

Table S1. Number of sequenced samples per population. Latitude and longitude are also indicated. Population names include island abbreviations [St. Thomas (STT), St. Croix (STX), St. John (STJ) and Dry Tortugas (DRTO)].

pops	Acropora_n	Orbicella_n	Latitude	Longitude
DRTO_AFRO	0	18	24.6354819	-82.92132
DRTO_BIRD1	0	14	24.6117732	-82.870271
DRTO_BIRD2	0	32	24.6089121	-82.871992
DRTO_ELS1	20	0	24.6802388	-82.891248
DRTO_ELS2	14	0	24.6832657	-82.896139
DRTO_HOHO1	0	15	24.7233917	-82.820199
DRTO_HOHO2	0	32	24.724224	-82.814886
DRTO_HOLE	0	11	24.6828276	-82.926029
DRTO_LOG	0	19	24.6679492	-82.9261
DRTO_MAY	0	20	24.6081531	-82.944354
DRTO_MID	21	0	24.6630667	-82.812918
DRTO_OPEN	0	33	24.57325	-82.925743
DRTO_PALP	10	0	24.6208682	-82.867368
DRTO_PROP	19	0	24.6205692	-82.869648
DRTO_PUL	16	0	24.7024439	-82.79945
DRTO_SLWH	0	40	24.6062029	-82.948628
DRTO_TNC	37	0	24.6193979	-82.920337
DRTO_WIND	0	19	24.6237891	-82.942187
STJ_BRO	21	17	18.3644882	-64.706915
STJ_HAR	20	29	18.313241	-64.779314
STJ_HEN	24	35	18.3527833	-64.794479
STJ_HNB	13	15	18.3487821	-64.781118
STJ_HON	44	13	18.3505596	-64.679434
STJ_HOS	37	21	18.345384	-64.681681
STJ_JON	12	20	18.3612156	-64.774914
STJ_LEI	21	15	18.3639618	-64.725734
STJ_POP	0	16	18.3451991	-64.693733
STJ_RFB	16	48	18.3212915	-64.747532
STJ_STV	21	2	18.3310515	-64.808152
STJ_TBR	43	0	18.3427519	-64.817778
STJ_TEK	4	41	18.3091079	-64.722015
STJ_WIS	0	26	18.3694331	-64.760994
STJ_YAW	18	0	18.3156047	-64.726151
STT_BLP	0	44	18.34456	-64.985384
STT_BOT	13	0	18.3585777	-65.033013
STT_BUK	30	24	18.2782569	-64.898276
STT_COK	0	23	18.3506529	-64.864834
STT_COW	20	0	18.3045901	-64.846016
STT_FLR1	0	26	18.318096	-64.990624
STT_FLR2	3	37	18.316591	-64.988357
STT_FORT	24	0	18.3446592	-65.015962
STT_GSW	19	0	18.3056	-64.82771
STT_IBR	20	24	18.3794988	-64.964335
STT_MEG	0	35	18.3721812	-64.929268
STT_MER	16	0	18.3533081	-65.042383
STT_SAP	20	43	18.3355502	-64.848015
STT_SEA	0	37	18.29438	-64.86793
STT_THC	14	0	18.3567696	-64.856072
STX_BIA	9	14	17.7867275	-64.60934
STX_BIB	37	32	17.785005	-64.61193
STX_BIC	0	12	17.7835852	-64.613811
STX_BIE	16	14	17.8028197	-64.626767
STX_BIF	21	15	17.7901184	-64.612844
STX_BIZ	0	32	17.7921889	-64.611257
STX_BUT1	0	11	17.748775	-64.894961
STX_BUT2	19	0	17.7486057	-64.893612
STX_BUT3	16	20	17.751455	-64.891586
STX_CBE	35	11	17.7741984	-64.812125
STX_DEB	0	33	17.7612453	-64.669455
STX_FRD	0	34	17.7031504	-64.890102
STX_HAM	21	0	17.7660204	-64.88225
STX_SRA	20	7	17.7817891	-64.756493
STX_SRB	24	40	17.7851238	-64.760569
STX_SRC	0	28	17.7867841	-64.757517
STX_TBW	44	0	17.7649088	-64.61597
STX_THO	37	0	17.7377352	-64.604258

Table S2. Genetic distance (p) as estimated by ML (iQtree). Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), *A. prolifera* (APRO), *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA). Mean (xbar), number of pairwise comparison (n) and standard errors (serr) are shown.

	n	xbar	serr
ACER	4005	0.060	0
APAL	73920	0.037	0
APRO	10	0.045	0.009
ACER vs APAL	34650	0.298	0
OANN	630	0.075	0.001
OFAV	32896	0.068	0
OFRA	2346	0.084	0.001
OFRA vs OFAV	17408	0.148	0
OANN vs OFAV	8960	0.146	0
OANN vs OFRA	2380	0.104	0

Figure S1. Sample map of two archipelagos (Dry Tortugas, Florida) and the United States Virgin Islands. See Table S1 for details.

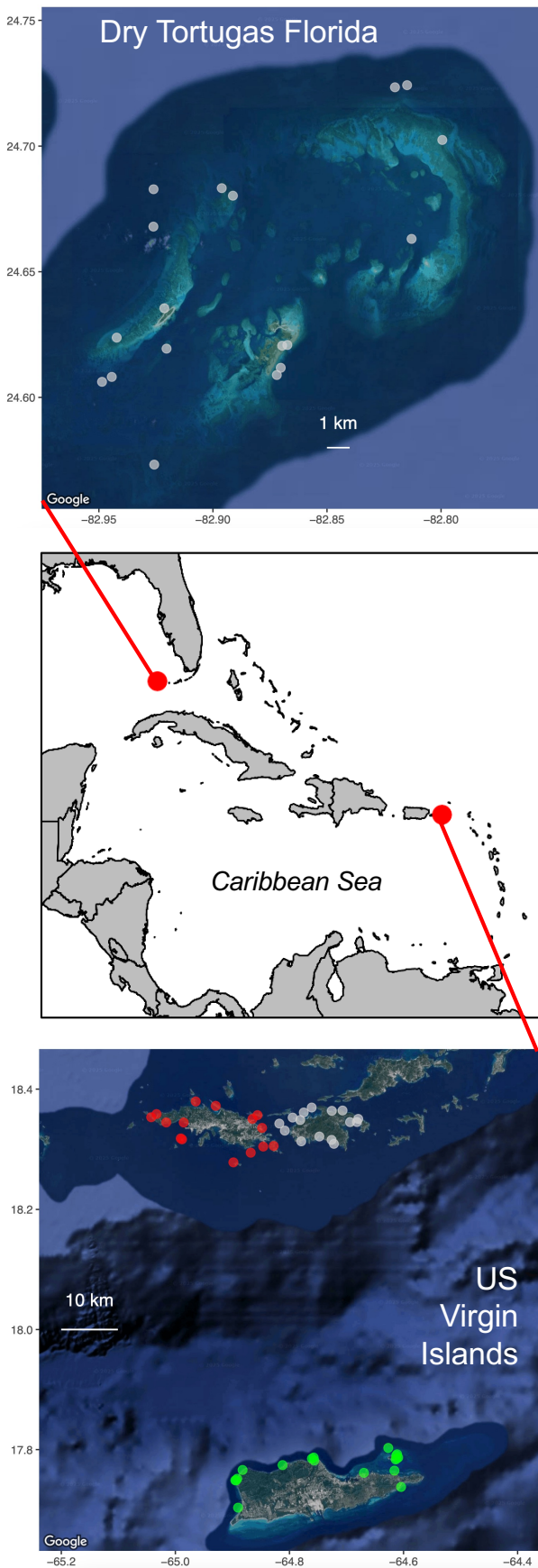


Figure S2. Histogram of pairwise relatedness coefficient (Rab; Hedrick et al. 2015) for all *Acropora* and *Orbicella* individuals (top and bottom respectively). We identified clones as those with a $R_{ab} > 0.85$ and 0.90 respectively.

