results).

2.2. Experimental procedure and data collection

Two levels of PC measurement were employed:

1- General abiotic/biotic substrate categories including live hard coral (HC), soft coral (SF), sponge (SP), nutrient indicator algae (NIA: Padina sp.; (Nejatkhah-Manavi et al., 2011)), recently killed coral (RKC), rock (RC), sand (SD), rubble (RB), and motile epibenthic invertebrates (MEI).

2- Growth forms of live hard corals including massive, submissive, columnar/digitate, and encrusting.

A horizontal look-outward system was used for BRUVS deployments. In general, two types of BRUV systems, a horizontal-BRUVS (HBRUVS) and vertical-BRUVS (VBRUVS), have been developed for monitoring fish populations but the VBURVS has been shown to be less appropriate for studying coral reef fish communities (Langlois et al., 2006). The BRUV sampling apparatus included a GoPro® HERO3 Black Edition HD camera, fixed 0.30 m above the base of a stainless steel frame, and a plastic bait bag 1.2 m from the camera. All videos were recorded at depths of 4-6m (a depth range of highest coral cover in the area; (Wilson et al., 2002)). Each cast recorded 60 min of front-view videos using full HD and wide-angle (170°) casting modes. Twelve drops (an optimized sample size for estimating reef fish abundances in the area; Ghazilou et al. unpublished data) were deployed at each study area (Borkouh Bay, eastern Nayband Bay, or western Nayband Bay) separated by a minimum of 250 m (Dorman et al., 2012). Snapshots from the recorded videos (one snapshot per video) were captured in the laboratory, imported into Adobe Photoshop CS4, and cropped to produce 10.66 × 4 inch, 300 pixel/inch TIFF images (Fig. 1). The PC of each substrate category or as well as the proportion of coral growth forms were computed for edited images using Coral Point Count with Excel extensions (CPCe) software (Kohler and Gill, 2006). Predetermined numbers of random (10, 25, 40, 65, or 80), stratified random (40), or stratified (40) sampling points were overlaid on each image (Fig. 2). The points were then previewed, and a substrate category was assigned to each point. Those sampling points which were overlaid on the water column were excluded from the analyses.

PIT surveys were performed at the same locations. For each PIT survey, a 100 m fiberglass tape measure (Freemans®- India) was first laid straight on the substratum at the same depth range as BRUV deployments. Close-up top view photos of the substrate were then taken at 0.5-m intervals along four intermittent transect segments 20 m in length (modified from PERSGA, 2004). A total of three transect lines were surveyed at each study area. The PC of the substrate categories and hard coral growth forms were determined by recording the corresponding categories of substrate that occurred exactly beneath the considered point for each photo.

2.3. Data analysis

The comparative ability of the BRUVS to estimate the benthic coverage was evaluated by univariate (i.e. PC of different substrate categories, coral growth form richness and diversity coral growth form diversity) and multivariate (i.e. substrate assemblage) analyses.

2.3.1. PCs of substrate categories

The assumptions of normality and homoscedasticity for the univariate analyses were first assessed using Kolmogorov-Smirnov and Levene's tests, respectively and arcsine square-root transformation was applied to achieve normal distributions (Zar, 1998). A one-way analysis of variance (ANOVA) followed by Tukey's HSD test assessed the impact of the survey method on the estimated PC of each category. A more conservative significance level of $P< 0.01$ was considered to account for heteroscedasticity (Zar, 1998).

Pearson's product-moment correlation coefficients were calculated for pair-wise combinations of BRUV methods to test for the reliability of PCs obtained by applying different point sampling strategies (Booth et al., 2006). The same approach was used to assess the associations among substrate components at experimental site.

2.3.2. Coral growth form richness and diversity

Hard coral growth form richness was calculated by counting the number of coral growth forms that were recorded. Coral growth form diversity was calculated as:

$$N = \exp(-\sum_{i}^{s} p_i ln p_i)$$

Where s is the total number of growth forms in the sample and p_i is proportional coverage of *i*th growth form (Wiens and Rotenberry, 1981). Data on richness and diversity were not normal and normality could not be achieved by transformation. Growth form richness or diversity values were compared among different methods by means of Kruskal–Wallis tests.

