**SUPPLEMENTARY INFORMATION**

**The Relationship Between Genetic Diversity, Function, and Stability in Marine Foundation Species**

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**Table S1**. Listed metrics of genetic diversity as they were reported in the publication by taxa. “Overall category” refers to one of the eight categories used to describe the type of genetic information that was reported: Genotypic Information, Allelic Information, Observed Heterozygosity, Expected Heterozygosity, Inbreeding Coefficients, Diversity Indices, Nucleotide Specific Metrics, and Haplotype/Clade Metrics. The metric category refers to the grouping that each “paper specific metric” belongs to. Between publications, multiple terms might be used, but ultimately refer to the same metric. Genotypic richness could be calculated as “R” which equals (G-1)/(N-1) where G represents the number of unique multi-locus genotypes and N is the total sample size. It could also be calculated as “C” which equals the number of unique multi-locus genotypes divided by the number of ramets sampled for each population.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Taxon** | **Overall Category** | **Metric Category** | **Paper Specific Terms** | **Number of Instances** |
| Mangroves | Genotypic Information | Number of genotypes | Number of Genotypes | 1 |
| Allelic Information | Allelic Richness | Allelic Richness | 1 |
| Number of alleles per locus | 1 |
| Observed Heterozygosity | Observed heterozygosity | Observed heterozygosity | 1 |
| Expected Heterozygosity | Expected heterozygosity | Expected heterozygosity | 2 |
| Inbreeding Coefficient | Inbreeding Coefficient | FIS | 1 |
| Nucleotide Specific Metrics | Nucleotide diversity | Population diversity (pi/kb) | 6 |
| Total |  |  | **13** |
| Kelps | Genotypic Information | Genotypic diversity (R) | Genotypic diversity | 1 |
| Allelic Information | Allelic Richness | Allelic richness | 3 |
| Standardized allelic richness | 1 |
| Number of alleles | Number of alleles  | 3 |
| Mean number of alleles | 1 |
| Number of private alleles | Number of private alleles (neutral, adaptive, percentage) | 3 |
| Standardized number of private alleles | 1 |
| Observed Heterozygosity | Observed heterozygosity | Observed heterozygosity | 2 |
| Observed heterozygosity (neutral, adaptive, microsatellites, SNPs)  | 4 |
| Expected Heterozygosity | Expected heterozygosity | Expected heterozygosity  | 5 |
| Expected heterozygosity (adaptive, neutral, microsatellites, SNPs) | 4 |
| Expected heterozygosity (Nei) | Nei’s diversity/expected heterozygosity | 1 |
| Inbreeding Coefficients | FIS | FIS | 3 |
| Nucleotide Specific Metrics | Nucleotide diversity | Nucleotide diversity (adaptive, neutral) | 2 |
| Percentage of Polymorphic Loci | Percentage of polymorphic loci (adaptive, neutral) | 2 |
| Total | **36** |
| Marsh Plants | Genotypic Information | Number of Genotypes | Number of genotypes | 10 |
| Effective number of genotypes  | 1 |
| Mean number of genotypes per plot | 1 |
| Genotypic diversity (R) | Genotypic diversity | 1 |
| Genotypic richness | 1 |
| Clonal evenness | Nei’s evenness | 1 |
| Multi-locus lineages | Number of multi-locus lineages  | 1 |
| Relatedness | Relatedness | 1 |
| Allelic Information  | Allelic Richness | Allelic richness | 1 |
| Mean number of alleles per locus | 1 |
| Number of alleles | Number of alleles | 1 |
| Observed Heterozygosity | Observed Heterozygosity | Observed heterozygosity | 1 |
| Average heterozygosity | 1 |
| Diversity Indices | Bruvo | Bruvo Genetic diversity | 1 |
| Nucleotide Specific Metrics | Percentage of polymorphic loci | Proportion of polymorphic loci | 1 |
| Haplotype/Clade Metrics | Haplotype diversity  | Haplotype diversity | 1 |
| Total | 25 |
| Corals | Genotypic Information  | Number of genotypes | Number of genotypes | 11 |
| Genotypic diversity (R) | Clonal richness | 1 |
| Genotypic richness | 1 |
| Genotypic diversity (C) | Genotypic diversity | 1 |
| Genotypic richness | 1 |
| Clonal richness | 1 |
| Proportion of distinguishable genotypes | 1 |
| Genotypic diversity (other) | Observed genotypic diversity | 5 |
| Genotypic diversity (observed/expected diversity) | 2 |
| Expected genotypic diversity | 2 |
| Clonal evenness | Clonal Evenness | 3 |
| Genotypic evenness | 2 |
| Fager’s Evenness | 1 |
| Allelic Information | Allelic richness | Allelic Richness | 4 |
| Mean number of alleles per locus | 3 |
| Number of alleles per locus | 2 |
| Rarefied allelic richness | 1 |
| Number of alleles | Number of alleles | 1 |
| Mean number of alleles | 1 |
| Effective number of alleles | 1 |
| Minor allele frequency | 1 |
| Number of private alleles | Number of private alleles | 1 |
| Private allelic richness | Private allelic richness | 2 |
| Number of private alleles per locus | 1 |
| Rarefied private allelic richness | 1 |
| Observed Heterozygosity | Observed heterozygosity | Observed heterozygosity | 14 |
| Expected Heterozygosity  | Expected heterozygosity | Expected heterozygosity | 16 |
| Expected heterozygosity (Nei) | Expected heterozygosity/gene diversity (nei) | 1 |
| Inbreeding Coefficients | Fis | Fis | 4 |
| Fst | Fst | 9 |
| Diversity Indices | Shannon-Wiener index | Shannon-Wiener index | 1 |
| Simpson’s index  | Simpson’s index  | 1 |
| Complement of Simpson’s index | 1 |
| Nucleotide Specific Metrics | Nucleotide diversity | Nucleotide diversity  | 4 |
| Mean nucleotide diversity | 1 |
| Haplotype/Clade Metrics | Number of symbiodinium types | Number of clades | 7  |
| Number of ITS2 Types  | 2 |
| Number of OTUs | 2 |
| Haplotype diversity | Haplotype diversity | 3 |
| Haplotype diversity (COI, ITS, mtDNA) | 3 |
| Number of haplotypes | Number of haplotypes | 5 |
| Number of haplotypes (COI, ITS) | 2 |
| Other | Proportion of Intragenomic variation | 1 |
| Total  | 124 |
| Seagrasses | Genotypic Information | Number of Genotypes | Number of genotypes | 38 |
| Genotypic Diversity (R) | Clonal richness  | 12 |
| Genotypic diversity | 6 |
| Genotypic Richness | 6 |
| Clonal diversity | 2 |
| Genotypic diversity (C) | Genotypic diversity | 3 |
| Genotypic Richness (called G, but calculated like C) | 1 |
| Clonal evenness | Clonal evenness | 2 |
| Pareto Index | 3 |
| Genotypic evenness | 1 |
| Multi-Locus Lineages | Number of Multi-locus lineages | 2 |
| Genotypic diversity (RMLL) | 1 |
| Relatedness | Relatedness  | 2 |
| Other  | Between population similarity | 1 |
| Clonal subrange | 1 |
| Diversity | 1 |
| Genetic variability | 1 |
| Number of sources | 1 |
| Within population genetic similarity | 1 |
| Allelic Information | Allelic richness | Allelic richness | 21 |
| Mean number of alleles per locus | 6 |
| Standardized allelic richness | 2 |
| Number of alleles | Number of alleles | 7 |
| Mean number of alleles | 2 |
| Effective number of alleles | 2 |
| Number of private alleles  | Number of private alleles | 3 |
| Observed Heterozygosity | Observed Heterozygosity | Observed heterozygosity | 28 |
| Heterozygosity | 2 |
| Observed heterozygosity (%) | 1 |
| Expected Heterozygosity | Expected Heterozygosity | Expected heterozygosity | 26 |
| Expected heterozygosity (%) | 1 |
| Unbiased heterozygosity | Unbiased expected heterozygosity  | 1 |
| Unbiased heterozygosity | 1 |
| Inbreeding Coefficients | Fis | Fis | 14 |
| Fst | Fst | 1 |
| Diversity Indices | Shannon-Wiener Index | Shannon Wiener Index | 3 |
| Simpson’s index | Simpson’s index | 1 |
| Complement of Simpson’s diversity index  | 1 |
| Nucleotide Specific Metrics | Nucleotide diversity | Nucleotide diversity | 1 |
| Percentage of polymorphic loci | Percentage of polymorphic loci | 3 |
|  | Polymorphic information content | 2 |
| Total | 211 |