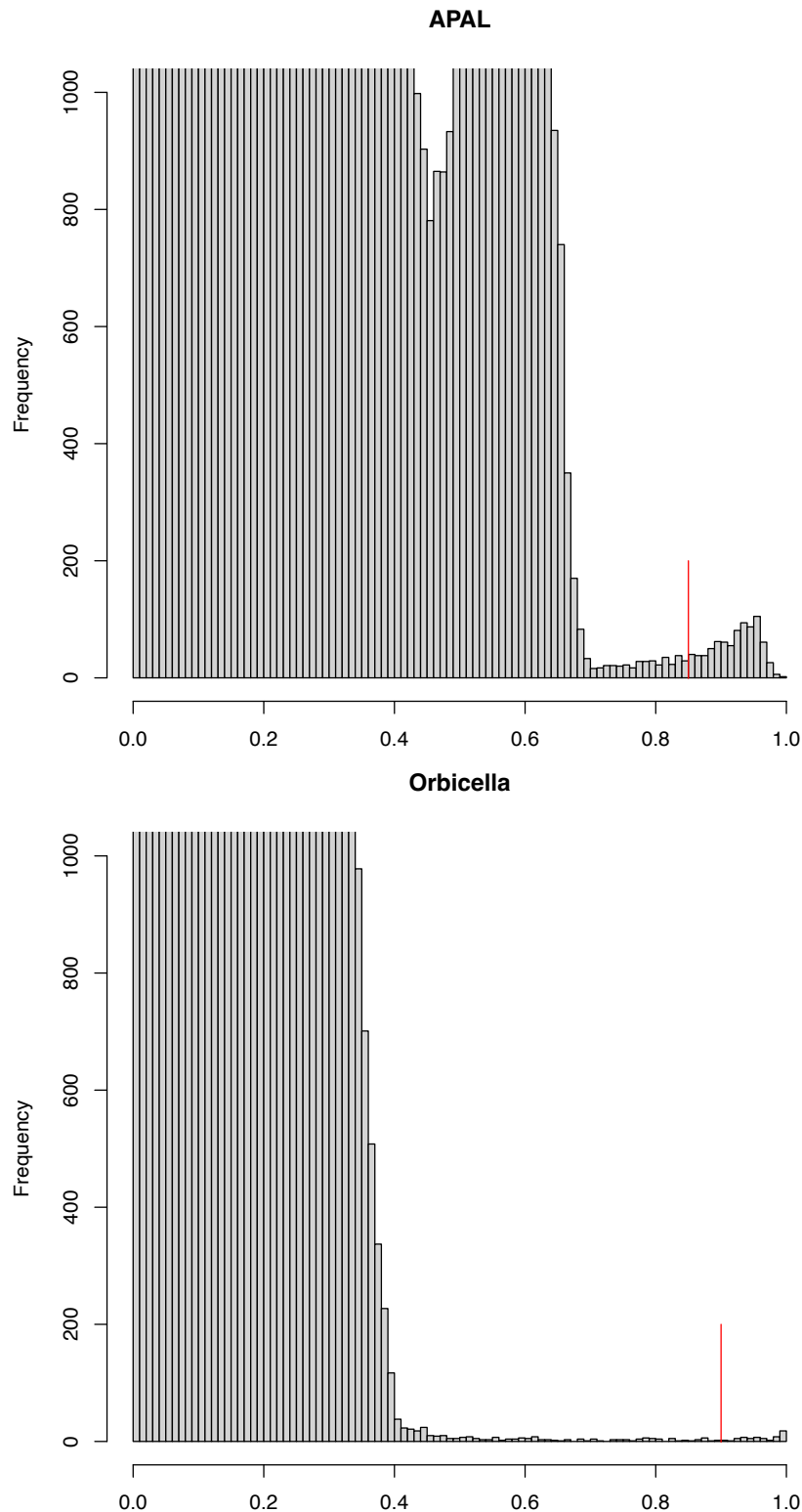


Figure S3. Identifying pure and hybrid *Acropora* individuals. A) PCAngsd analysis of genotype likelihoods. Morphospecies of *cervicornis* (ACER), *palmata* (APAL) and *prolifera* (APRO) are indicated by color and split by island [St. Thomas (STT), St. Croix (STX), St. John (STJ) and Dry Tortugas (DRTO)]. B) Histogram of proportion of a Q lineage (k=2) in an NGSadmixture analysis by island. C) Correlation between per-individual PC1 and proportion of a K=2 lineage is high. The red lines indicate the thresholds at which “pure” lineages were assessed in the hybrid analyses (PC threshold = -0.06 and 0.15; Q threshold = 0.05 and 0.94).