2.3.3. Substrate assemblage

A Bray-Curtis similarity matrix of arcsine square-root transformed data were generated. The similarity matrices were analysed by a one-factor permutational multivariate analysis of variance (PERMANOVA) to compare the substrate compositions obtained by the different methods (Anderson, 2001). Significance of the observed differences was tested at $p= 0.05$ using 9999 permutaions of residuals under a reduced model. Indices of multivariate dispersion (MVDISP) were used to check for variability among replicate samples and permutational analysis of multivariate dispersions (PERMDISP) was performed to determine whether the significant differences were caused by a difference in the position of the treatment groups in multivariate space and/or differences in their dispersion (Clarke and Warwick, 2001). PERMANOVAs were followed by post-hoc tests to compare levels of fixed factors. Contribution of each family to the observed pairwise differences was determined using SIMPER routine in PRIMER V6 software (Clarke and Gorley, 2006). Non-metric multidimensional scaling (nMDS) on the basis of Bray-Curtis dissimilarity matrix calculated from arcsine square-root transformed estimates of coverage ratios was used to visualize variations in substrate assemblage obtained by different PIT or BRUV methods.

2.3.4. Optimization

The mean levels of precision (standard error as a ratio of the mean) of PC estimates of HC were calculated for 3–10 replicate BRUV deployments (drops) using bootstrapping with replacement (modified from Gladstone et al. 2012) to determine the optimum number of drops (sample size) needed to estimate hard-coral PC. Random simulations (n = 1000) were performed using a batch of 36 replicates available for each site. Calculated mean precisions were plotted against replicate size, allowing the determination of the optimum sample size at a precision level of 0.1.

To determine the optimum number of sampling points (sample unit size) for estimating hard-corals PC, the BRUV data were subjected to a power analysis by statistically comparing (one-way ANOVA) the minimum change (δ) of substrate coverage that could be detected using 10, 25, 40, 65, or 80 random points (modified from (Lam et al., 2006)).

Optimization of the sampling design was performed to obtain a precise estimation of live hard coral coverage and other categories were not considered from the analyses. This was due to the highlighted importance of HC in determining reef status (English et al., 1994)

3. Results

3.1. Single category coverage

Only four substrate categories occurred frequently (>50%) in the survey samples of eastern Nayband Bay, or western Nayband Bay: HC, RC, SD, and MEI. RB only occurred in eastern Nayband Bay. The other categories were observed very rarely and were thus excluded from the analyses. Hard corals were predominant at Borkouh Bay, whereas rock constituted the predominant substrate category at eastern and western Nayband Bay (Fig. 3). PCs of HC, RC, SD, and RB did not differ significantly ($P \geq 0.05$) among examined methods (Table 1). Holothurians and echinoids were the major components of the MEI category. There was a significant difference in PC of MEI obtained by different methods (Table 1). Pairwise comparisons showed that the BRUVS method significantly ($P<0.05$) underestimated the PC of MEI in areas of high and moderate relief (Fig. 3). The MEI and HC were significantly negatively correlated in areas of both high (r=-0.88, p=0.00) and moderate relief (r= -0.73, p= 0.01). The way that the points were overlaid in BRUVS photos had no significant ($P \geq 0.05$) effect on estimated PCs of substrates (Fig. 3). The correlation coefficients between different strategies were generally strong and significant for all substrate categories except for MEI (Table 2). Benthic hard coral communities of experimental sites were dominated by digitate corals contributing 70.3%±4.3 to coral cover at Borkouh Bay, 40.12% ±7.3 at eastern Nayband bay, and 55.51%±4.44 at western Nayband Bay. Coral growth form richness and diversity did not differ significantly among BRUV and PIT methods (Table 3)

