

Figure S1A. Evaluating differences in community structure. The orange circles and blue triangles represent two sets of communities to be compared. Communities may be different in the location of their centroids, or the mean structure of the groups (A, B). In this scenario, communities often have different compositions. Communities may also differ in their spread (dispersion), or variability in the structure (B, C). In this scenario, the differences in the variability indicate that the blue triangle group is more coherent than the orange circle group. Permutated analysis of variance will distinguish between groups that have different centroids, but is also sensitive to differences in variability, as in B and C (Supplemental Ref. 13). However, permutated analysis of beta-dispersion will determine if groups have different spreads (Supplemental Ref. 14). In example C, the groups have similar centroids but different spreads. In this scenario, permutated analysis of beta-dispersion will reveal differences between the groups, but permutated analysis of variance may be less robust. Therefore, both methods provide complementary information as to whether communities have different structure and the nature of any detected difference(s). In this paper, permutated analysis of variance was implemented using the `adonis` function in R, and permutated analysis of beta-dispersion was implemented using the `betadisper` function, both in the `vegan` package (Supplemental Ref. 25). Please see (Supplemental Ref. 26) for an introduction to multivariate statistics for microbial communities.

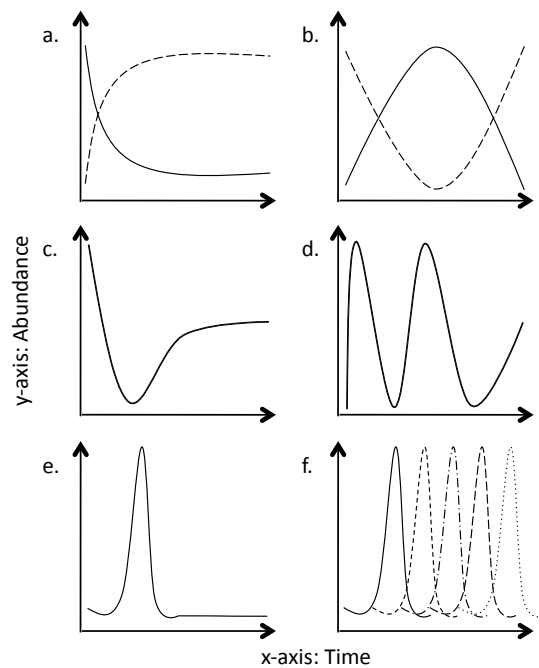


Figure S2A. Examples of trajectories of taxon abundances over time.

- (a) Decrease (or increase, dashed line) in abundance, then maintenance.
- (b) Gradual increase (or decrease, dashed line) in abundance over time points, then decrease (or increase).
- (c) Rapid decrease, gradual increase and maintenance.
- (d) Oscillating dynamics.
- (e) Achieve maxima at one time point, followed by reduction in abundance.
- (f) Succession of multiple taxa through time; each taxon's abundance peaks at a time point that does not overlap with another taxon's maximum abundance.