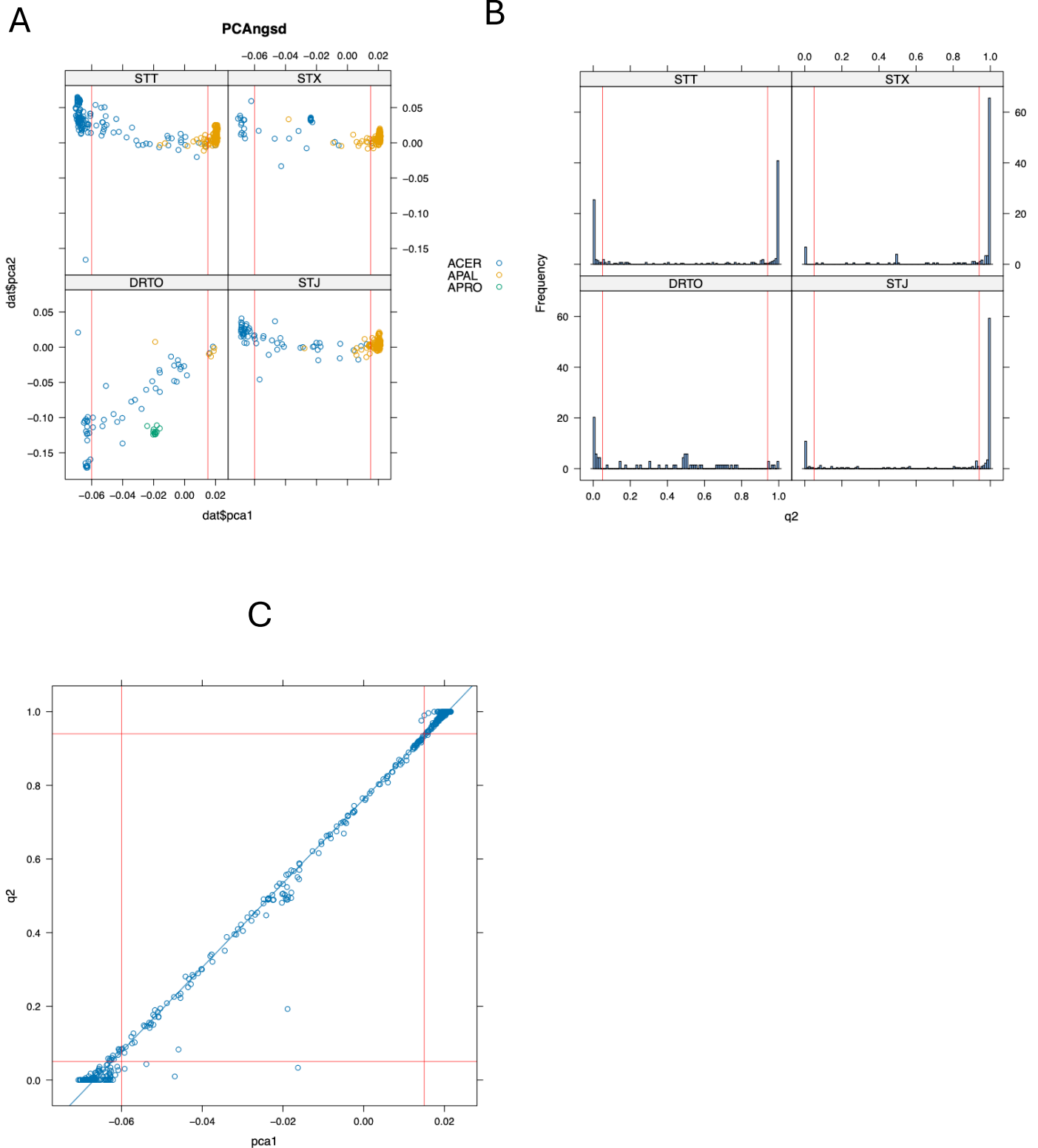


Figure S4. Identifying pure and hybrid *Orbicella* individuals. A) PCAngsd analysis of genotype likelihoods. Morphospecies of annularis (OANN), franksi (OFRA) and faveolata (OFAV) are indicated by color and split by island [St. Thomas (STT), St. Croix (STX), St. John (STJ) and Dry Tortugas (DRT)]. B) Histogram of proportion of a Q lineage (k=2) in an NGSadmixture analysis by island. C) Correlation between per-individual PC1 and proportion of a K=2 lineage is high. The red lines indicate the thresholds at which “pure” lineages were assessed in the hybrid analyses between OFAV and the others (OANN, OFRA and their hybrids; PC threshold = -0.03 and 0.02; Q threshold = 0.05 and 0.95).

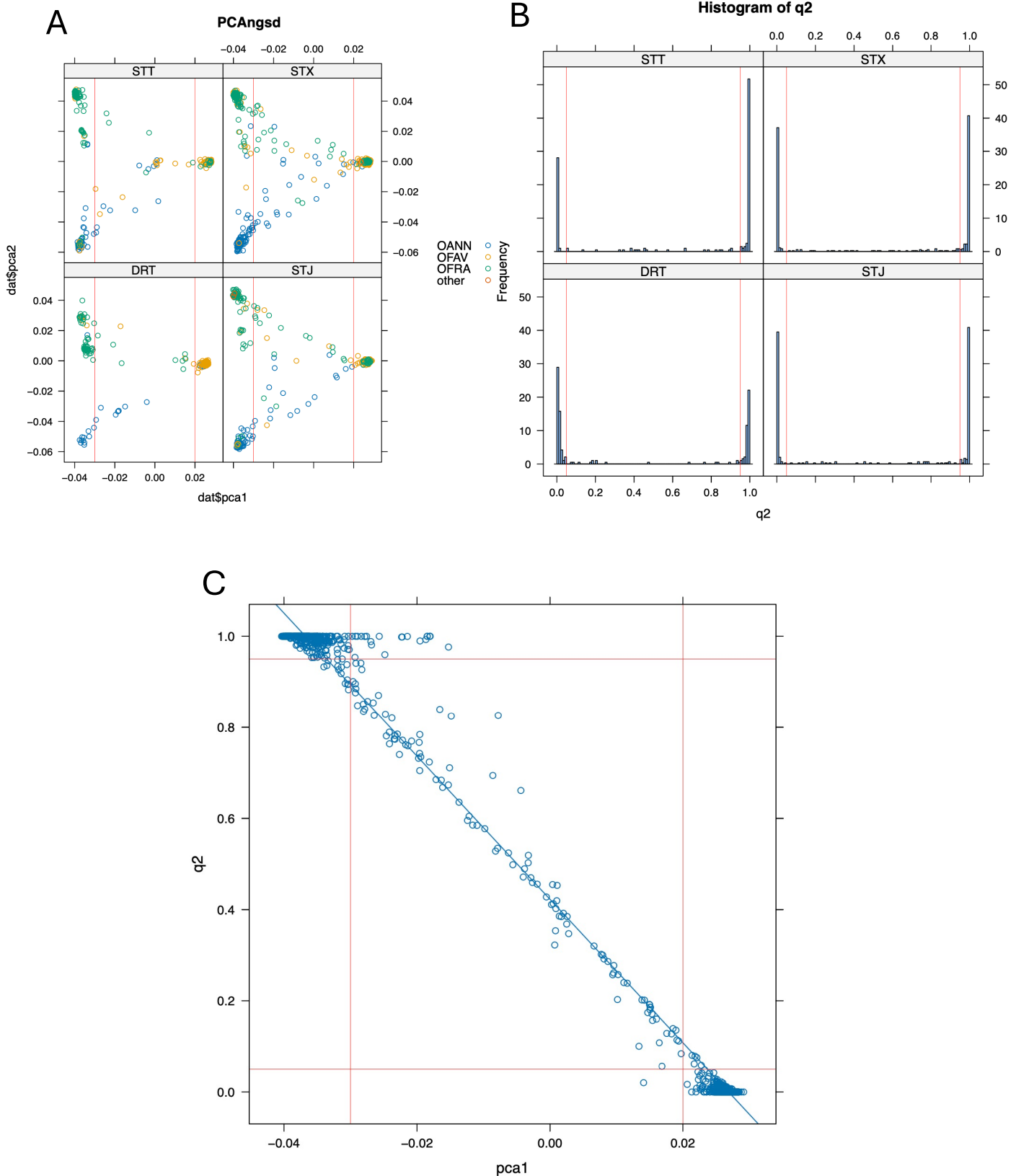


Figure S5. Number of ramets per unique genotype, split by field identification. Note that the y-axis goes only to 10 to show the rare instances of clonal replicates. Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), *A. prolifera* (APRO), *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA).

