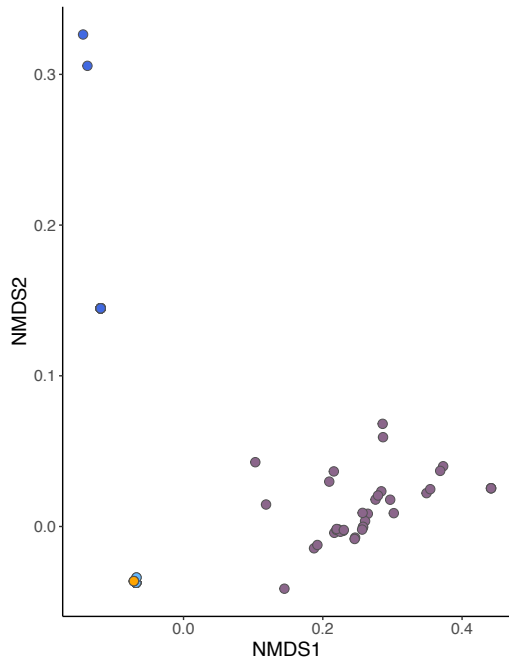
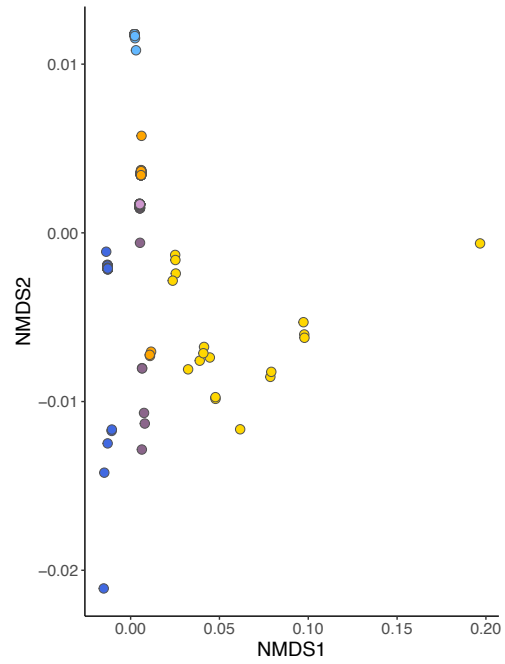