3.2. Substrate assemblage

The PERMANOVA showed that the estimates of the substrate assemblage of Boukouh Bay, differed significantly (P<0.05) among the survey methods (Table 4). Follow-up pairwise tests between methods indicated significant differences between the PIT and BRUV methods (Table

4). SIMPER analyses highlighted that the "MEI" category primarily accounted for the observed differences in substrate assemblage obtained by using PIT and BRUV methods at the Borkouh Bay (Table 5). Meanwhile, replicate substrate compositions (in terms of percentage cover) determined by the PIT method (MVDISP=0.62) were less variable than the $\mathrm{BRUV}_{\text{(stratified random)}}$ (MVDISP=1.08), $\mathrm{BRUV}_{\text{(random)}}$ (MVDISP=1.10), or $\mathrm{BRUV}_{\text{(stratified)}}$ (MVDISP=1.19) and nMDS ordination plot illustrated some separation between the PIT and BRUV methods in the Borkouh Bay and eastern Nayband Bay (Fig. 4).

3.3. Optimisation

Increasing the number of points to be sampled in CPCe had a significant effect ($p<0.05$) on the δ values for eastern and western Nayband Bay, with significantly higher δs obtained for $\leq$10 sampling points (Table 6).

The precision of estimates of percentage cover of live hard corals was improved by increasing the number of replicate BRUV deployments (drops) at examined sites (Fig. 5). Totals of 11, 50, and 7 replicate deployments were required to achieve the desired precision level (i.e. 0.1) in the areas of high (Borkouh Bay), moderate (eastern Nayband Bay), and low (western Nayband Bay) relief, respectively.

4. Discussion

Our results indicated that the analysis of the stills from BRUVS approximates the same estimates on PCs of HC, RC, SD, or MEI as the PIT surveys in the Persian Gulf. This conclusion, however, was not robust at different locations across the habitat complexity gradient, suggesting that the BRUVS may only be effectively applied on relatively low-complexity reefs. Marine habitats are 3D environments (Costello, 2009), and the ability of a survey method to accurately and precisely detect the components of the substrata depends on the distributional pattern and size of the specified components and on the topography of the field (Leonard and Clark, 1993). As such, capturing large and high resolution multi-view images of the substratum is necessary to accurately detect patchily distributed cryptic components in complex marine environments, e.g., coral reefs (Miller and Ambrose, 2000). The lower resolution of digitised large-scale photos, however, impedes the ability to identify small individuals and cryptic species in 2D planar photographs (Foster et al., 1991; Leujak and Ormond, 2007; Lirman et al., 2007). In the present study, a mono-view horizontal video recording system was used for recording videos, resulting in acquisition of planar 2D still photos. Coral reefs dominated most areas of the 2D photos, particularly in areas of high or moderate coral relief which made it difficult to recognise subsurface dwelling sea cucumbers or sea urchins which are generally inhabit subsurface. Detectability issues have been reported to be a common issue associated with 2D photography/videography. For example, Foster et al. (1991) found higher estimates of PCs of sessile animals on point quadrats that photoquadrats. Leujak and Ormond (2007) demonstrated that that photo-quadrate methods would be less effective in detecting cryptic and/or shaded biota and suggested the use of filed notes to record presence of cryptic animals. With BRUV video-photography, the problem may be substantially resolved by analysing the full movie to record the maximum number of sea urchins/sea cucumbers (MaxN) in a single video frame. The same approach has been suggested for estimating relative abundances of fish in BRUV surveys (Cappo et al., 2006). In our study, we did not followed the MaxN approach. Instead, we decided to analyse the full movie records to obtain the snapshots representing fewest number of fish, thereby minimizing the shading action of fish on substrates. The captured snapshots were implicitly used for analyzing substrate coverage (including PC of MEI).