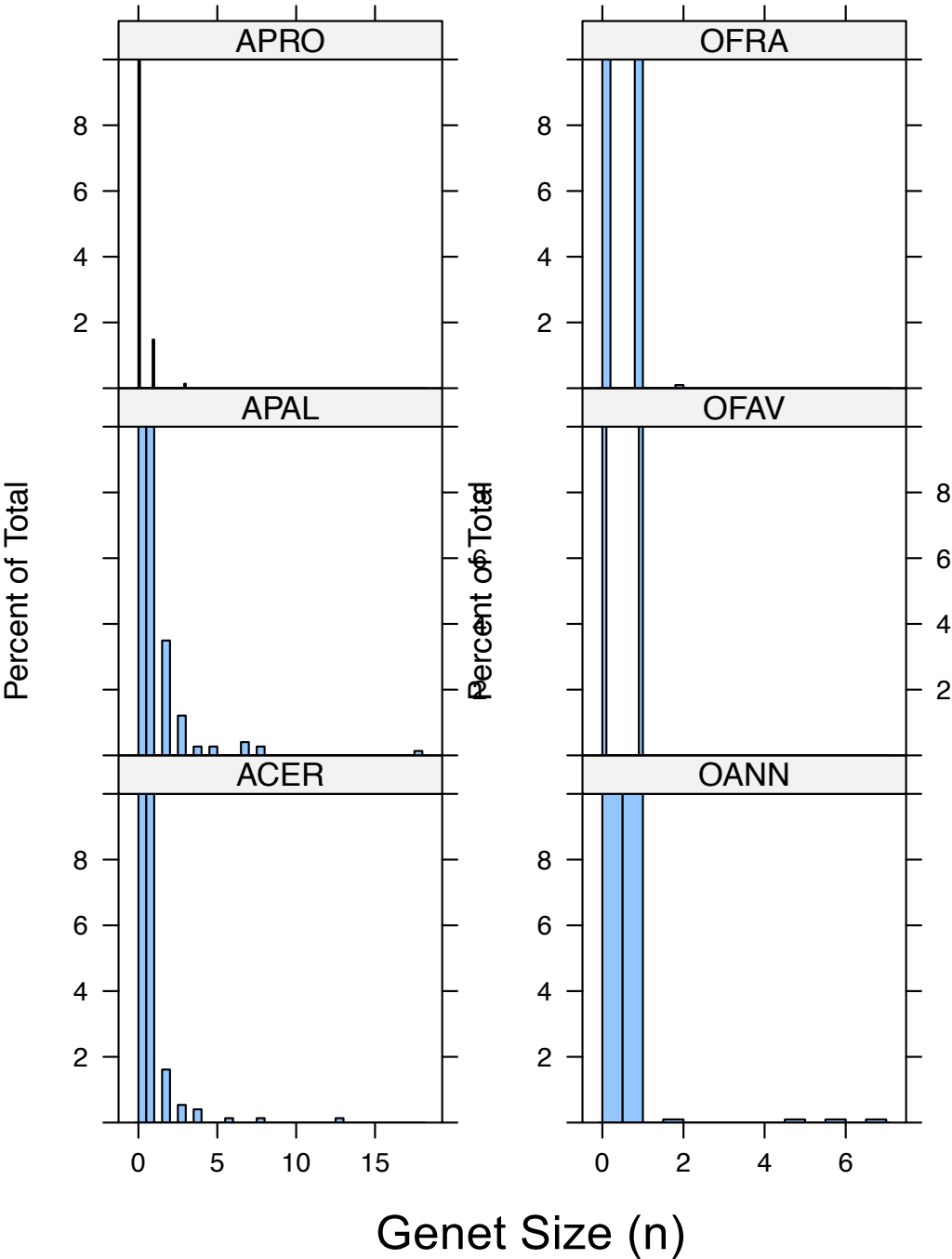


Figure S6. A) *Acropora* genotypic frequency of field ID by site and B) rarefaction curves of all genotypes (blue line; left) and per population (red lines; blue line indicates 1:1 ratio). Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), and *A. prolifera* (APRO) and island abbreviations refer to St. Thomas (STT), St. Croix (STX), St. John (STJ) and Dry Tortugas (DRTO).

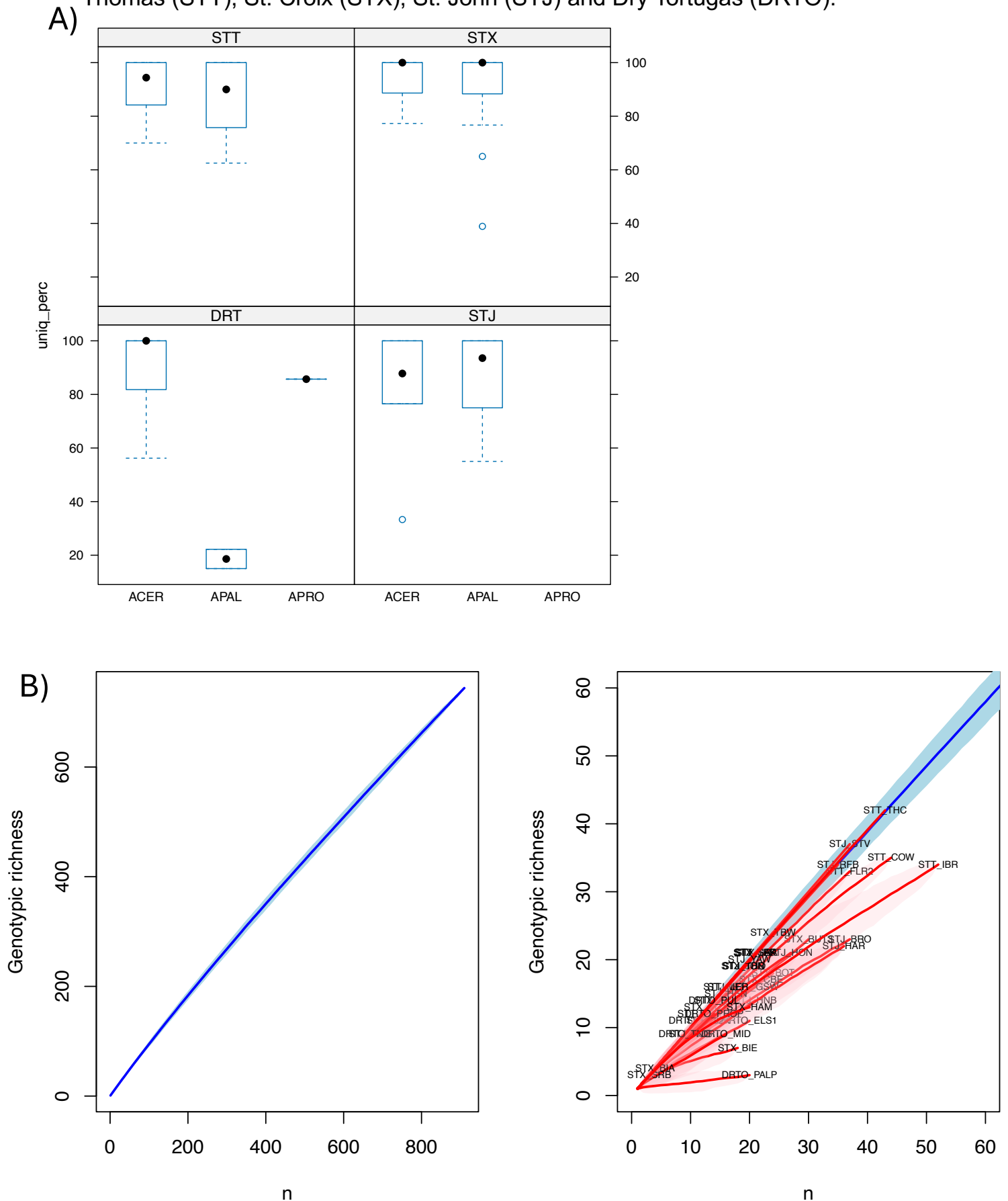


Figure S7. A) *Orbicella* genotypic frequency of field ID by site and B) rarefaction curves of all genotypes (blue line; left) and per population (red lines; blue line indicates 1:1 ratio). Species abbreviations refer to *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA) and island abbreviations refer to St. Thomas (STT), St. Croix (STX), St. John (STJ) and Dry Tortugas (DRT).

