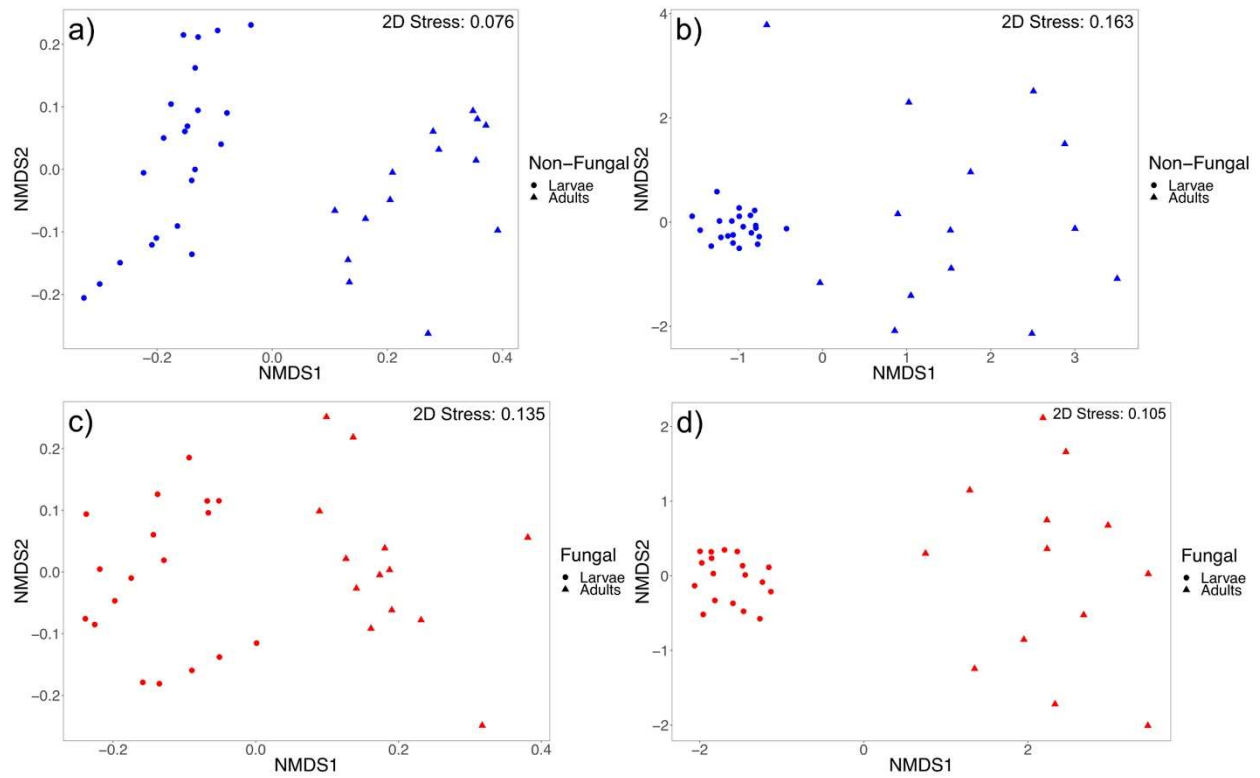
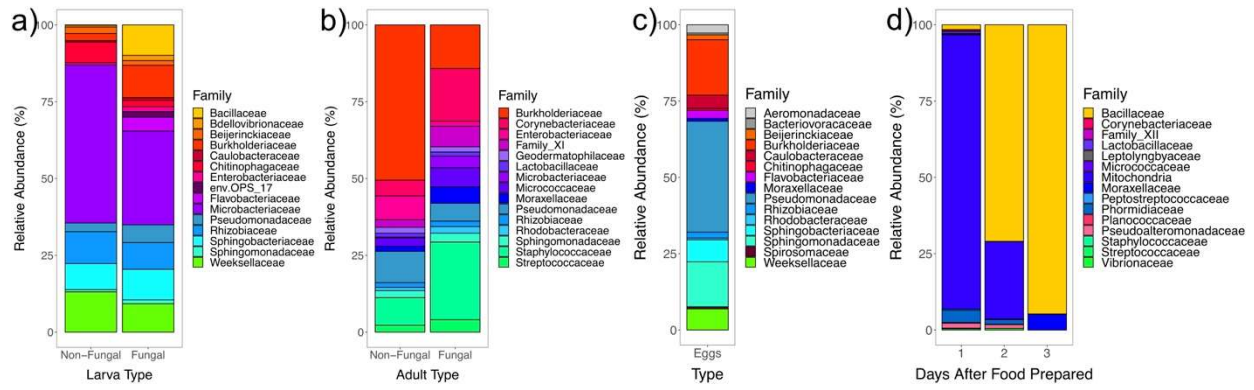


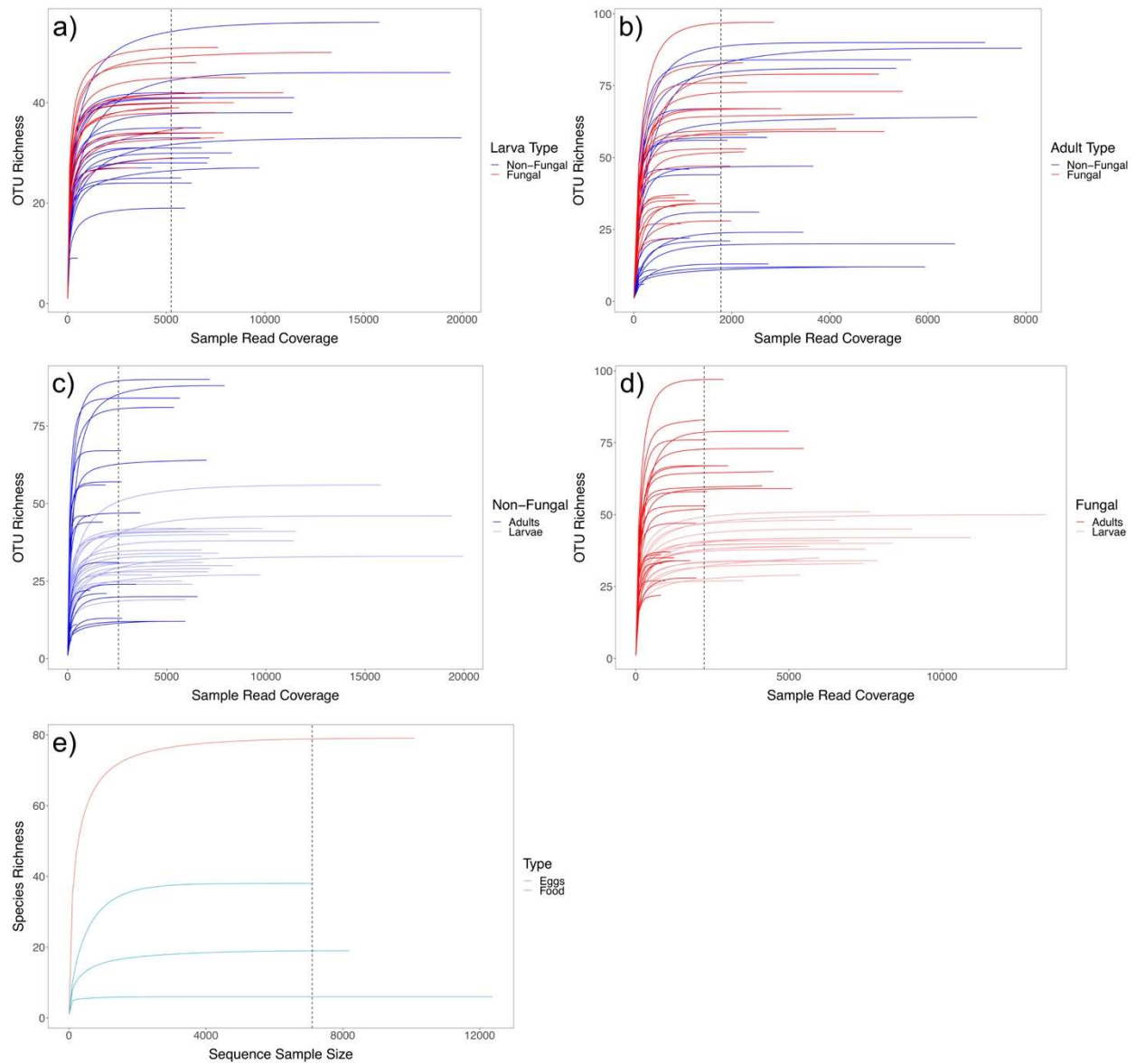
**Fig. S1.** Box plots of within group variation of measures for Bray-Curtis dissimilarity and unweighted UniFrac distance for (a, b) developmental stage of non-fungal mosquitoes ( $N = 36$ ), and (c, d) developmental stage of fungal mosquitoes ( $N = 31$ ). Significant differences were calculated with permutational statistical tests for the homogeneity of group dispersions ( $***p < 0.001$ ).