The camera viewing angle is another potential negative issue of the BRUV method. We used a horizontal look-outward system for our study, resulting in production of front view seascape videophotographs the upper portions of which have been occupied by the water column. Although, cropping was applied to reduce theses portions, some sampling points were inevitably overlaid on the water column, and these sampling points were excluded from the analyses. The effective sampling point density (i.e. number of points overlaid on the actual substrata) consequently varied among the replicates, which could compromise the accuracy of the estimated PC. Although not examined in our study, this problem may be partially resolved by using interactive cropping (fine cropping each image at the water column/substrate interface) rather than fixed cropping.

Hard coral growth forms have been found as a suitable substitute for coral diversity in areas of high coral species richness (Hill and Wilkinson, 2004). Information on diversity and richness of coral growth form can also be used for monitoring changes in reef topography (Hill and Wilkinson, 2004). Leujak and Ormond (2007) concluded that, compared to the PC of broad substrate categories, relatively higher levels of resolution should be deployed to get accurate estimates on PC of coral growth forms. Results of our study indicated that, resolution of the BRUVS photos were high enough to ensure accurate determination of PC of coral growth forms, since no magnifications were performed during the process of image analysis. Yet, application of point sampling-based methods is not recommended for assessing coral growth form diversity due to low precision (Leujak and Ormond, 2007).

In the present study, analyses of BRUVS photos were performed using differed point sampling strategies, including random sampling, stratified random sampling, and stratified sampling. We have compared the accuracy different point sampling strategies and found no significant differences among different treatments. Estimates of PCs of HC, RC, or SD were also highly correlated among random, stratified random and stratified methods, suggesting high reliability of different sampling methods. Previous studies employing the use of different sampling scheme for photo/video analysis revealed somewhat inconsistent results. For example, (Leujak, 2006) found no differences between random and non-random sampling strategies for video-transect method. In contrast, Endean et al. (1997) demonstrated that the stratified sampling designs may suffer autocorrelation particularly for those components that are regularity distributed (e.g. *Porites* corals). In the present study, we did not found significant correlation between estimated PCs of HC obtained by random and stratified/stratified random sampling patterns in an area of low relief (western Nayband Bay). In this case, our result may highlight the autocorrelation phenomenon on areas of low coral relief (western Nayband Bay), since coral colonies were more dispersed in western Nayband Bay.

In general, studies on fish-habitat associations include utilization of different methods for quantifying fish abundances and habitat structure (e.g. Ahmadia et al., 2012; Bozec et al., 2005). Baited remote underwater video stations has become a common tool for estimating the abundance and diversity of fish in marine protected areas, deep sea habitats, and/or topographically complex marine habitats (Cappo et al., 2006). The method have been found to provide cost effective alternative to diver-based methods, minimizing issues associated observer errors and altered behavior of fish in the presence of divers (Watson and Harvey, 2007). Based on the results of the current study, it can be concluded that the BRUV technique can also be used to accurately determine the percent coverage of main substrata in marine environments. In this case BRUVS will simultaneously provide accurate information on both fish abundance and habitat structure, resulting in less labor intensive operations in the field.

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Table 1. Results of one-way ANOVA testing the effects of survey method on estimated percentage cover. HC, live hard corals; RC, rock; SD, sand; MEI, motile epibenthic invertebrates; RB, rubble

Hard coral relief	Substrate category	df_1	df_2	F	*p*
High	HC	3	44	1.86	0.15
	RC	3	44	0.26	0.85
	SD	3	44	1.80	0.16
	MEI	3	44	48.64	0.00
Moderate	HC	3	44	0.67	0.57
	RC	3	44	0.27	0.84
	SD	3	44	0.54	0.40
	MEI	3	44	4.19	0.01
	RB	3	44	0.29	0.83
Low	HC	3	44	0.19	0.90
	RC	3	44	0.49	0.61
	SD	3	44	1.57	0.21
	MEI	3	44	0.60	0.62

Table 2. Pearson's correlation coefficient (r) and levels of significance of correlations between different strategies of point sampling. HC, live hard corals; RC, rock; SD, sand; MEI, motile epibenthic invertebrates; R, random; SR, stratified random; S, stratified