A)

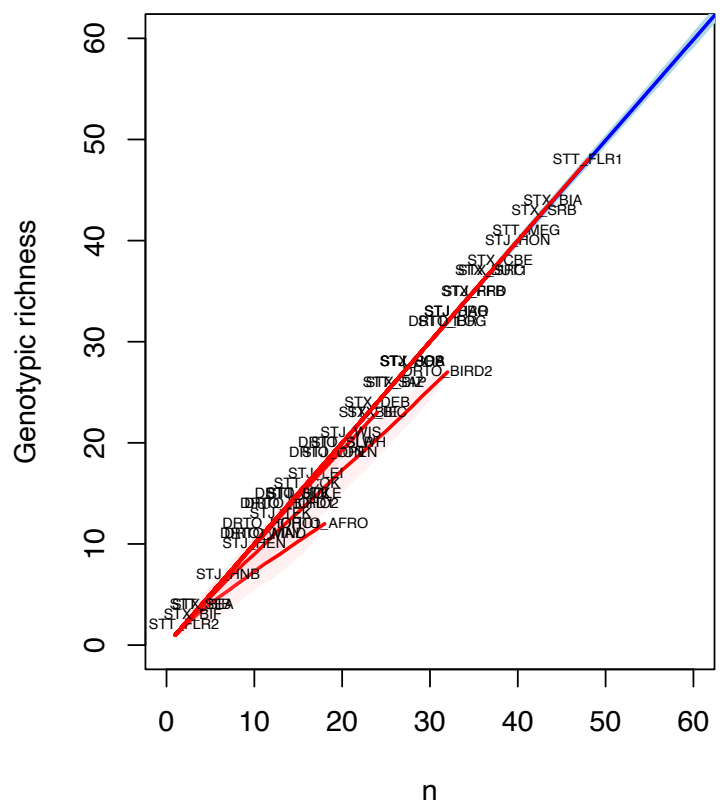
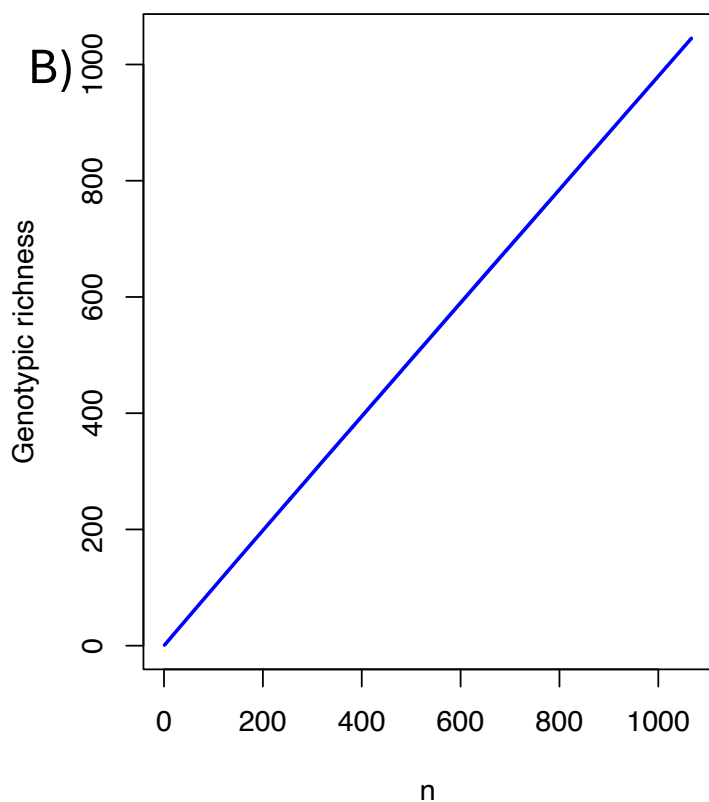
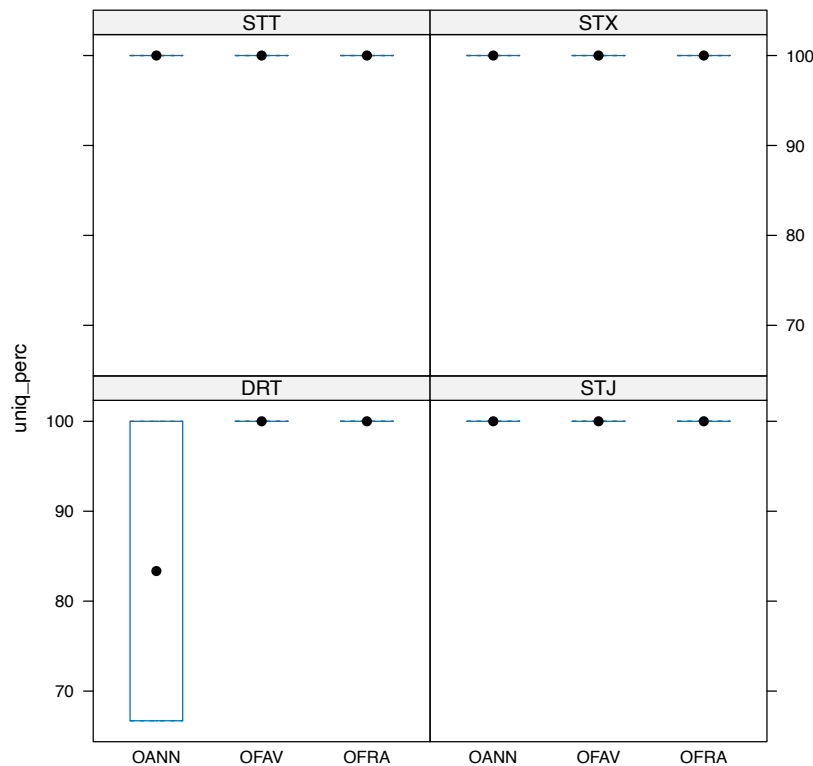


Figure S8. Genetic distance (p) as estimated by ML (iQtree). Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), *A. prolifera* (APRO), *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA). Mean (xbar), number of pairwise comparison (n) and standard errors (serr) are shown in Table S2.

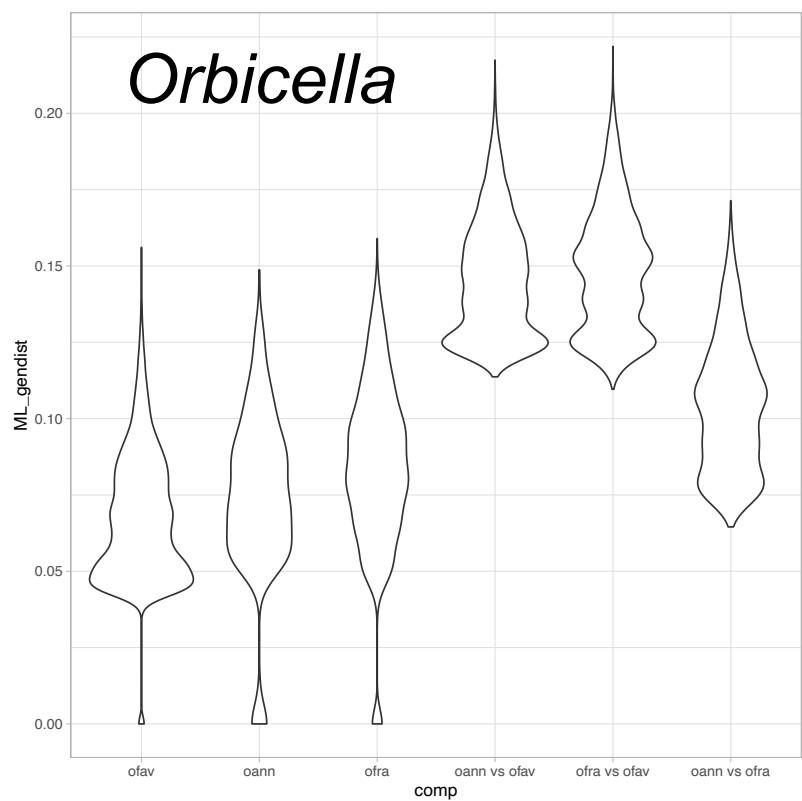
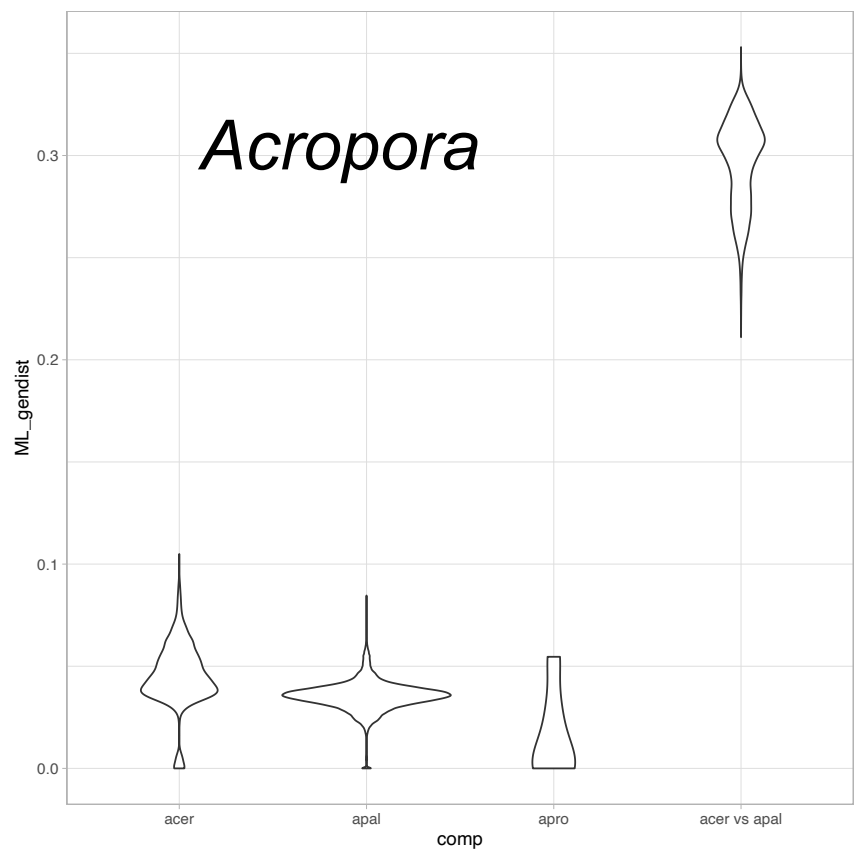