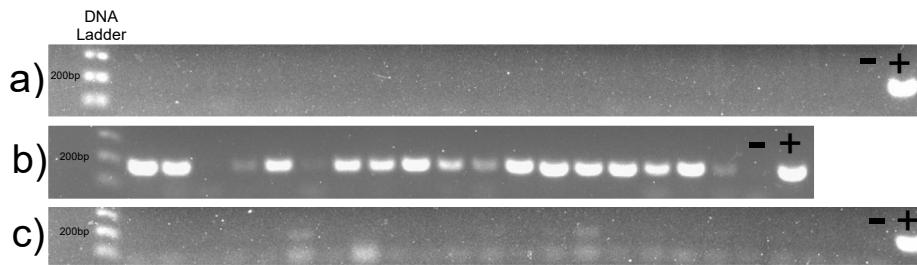
**Fig. S2.** Non-metric multidimensional scaling plots of beta diversity measures across developmental stages for each treatment group. (a, b) Weighted UniFrac distance and Jaccard index for non-fungal mosquitoes ( $N = 36$ ), respectively. (c, d) Weighted UniFrac distance and Jaccard index for fungal mosquitoes ( $N = 31$ ), respectively.



**Fig. S3.** Mean relative abundances of the 15 most abundant families shared across (a) larvae type ( $N = 38$ ), (b) adult type ( $N = 33$ ), and the 15 most abundant families in (c) 50 mosquito eggs, and (d) food source across 3 days after preparation.



**Fig. S4.** Rarefaction curves for sequencing reads from independent datasets (a) larva type, (b) adult type, (c) developmental stage of non-fungal mosquitoes, (d) developmental stage of fungal mosquitoes, (e) eggs and food. Read cutoff values are indicated with vertical dashed lines.



**Image S1.** Gel images of PCR amplicons produced using *Z. culisetae* specific primers for (a) non-fungal larvae, (b) fungal larvae, and (c) fungal adults. Positive controls (+) were produced from DNA extracted from a pure *Z. culisetae* culture. Negative controls (-) contained no DNA template. Agarose gels were prepared at 1% concentration and SYBR Green gel stain.