		Area of high relief		Area of moderate relief		Area of low relief	
Substrate category	comparison	r	*p*	r	*p*	r	*p*
HC	R-S	0.89	0.00	0.95	0.00	0.44	0.14
	R-SR	0.86	0.00	0.88	0.00	0.36	0.23
	SR-S	0.90	0.00	0.96	0.00	0.70	0.01
RC	R-S	0.94	0.00	0.92	0.00	0.50	0.09
	R-SR	0.95	0.00	0.93	0.00	0.71	0.008
	SR-S	0.94	0.00	0.97	0.00	0.74	0.006
SD	R-S	0.63	0.02	0.62	0.029	0.73	0.006
	R-SR	0.78	0.002	0.76	0.004	0.90	0.00
	SR-S	0.86	0.00	0.78	0.002	0.69	0.01
MEI	R-S	0.00	1.00	0.56	0.055	0.14	0.65
	R-SR	-	-	0.57	0.05	0.47	0.11
	SR-S	-	-	0.20	0.51	0.10	0.74

Table 3. Results of Kruskal–Wallis tests comparing the effects of survey method on coral growth form richness and diversity

Hard coral relief	Variable	df	H	P $_{(adjusted\ for\ ties)}$
High	Growth form richness	3	5.76	0.12
	Growth form diversity	3	4.58	0.20
Moderate	Growth form richness	3	3.56	0.35
	Growth form diversity	3	1.25	0.74
Low	Growth form richness	3	5.34	0.14
	Growth form diversity	3	3.05	0.38

Table 4. Results of PERMANOVA and follow-up pairwise comparisons on PC estimation data obtained by different survey methods at high, moderate or low levels of coral relief

Coral relief	Pseudo F	$p_{(perm)}$
High	3.86	0.00
Moderate	1.76	0.10
Low	1.32	0.23
Pairwise comparisons (the area of high relief)		
	t- value	$P_{(perm)}$
PIT Vs. $BRUV_{(random)}$	2.94	0.002
PIT Vs. $BRUV_{(stratified\ random)}$	3.34	0.001
PIT Vs. $BRUV_{(stratified)}$	2.73	0.002
$BRUV_{(random)}$ Vs. $BRUV_{(stratified\ random)}$	0.27	0.92
$BRUV_{(random)}$ Vs. $BRUV_{(stratified)}$	0.24	0.91
$BRUV_{(stratified\ random)}$ Vs. $BRUV_{(stratified)}$	0.55	0.75

Note: multivariate dispersions were not significantly different ($p \geq 0.05$) among different groups

Table 5. Percent contribution of the top contributor category to the observed differences between survey methods

	Top contributor	Average proportion		%δ	δ/SD	Contribution (%)
		Group 1	Group 2			
PIT Vs. $BRUV_{(random)}$	OT	6.44	4.01	9.59	2.15	31.42
PIT Vs. $BRUV_{(stratified\ random)}$	OT	6.44	4.53	11.09	3.17	34.09
PIT Vs. $BRUV_{(stratified)}$	OT	6.44	4.49	9.75	2.28	39.99

Table 2. Comparison of minimum detectable changes of live hard corals derived from different number of sampling points used for BRUV analysis.

*Different letters within a row indicate significant differences (*P*≤0.05).

	BRUV-photo (Random)					PIT
	10	25	40	65	80	40
Borkouh Bay (an area of high coral relief)	7.1^{A}*	2.0A^{B}	0.9^{B}	0.5^{B}	0.4^{B}	0.3^{B}
Eastern Nayband Bay (an area of moderate coral relief)	10.7^{A}	3.4^{B}	1.6^{B}	0.8^{B}	0.7^{B}	0.2^{B}
Western Nayband bay (an area of low coral relief)	8.8^{A}	1.5^{B}	0.8^{B}	0.6^{B}	0.3^{B}	0.2^{B}