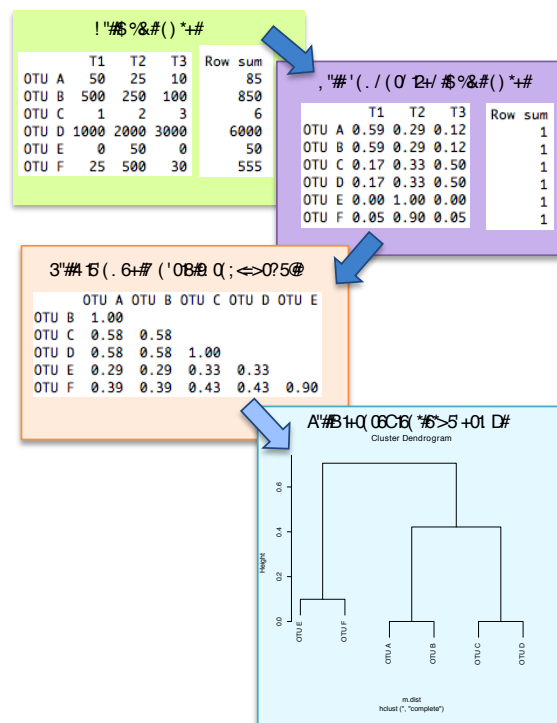


Figure S3A. Steps in hierarchical cluster analysis for the discovery of OTUs that had similar occurrence patterns. Here OTUs are defined at 97% sequence identity, and T1, T2, and T3 represent communities sampled at different time points. First, the rarefied OTU table was standardized by dividing each OTU occurrence by its total number of sequences. This permitted direct comparison of both rare and prevalent OTUs that had similar occurrence patterns. Then, Bray-Curtis similarity was calculated between all pairs of OTUs to create a distance matrix. The distances are a metric between 0 and 1, where 0 means that the two OTUs compared had no occurrences (which accounts for proportion) in common, while 1 means that the OTUs had identical occurrence patterns. Finally, the distance matrix was used for hierarchical clustering using complete linkage. In this process, the two OTUs most similar in their occurrence patterns (e.g., had the highest Bray-Curtis similarity) were clustered together, and then the most two similar clusters were combined until, ultimately, one large cluster, comprised of all OTUs, was achieved.

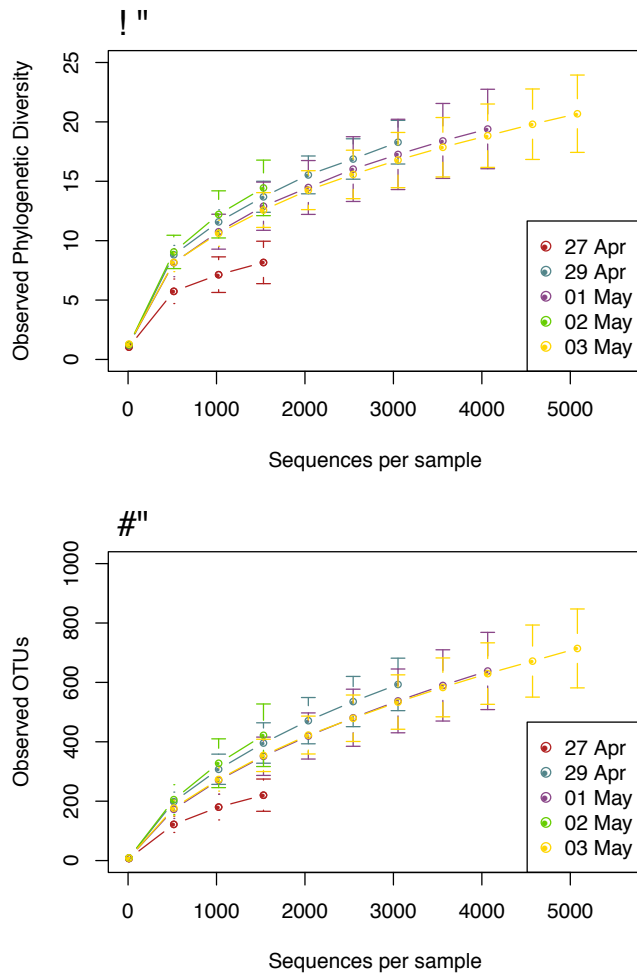


Figure S4A. Rarefied richness and phylogenetic diversity to visualize sequencing effort and alpha diversity for apple flower-associated microbial communities through time. Error bars are standard error around the mean of 10 samplings at each sequencing depth. Analyses were performed with the QIIME 1.3 workflow for alpha diversity. The rarefaction curves show how exhaustive sequencing was across all trees for each day. (a) Rarefaction of phylogenetic diversity. (b) Rarefaction of observed OTUs (richness). Before analyses, all communities were sampled evenly to 1677 sequences, the minimum richness observed.