Table S2. Environmental metrics. Measured environmental metrics for each taxa.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Seagrasses | Corals | Marsh Plants | Mangroves | Kelps |
| Depth | 17 | Depth | 23 | Elevation | 2 | Rain fall  | 2 | Nutrients | 3 |
| Temperature | 15 | Temperature | 19 | Porewater salinity | 2 | Habitat modification | 1 | Salinity | 3 |
| Salinity  | 8 | Light | 6 | Area | 1 | Past sea level | 1 | Temperature | 3 |
| Light | 5 | Salinity  | 6 | Sediment organic content | 2 | Porewater pH  | 1 | Exposure | 2 |
| Sediment characteristics | 5 | Chlorophyll a | 4 | Site Age  | 1 | Porewater salinity  | 1 | Canopy removal | 1 |
| Tidal | 5 | pH  | 3 | Tide height | 1 | Temperature | 1 | Depth | 1 |
| Exposure | 3 | Reef habitat  | 3 |  |  | Tide elevation | 1 | DO | 1 |
| Habitat modification | 3 | Transparency | 3 |  |  |  |  | KD | 1 |
| Nutrients | 3 | DO | 2 |  |  |  |  | Light | 1 |
| Turbidity | 2 | Nutrients | 2 |  |  |  |  | Marginal versus central habitat | 1 |
| "Disturbance factors" (high temp, red tide) | 1 | Sedimentation | 2 |  |  |  |  | Turbidity | 1 |
| Chlorophyll a | 1 | Storms | 2 |  |  |  |  |  |  |
| distance to shore  | 1 | Bleaching | 1 |  |  |  |  |  |  |
| KD490 | 1 | KD | 1 |  |  |  |  |  |  |
| Ocean currents | 1 | Seamount | 1 |  |  |  |  |  |  |
| pH  | 1 | Slope | 1 |  |  |  |  |  |  |
| Prevailing wind  | 1 | Tide current speed | 1 |  |  |  |  |  |  |
| Proximity to coastal embayment | 1 | Turbidity | 1 |  |  |  |  |  |  |
|  |  | Water flow  | 1 |  |  |  |  |  |  |
|  |  | Wave Direction | 1 |  |  |  |  |  |  |