Fig 1

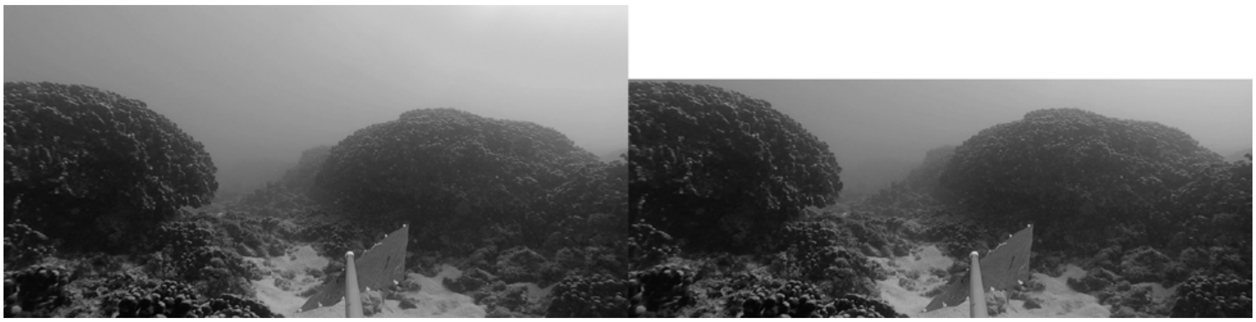

Fig 2

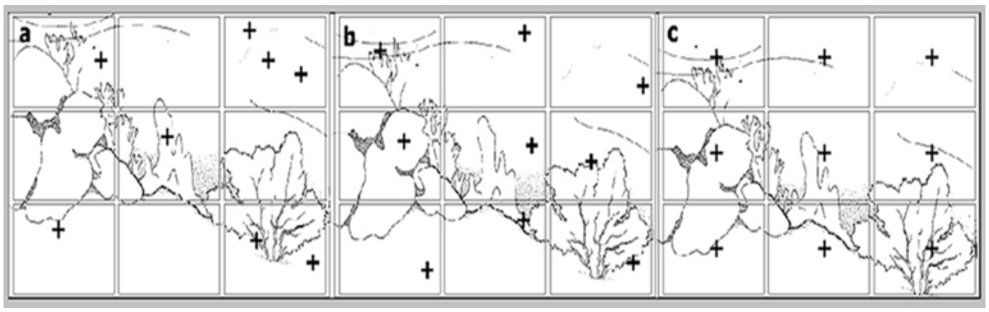

Fig 3

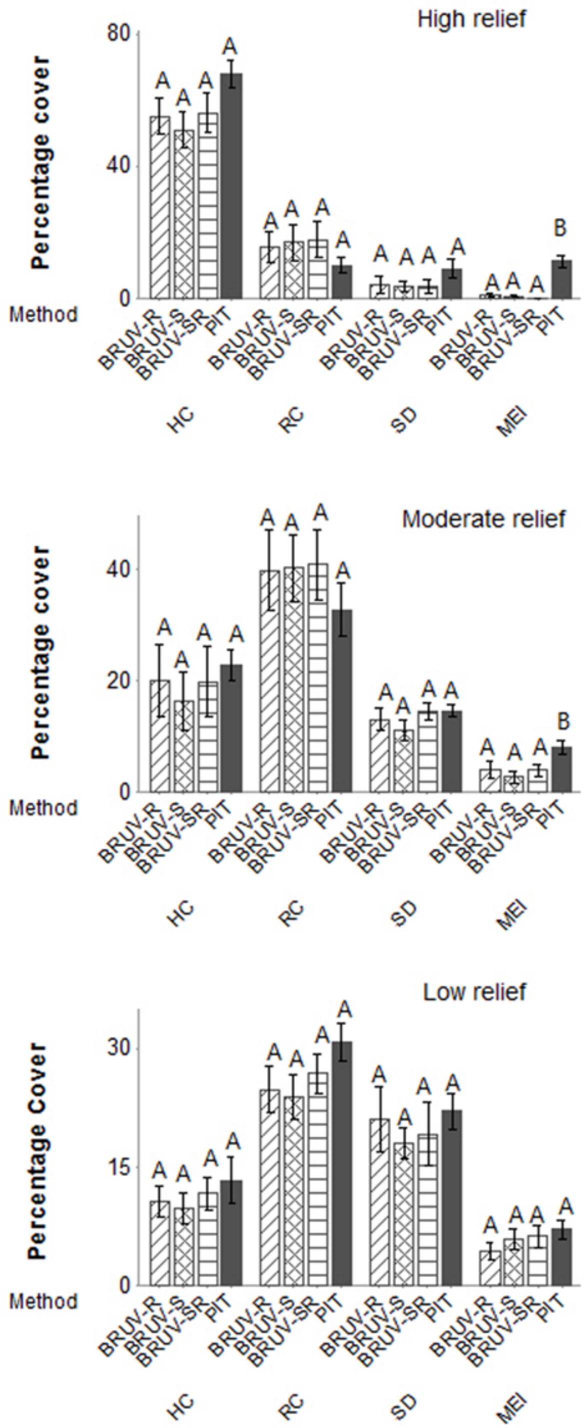
High relief
Percentage cover
80
40
0
Method
BRUV-R
BRUV-S
BRUV-SR
PIT
HC
RC
SD
MEI
Moderate relief
Percentage cover
40
20
0
Method
HC
RC
SD
MEI
Low relief
Percentage Cover
30
15
0
Method
HC
RC
SD
MEI