Figure S9. *Acropora* admixture (K = 2-10), ordered by morphospecies. Most samples came from the USVIs, except the noted ACER and all APRO, which came from Florida (DRT0). Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), and *A. prolifera* (APRO).

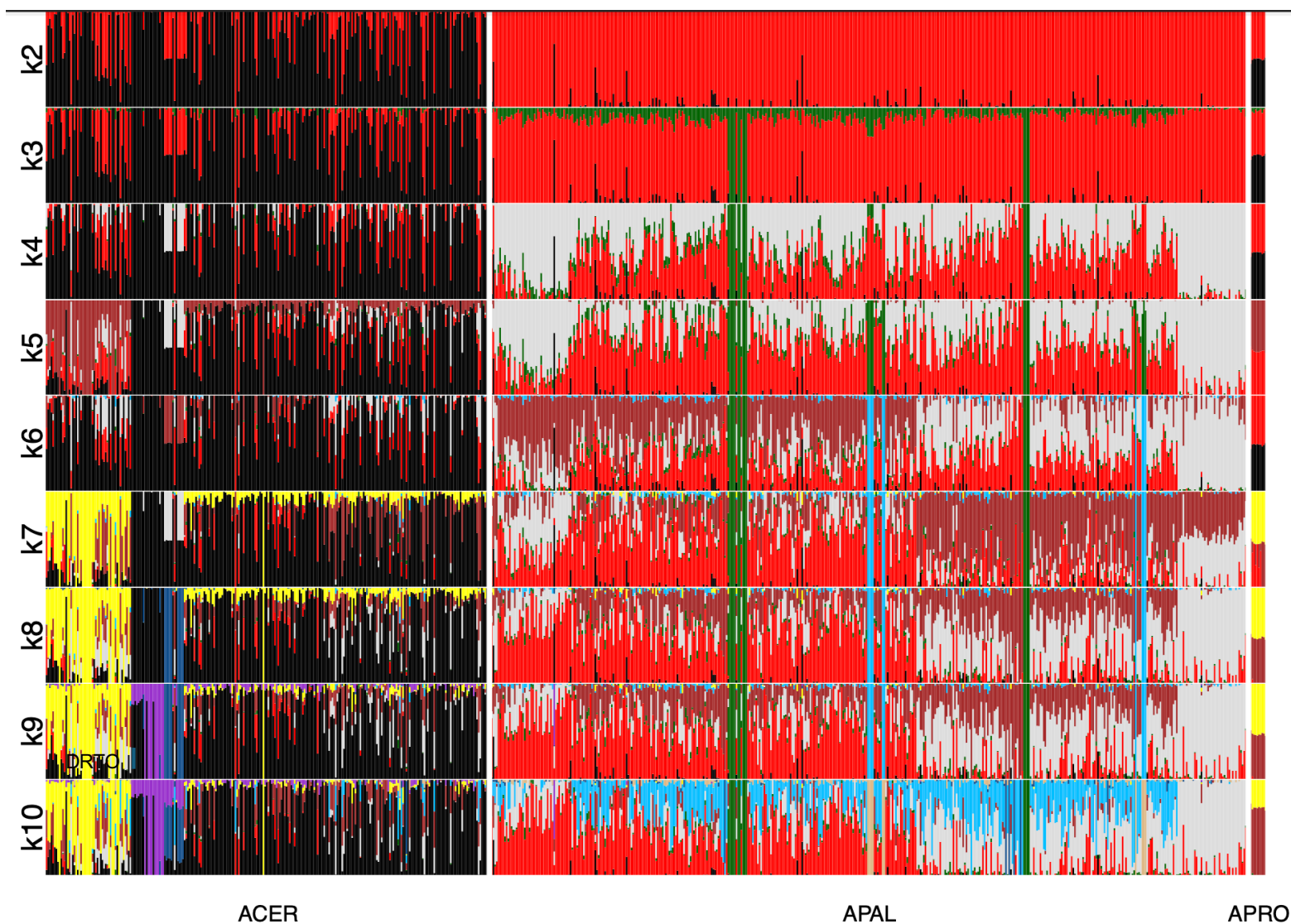


Figure S10. *Orbicella* admixture Top: Admixture plot of k2-10. Species abbreviations refer to *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA).