Figure S1. Species breakdown. The number of publications that studied each species for each coastal foundation taxa: (a) seagrasses, (b) coral hosts, not including those that studied *Symbiodinium*, (c) marsh plants, (d) kelps, (e) mangroves.

Table S3. Coral *Symbiodinium.* The number of publications that measured the diversity of *Symbiodinium* in each coral species (scientific name as referred to in publication) listed. Some studies measured diversity of more than one species of coral.

|  |  |
| --- | --- |
| Species | Number of Publications |
| *Acropora brueggemanni* | 1 |
| *Acropora corymbosa* | 1 |
| *Acropora forosa* | 1 |
| *Acropora horrida* | 1 |
| *Acropora latistella* | 1 |
| *Acropora millepora* | 1 |
| *Acropora subglabra* | 1 |
| *Astreopora myriophthalma* | 1 |
| *Coscinaraea exesa* | 1 |
| *Coscinaraea marshae* | 1 |
| *Coscinaraea mcneilli* | 1 |
| *Ctenactis crassa* | 1 |
| *Cycloseris hexagonalis* | 1 |
| *Cyphastrea chalcidicum* | 2 |
| *Cyphastrea serailia* | 1 |
| *Diploastrea heliopora* | 1 |
| *Echinophyllia echinoporides* | 1 |
| *Echniopora lamellosa* | 3 |
| *Eunicella singularis* | 1 |
| *Favia palauensis* | 2 |
| *Favia stelligera* | 1 |
| *Favites abdita* | 2 |
| *Favites halicora* | 1 |
| *Fungia concinna* | 1 |
| *Fungia danae* | 1 |
| *Fungia fungites* | 1 |
| *Galaxea fascicularis* | 2 |
| *Goniastrea aspera* | 2 |
| *Goniastrea australensis* | 2 |
| *Goniastrea edwardsi* | 1 |
| *Goniastrea pectinata* | 1 |
| *Goniastrea retiformis* | 1 |
| *Heliofungia actiniformis* | 1 |
| *Hydnophora exesa* | 1 |
| *Hydnophora rigida* | 2 |
| *Leptastrea pruinosa* | 1 |
| *Leptastrea purpurea* | 1 |
| *Leptastrea transversa* | 1 |
| *Leptoseris hawaiiensis* | 1 |
| *Leptoseris papyracea* | 1 |
| *Leptoseris scabra* | 1 |
| *Leptoseris tubulifera* | 1 |
| *Lobophyllia corymbosa* | 1 |
| *Lobophyllia hemprichii* | 1 |
| *Lobophyllia pachysepta* | 1 |
| *Merulina ampliata* | 1 |
| *Merulina scabricula* | 1 |
| *Montastrea annularis* | 1 |
| *Orbicella faveolata* | 1 |
| *Montastrea magnistellata* | 1 |
| *Montipora efflorescens* | 2 |
| *Montipora mollis* | 1 |
| *Pavona varians* | 2 |
| *Pectinia alcicornis* | 1 |
| *Platygyra daedalea* | 1 |
| *Platygyra verweyi* | 1 |
| *Plesiastrea verispora* | 2 |
| *Pocillopora damicornis* | 4 |
| *Pocillopora verrucosa* | 2 |
| *Porites attenuata* | 1 |
| *Porites australiensis* | 1 |
| *Porites cylindrica* | 1 |
| *Porites lichen* | 1 |
| *Porites lutea* | 2 |
| *Porites monticulosa* | 1 |
| *Seriatopora caliendrum* | 1 |
| *Seriatopora hystrix* | 1 |
| *Sinularia spp.* | 1 |
| *Stylophora pistillata* | 1 |
| *Symphyllia wilsoni* | 1 |
| *Turbinaria mesenterina* | 1 |
| *Turbinaria reniformis* | 1 |