Fig 4

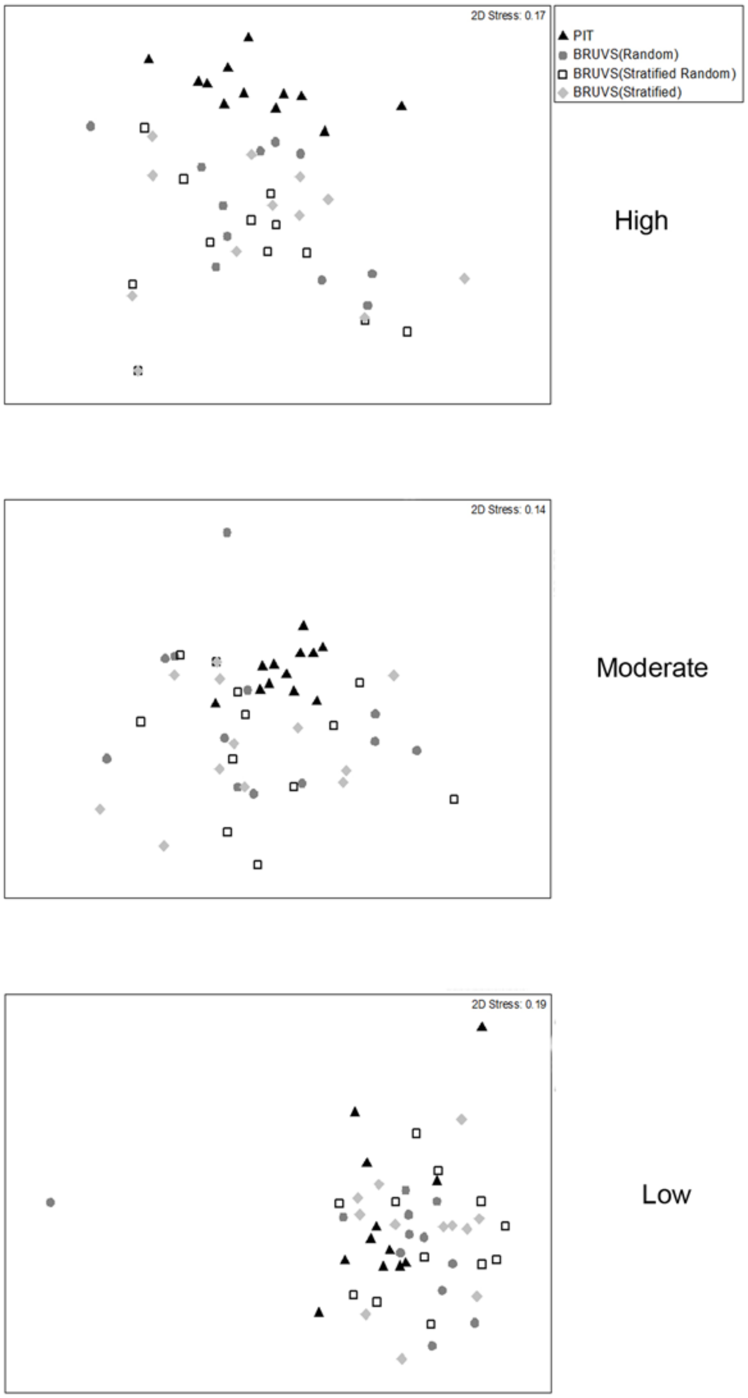
2D Stress: 0.17
PIT
BRUVS(Random)
BRUVS(Stratified Random)
BRUVS(Stratified)
High
2D Stress: 0.14
Moderate
2D Stress: 0.19
Low