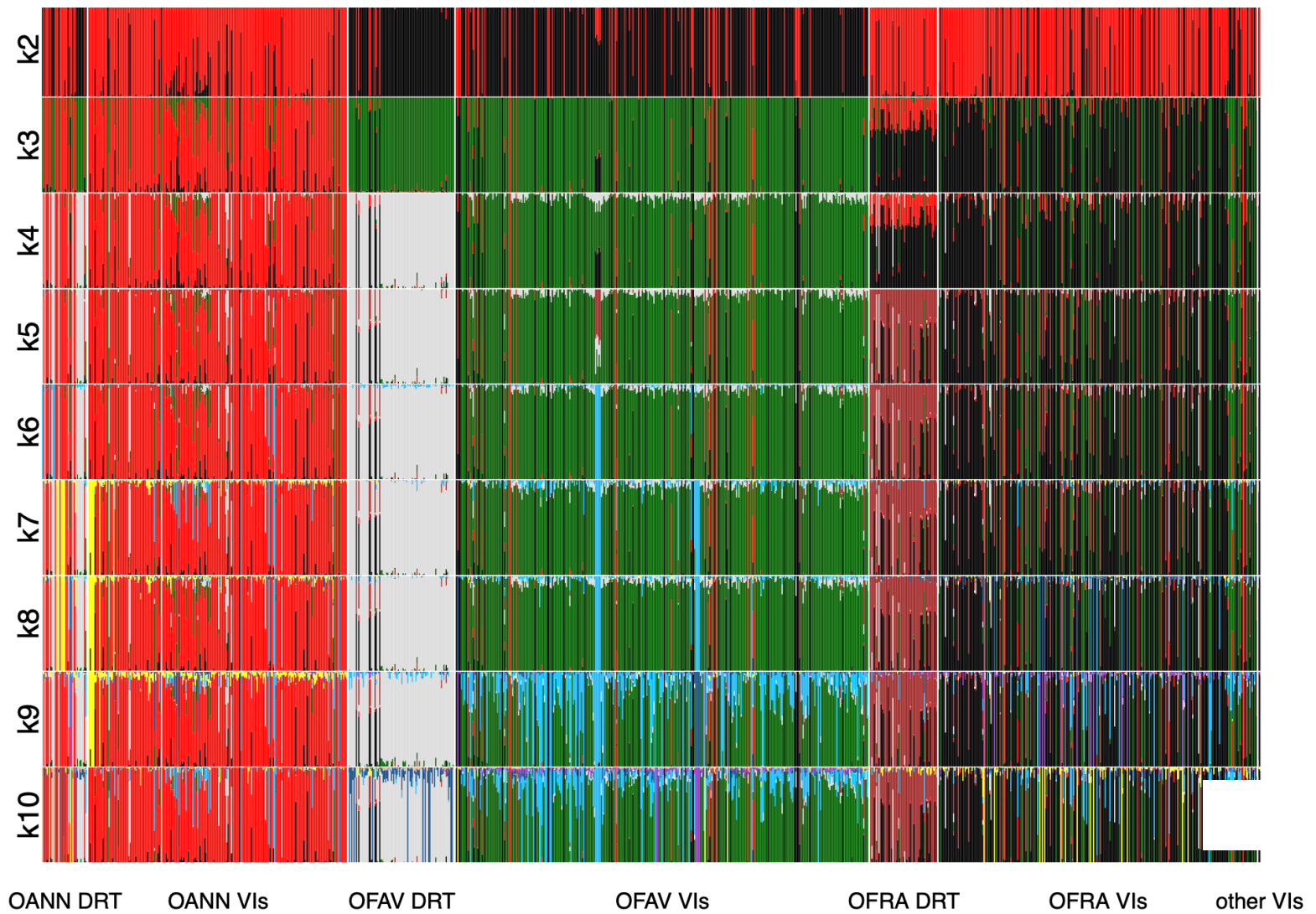


Figure S11. The distribution of hybrid index per individual for each site with $n \geq 10$ unique genets for A) *Acropora* and B) *Orbicella*.

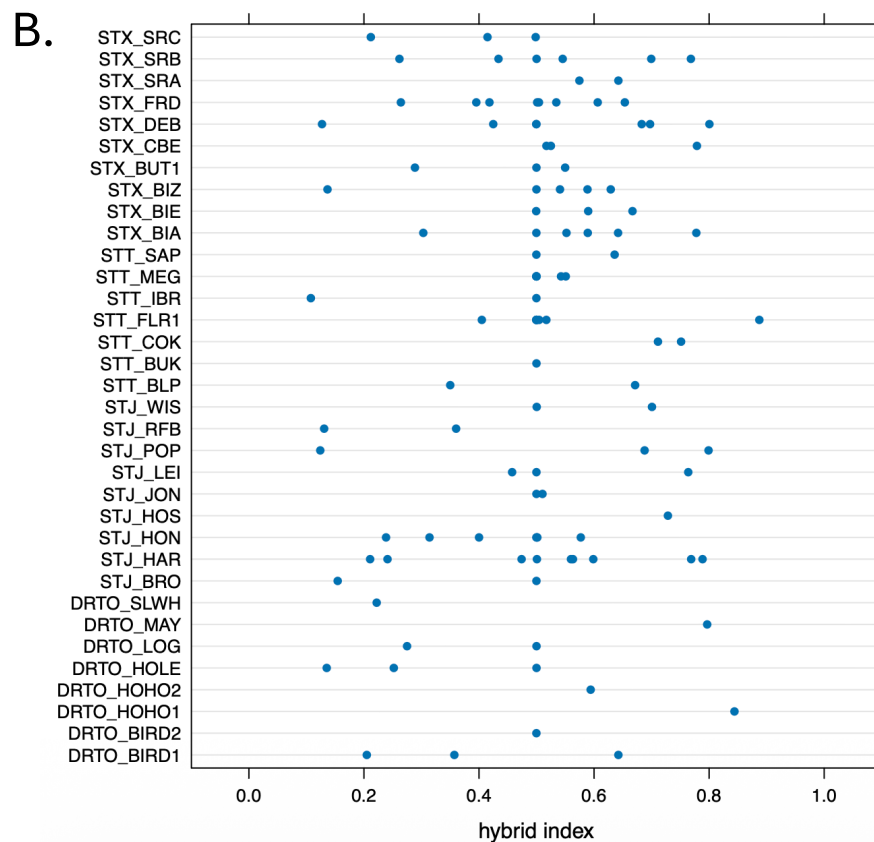
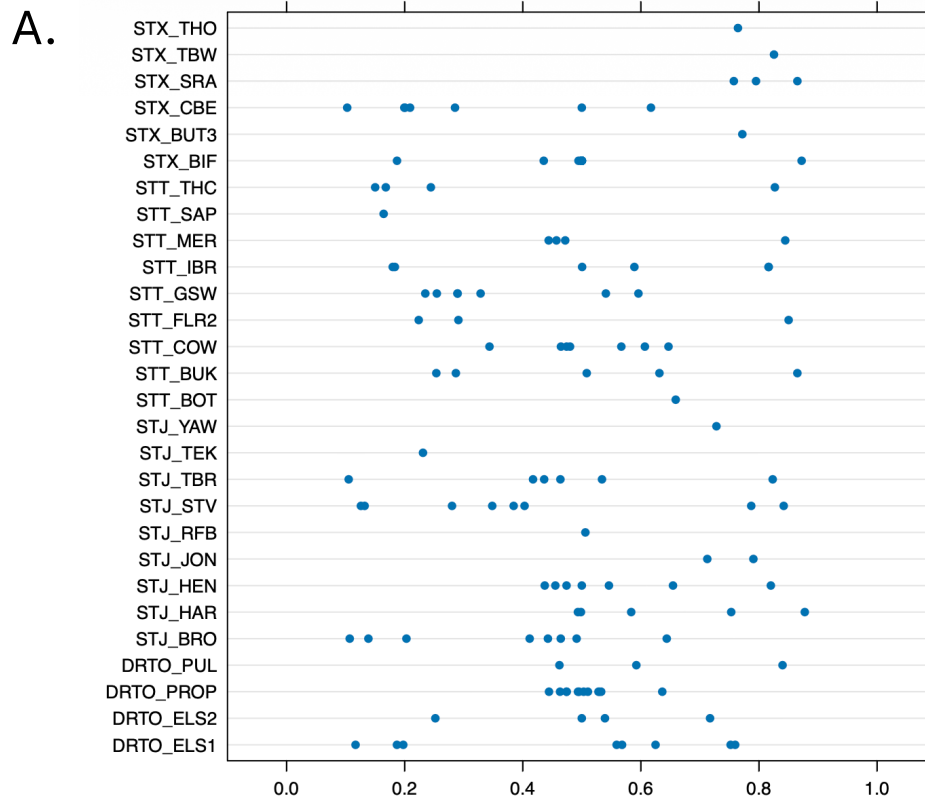


Figure S12. *Acropora* hybridization patterns. A) Genomic clines and B) the hybrid index, Q10 ancestry and their marginal histograms. Both plots are based on ancestry-informative markers (AIMs; 113 loci)