## Supplementary Figures and Tables

**A** *A. boucheti*



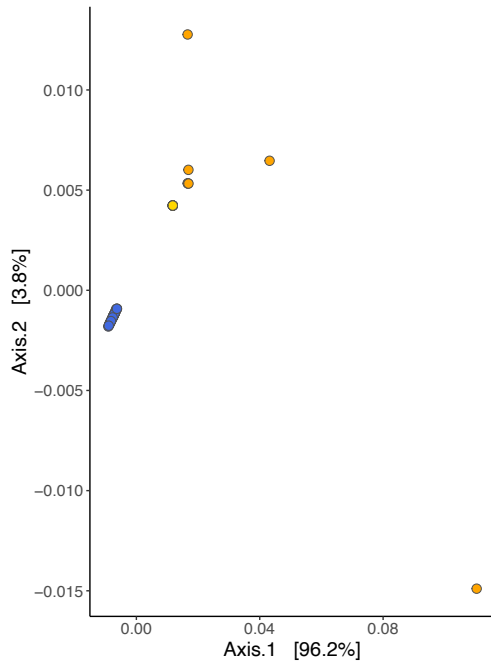
**B** *A. kojimai*



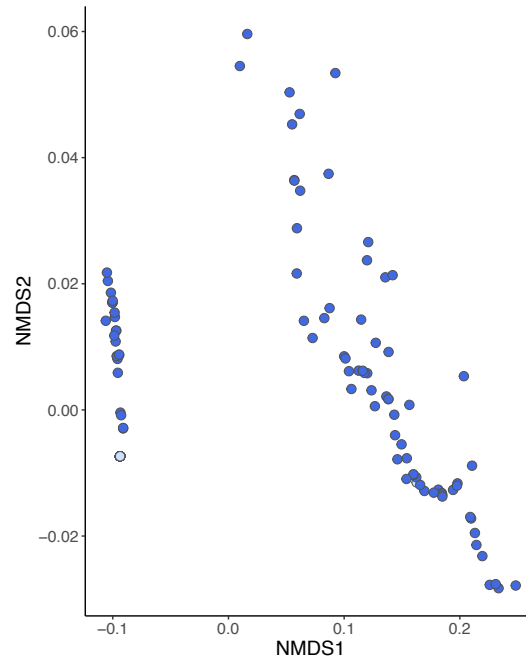
Geographic region

- Tonga Arc
- NELSC
- ELSC
- Futuna
- North Fiji Basin
- Manus Basin
- Woodlark

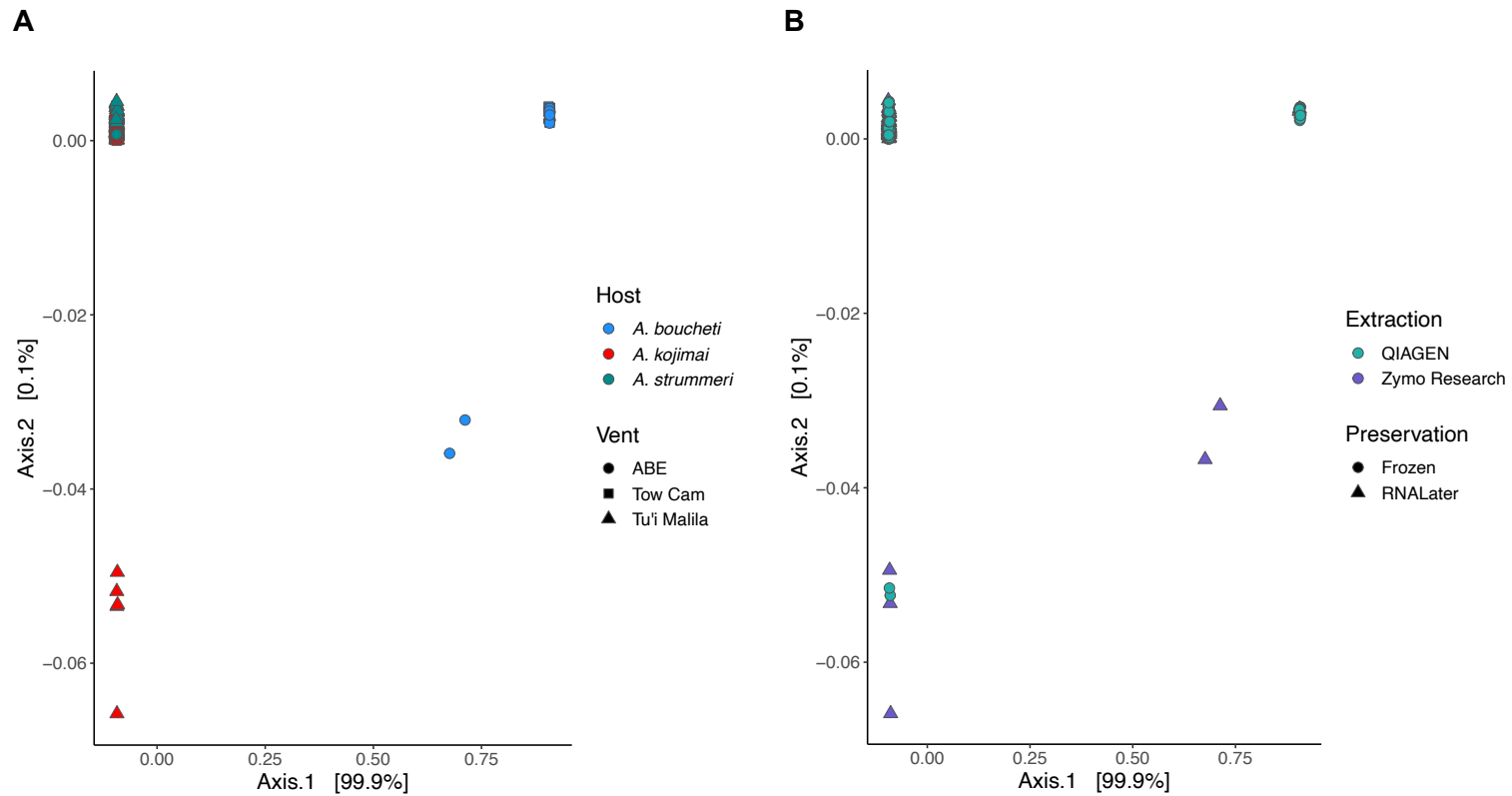
**C** *A. strummeri*



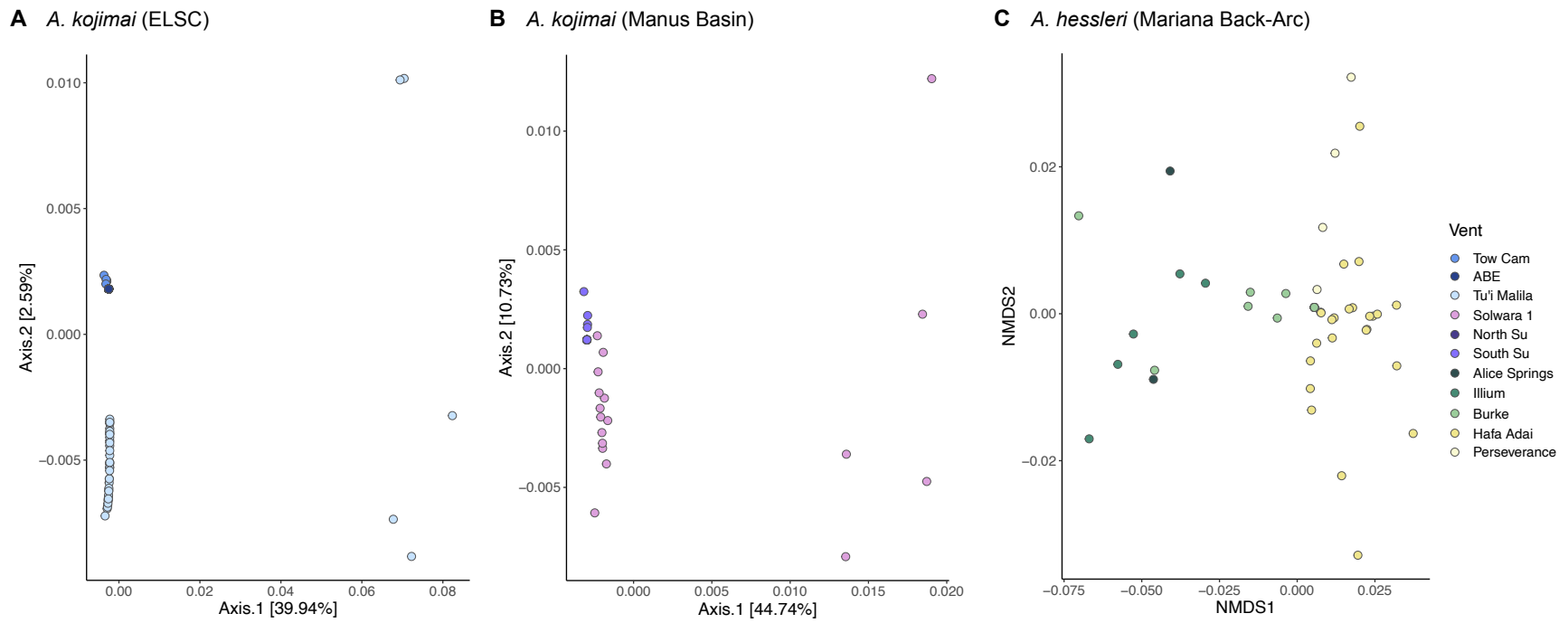
**D** *I. nautiliei*



**Fig. S1** Metric and non-metric multidimensional scaling plots based on weighted UniFrac distances for host species sampled across broader geographic regions. Proportional ASV abundances for *A. boucheti* and *I. nautiliei* were square-root transformed before analysis to improve fit of the data. Metric multidimensional scaling was used in *A. strummeri* due to data limitations. ASVs are notably structured by geographic region in *Alviniconcha*, but not *Ifremeria*.



**Fig. S2** Metric multidimensional scaling plots based on weighted UniFrac distances for *Alviniconcha* species from the ELSC. Samples from this region were processed with a mixture of DNA preservation and extraction methods and were therefore suitable for assessing the effect of methodology on patterns of symbiont ASV diversity. Proportional abundances were square-root transformed before analysis and points were jittered slightly to improve visualization of overlapping samples. No obvious clustering by method is observed and structuring of samples appears to be better explained by biological factors, such as host species (see also Table 1).



**Fig. S3** Metric and non-metric multidimensional scaling plots based on weighted UniFrac distances for *A. kojimai* and *A. hessleri*. Within-basin structure for the other species was either not observed or could not be accurately assessed due to data insufficiency.