Fig 5

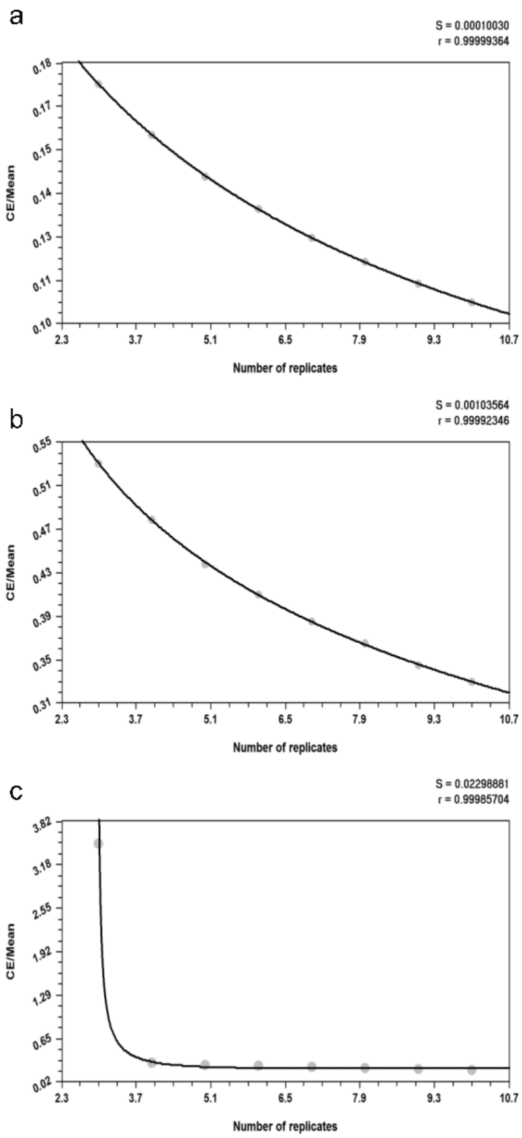

Figure legends

Fig. 1. A BRUV video photograph before (left) and after (right) cropping. Note the reduced proportions of the water column in the cropped image.

Fig. 2. Strategies by which sampling point were overlaid on BRUV stills: (a) random, (b) stratified random, and (c) stratified.

Fig 3. Mean percentage cover of different substrate categories obtained by BRUV and point PIT survey methods. HC, live hard corals; RC, rock; SD, sand; MEI, motile epibenthic invertebrates; RB, rubble; –R, random; -SR, stratified random; -S, stratified. Note: dissimilar uppercase letters denote significant difference ($P < 0.05$) between methods. Error bars represent ±1 standard error.

Figure 4. nMDS plots of substrate assemblage driven by different survey methods. High, area of high relief; Moderate, area of moderate relief; Low, area of low relief

Fig 5. The effect of replicate size on the precision of the estimates of hard-coral coverage obtained by BRUVs at (a) Borkouh Bay, (b) eastern Nayband Bay, and (c) western Nayband Bay.