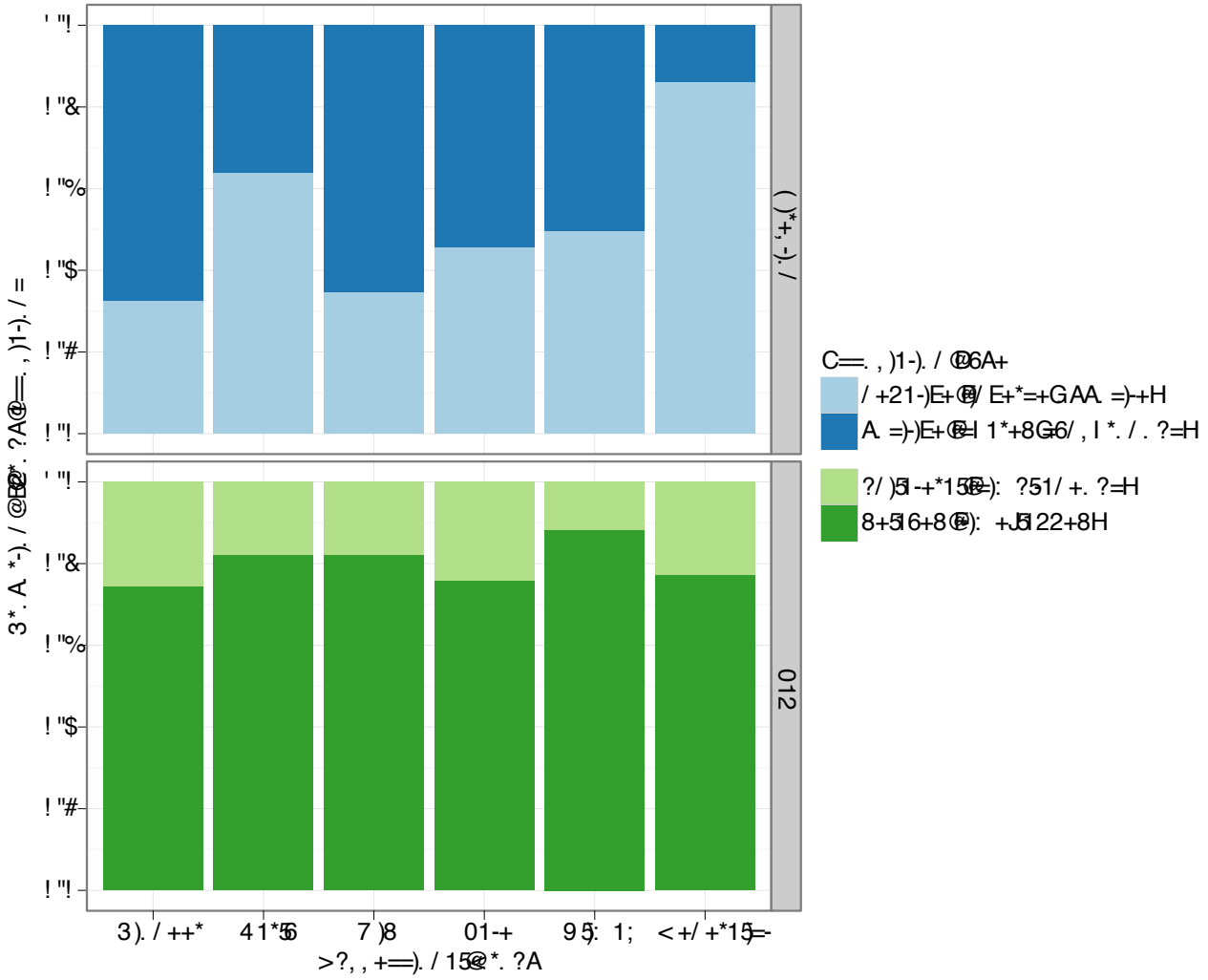


Figure S5A. For each successional group, proportion of positive and negative, and unilateral and delayed associations between OTUs.

Table S1A. Mapping file and barcodes ("tags") for each flower sample that was sequenced by 454.