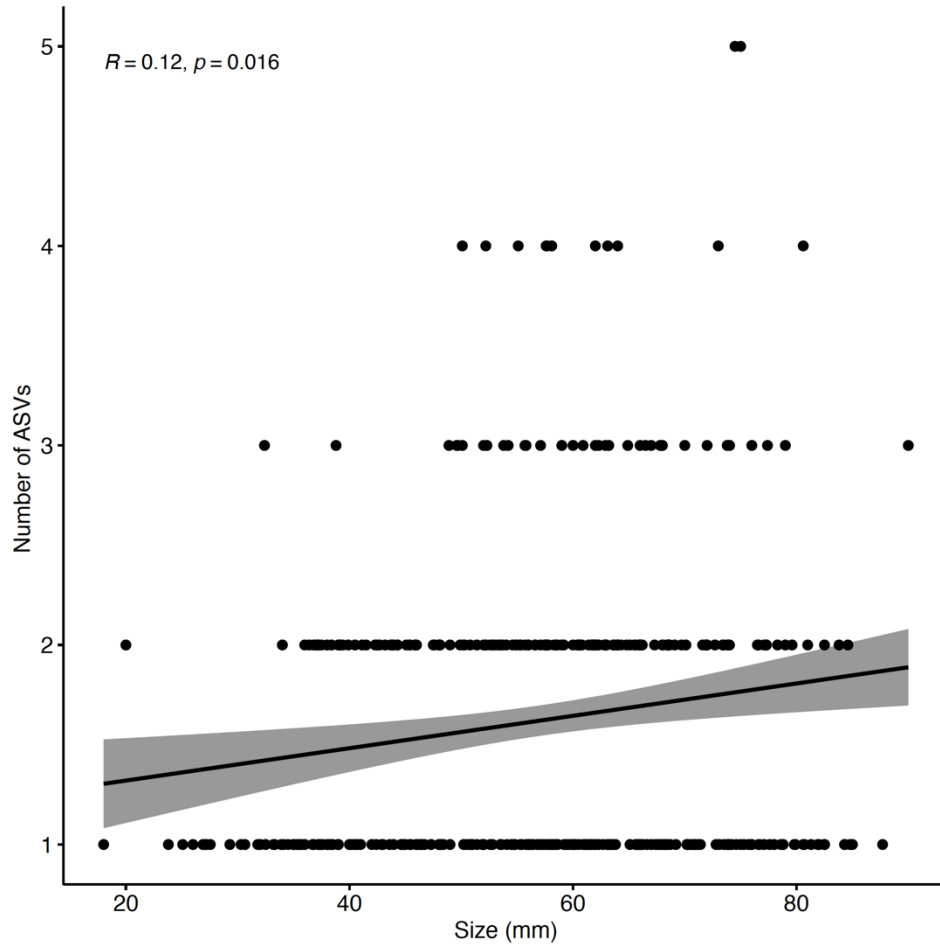


Fig. S4 Correlation of symbiont richness with host size.

**Table S1** Number of snails sampled per species and vent field.

<b>Host</b>	<b>Geographic region</b>	<b>Vent</b>	<b># samples</b>
<i>A. adamantis</i>	Mariana Arc	Chamorro	2
<i>A. boucheti</i>	Tonga Arc	Niua South	83
	NELSC	Mangatolo	18
	ELSC	Tow Cam	7
		ABE	13
	Futuna	Fati Ufu	3
	Manus Basin	Big Papi	8
		Roman Ruins	10
		Fenway	2
		North Su	4
		South Su	12
<i>A. hessleri</i>	Mariana Back-Arc	Alice Springs	2
		Illium	5
		Burke	7
		Hafa Adai	24
		Perseverance	9
<i>A. kojimai</i>	NELSC	Mangatolo	21
	ELSC	Tow Cam	38
		ABE	5
		Tu'i Malila	105
	Futuna	Fati Ufu	41
		Fatu Kapa	15
	North Fiji Basin	Phoenix	35
	Manus Basin	Solwara 1	18
		North Su	4
		South Su	15
Woodlark	Scala	24	
<i>A. marisindica</i>	Carlsberg Ridge	Wocan	8
<i>A. strummeri</i>	ELSC	Tow Cam	2
		ABE	1
		Tu'i Malila	39
	Futuna	Fati Ufu	7
	North Fiji Basin	Phoenix	7
<i>I. nautiliei</i>	Tonga Arc	Niua South	59
	ELSC	Tahi Moana	32
		ABE	14
		Tu'i Malila	62