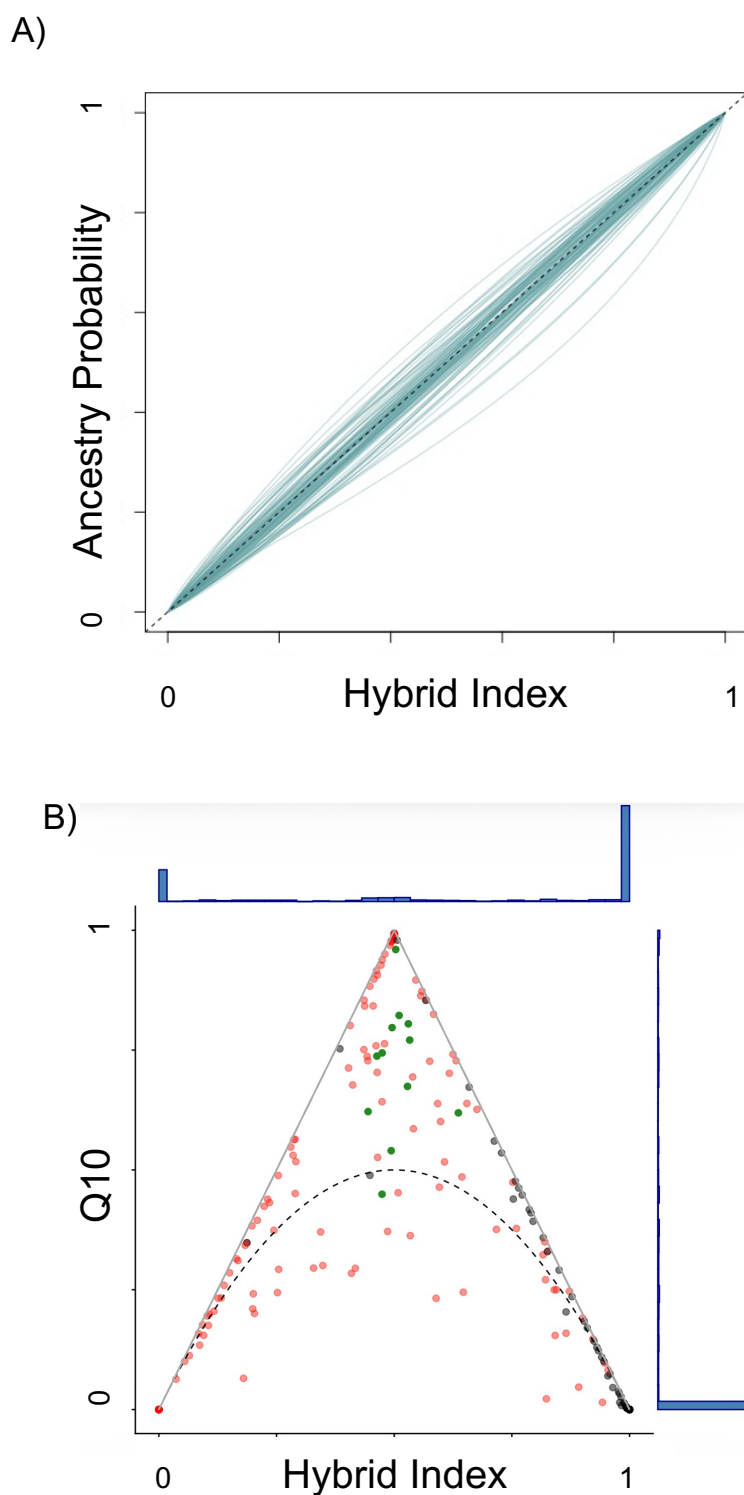


Figure S13. *Orbicella* hybridization patterns. A) Genomic clines and B) the hybrid index, Q10 ancestry and their marginal histograms. Both plots are based on ancestry-informative markers (AIMs; 230 loci) between *faveolata* versus *annularis/franksi*.

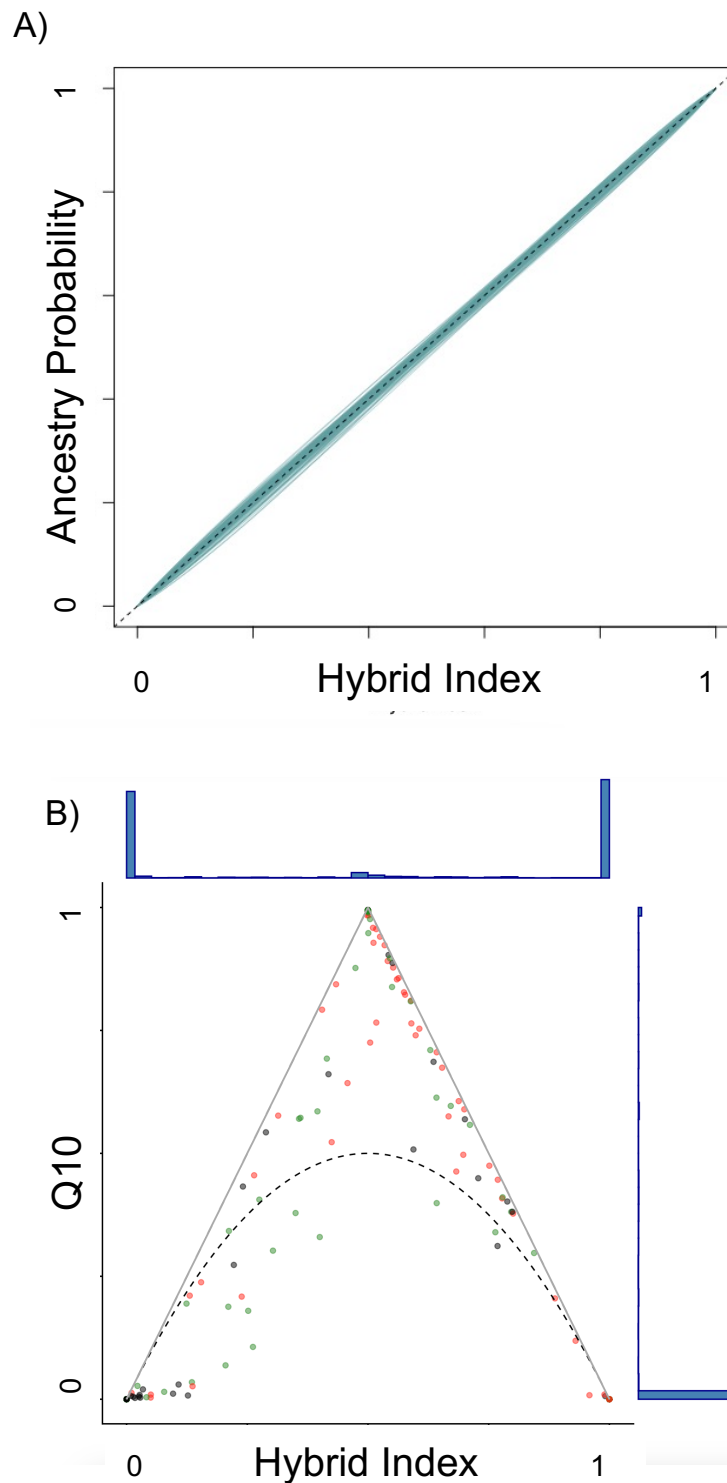


Fig S14. Proportion of Symbiodineaceae genera (Clades A-D) across *Acropora* (top; n = 617) and *Orbicella* (bottom; n = 1037) communities. The pure vs hybrid assignments were made using PC and NGSadmix. Samples are sorted by Symbiodineaceae clade proportion. Species abbreviations refer to *Acropora cervicornis* (ACER), *A. palmata* (APAL), *A. prolifera* (APRO), *Orbicella annularis* (OANN), *O. faveolata* (OFAV) and *O. franksi* (OFRA).