SampleID	BarcodeSequence	LinkerPrimerSequence	Date	Treatment	Tree	PrePost	Blossoms Open/Closed	Experiment Day
01M.1.15X	AAAAAAGC	ACCMGGATTAGATAACCCCKG	1-May-10	Control	1	Post	Open	5
01M.2.15X	AAAAAAGT	ACCMGGATTAGATAACCCCKG	1-May-10	Control	2	Post	Open	5
01M.3.15X	AAAAAAGG	ACCMGGATTAGATAACCCCKG	1-May-10	Control	3	Post	Open	5
01M.4.15X	AAAAACAA	ACCMGGATTAGATAACCCCKG	1-May-10	Spray	4	Post	Open	5
01M.5.15X	AAAAACAC	ACCMGGATTAGATAACCCCKG	1-May-10	Sprayed	5	Post	Open	5
01M.6.15X	AAAAACAT	ACCMGGATTAGATAACCCCKG	1-May-10	Sprayed	6	Post	Open	5
02M.1.15X	AAAAACAG	ACCMGGATTAGATAACCCCKG	2-May-10	Control	1	Post	Open	6
02M.2.15X	AAAAACCA	ACCMGGATTAGATAACCCCKG	2-May-10	Control	2	Post	Open	6
02M.3.15X	AAAAACCC	ACCMGGATTAGATAACCCCKG	2-May-10	Control	3	Post	Open	6
02M.4.15X	AAAAACCT	ACCMGGATTAGATAACCCCKG	2-May-10	Sprayed	4	Post	Open	6
02M.5.15X	AAAAACCG	ACCMGGATTAGATAACCCCKG	2-May-10	Sprayed	5	Post	Open	6
02M.6.15X	AAAAACTA	ACCMGGATTAGATAACCCCKG	2-May-10	Sprayed	6	Post	Open	6
03M.1.15X	AAAAACTC	ACCMGGATTAGATAACCCCKG	3-May-10	Control	1	Post	Open	7
03M.2.15X	AAAAACTT	ACCMGGATTAGATAACCCCKG	3-May-10	Control	2	Post	Open	7
03M.3.15X	AAAAACTG	ACCMGGATTAGATAACCCCKG	3-May-10	Control	3	Post	Open	7
03M.4.15X	AAAAACGA	ACCMGGATTAGATAACCCCKG	3-May-10	Sprayed	4	Post	Open	7
03M.5.15X	AAAAACGC	ACCMGGATTAGATAACCCCKG	3-May-10	Sprayed	5	Post	Open	7
03M.6.15X	AAAAACGT	ACCMGGATTAGATAACCCCKG	3-May-10	Sprayed	6	Post	Open	7
27A.1.15X	AAAAAAGC	ACCMGGATTAGATAACCCCKG	27-Apr-10	Control	1	Pre	Closed	1
27A.2.15X	AAAAAAGT	ACCMGGATTAGATAACCCCKG	27-Apr-10	Control	2	Pre	Closed	1
27A.3.15X	AAAAAAGG	ACCMGGATTAGATAACCCCKG	27-Apr-10	Control	3	Pre	Closed	1
27A.4.15X	AAAAAACA	ACCMGGATTAGATAACCCCKG	27-Apr-10	Sprayed	4	Pre	Closed	1
27A.5.15X	AAAAAACCC	ACCMGGATTAGATAACCCCKG	27-Apr-10	Sprayed	5	Pre	Closed	1
27A.6.15X	AAAAAACCT	ACCMGGATTAGATAACCCCKG	27-Apr-10	Sprayed	6	Pre	Closed	1
29A.1.15X	AAAAAATC	ACCMGGATTAGATAACCCCKG	29-Apr-10	Control	1	Pre	Open	3
29A.2.15X	AAAAAATA	ACCMGGATTAGATAACCCCKG	29-Apr-10	Control	2	Pre	Open	3
29A.3.15X	AAAAAATG	ACCMGGATTAGATAACCCCKG	29-Apr-10	Sprayed	3	Pre	Open	3
29A.4.15X2	AAAAAATT	ACCMGGATTAGATAACCCCKG	29-Apr-10	Sprayed	4	Pre	Open	3
29A.5.15X	AAAAAATG	ACCMGGATTAGATAACCCCKG	29-Apr-10	Sprayed	5	Pre	Open	3
29A.6.15X	AAAAAAGA	ACCMGGATTAGATAACCCCKG	29-Apr-10	Sprayed	6	Pre	Open	3

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