| Dataset               | Family              | Relative Abundance (Non-Fungal) | Relative Abundance (Fungal) | DF Num | DF Den | F      | p (Treatment)           |
|-----------------------|---------------------|---------------------------------|-----------------------------|--------|--------|--------|-------------------------|
| Larva Type            | Bacillaceae         | 0.10%                           | 9.55%                       | 1      | 6      | 1.037  | 0.348                   |
| Larva Type            | Bdellovibrionaceae  | 0.55%                           | 1.66%                       | 1      | 5.839  | 2.717  | 0.152                   |
| Larva Type            | Beijerinckiaceae    | 2.10%                           | 1.47%                       | 1      | 5.935  | 0.483  | 0.514                   |
| Larva Type            | Burkholderiaceae    | 2.24%                           | 10.18%                      | 1      | 5.972  | 1.89   | 0.219                   |
| Larva Type            | Caulobacteraceae    | 0.46%                           | 0.84%                       | 1      | 5.872  | 1.607  | 0.253                   |
| Larva Type            | Chitinophagaceae    | 6.50%                           | 2.05%                       | 1      | 5.995  | 0.707  | 0.433                   |
| Larva Type            | Enterobacteriaceae  | 0.69%                           | 1.46%                       | 1      | 5.995  | 0.605  | 0.466                   |
| Larva Type            | env.OPS_17          | 0.01%                           | 1.73%                       | 1      | 5.589  | 2.847  | 0.146                   |
| Larva Type            | Flavobacteriaceae   | 0.03%                           | 4.41%                       | 1      | 5.994  | 1.037  | 0.348                   |
| Larva Type            | Microbacteriaceae   | 49.98%                          | 29.41%                      | 1      | 5.981  | 2.339  | 0.177                   |
| Larva Type            | Pseudomonadaceae    | 2.74%                           | 5.56%                       | 1      | 5.589  | 2.378  | 0.178                   |
| Larva Type            | Rhizobiaceae        | 10.11%                          | 8.42%                       | 1      | 5.989  | 0.406  | 0.548                   |
| Larva Type            | Sphingobacteriaceae | 8.21%                           | 9.59%                       | 1      | 5.876  | 0.076  | 0.792                   |
| Larva Type            | Sphingomonadaceae   | 0.72%                           | 1.22%                       | 1      | 5.953  | 0.723  | 0.428                   |
| Larva Type            | Weeksellaceae       | 12.74%                          | 8.92%                       | 1      | 5.975  | 0.234  | 0.646                   |
| Adult Type            | Burkholderiaceae    | 40.19%                          | 10.44%                      | 1      | 5.316  | 4.779  | 0.077                   |
| Adult Type            | Corynebacteriaceae  | 4.08%                           | 12.58%                      | 1      | 4.87   | 10.144 | <b>0.025</b>            |
| Adult Type            | Enterobacteriaceae  | 6.14%                           | 1.23%                       | 1      | 4.87   | 0.8    | 0.413                   |
| Adult Type            | Family_XI           | 2.10%                           | 4.92%                       | 1      | 4.87   | 5.64   | 0.065                   |
| Adult Type            | Geodermatophilaceae | 1.53%                           | 1.25%                       | 1      | 5.497  | 0.001  | 0.978                   |
| Adult Type            | Lactobacillaceae    | 0.99%                           | 0.97%                       | 1      | 4.87   | 0      | 0.987                   |
| Adult Type            | Microbacteriaceae   | 0.23%                           | 2.78%                       | 1      | 4.951  | 1.005  | 0.363                   |
| Adult Type            | Micrococcaceae      | 2.16%                           | 4.60%                       | 1      | 4.977  | 0.854  | 0.398                   |
| Adult Type            | Moraxellaceae       | 1.31%                           | 3.91%                       | 1      | 4.87   | 6.885  | <b>0.048</b>            |
| Adult Type            | Pseudomonadaceae    | 8.12%                           | 4.27%                       | 1      | 5.297  | 0.569  | 0.483                   |
| Adult Type            | Rhizobiaceae        | 1.22%                           | 1.32%                       | 1      | 4.87   | 0.021  | 0.891                   |
| Adult Type            | Rhodobacteraceae    | 0.84%                           | 1.58%                       | 1      | 4.953  | 1.142  | 0.335                   |
| Adult Type            | Sphingomonadaceae   | 1.80%                           | 2.12%                       | 1      | 5.386  | 0.065  | 0.808                   |
| Adult Type            | Staphylococcaceae   | 7.16%                           | 18.57%                      | 1      | 4.87   | 6.355  | 0.054                   |
| Adult Type            | Streptococcaceae    | 1.77%                           | 2.99%                       | 1      | 4.87   | 1.34   | 0.301                   |
|                       |                     | Relative Abundance (Larvae)     | Relative Abundance (Adults) |        |        |        | p (Developmental Stage) |
| Non-Fungal Mosquitoes | Beijerinckiaceae    | 2.10%                           | 0.38%                       | 1      | 6.052  | 2.812  | 0.144                   |
| Non-Fungal Mosquitoes | Burkholderiaceae    | 2.23%                           | 42.16%                      | 1      | 6.481  | 24.134 | <b>0.002</b>            |
| Non-Fungal Mosquitoes | Chitinophagaceae    | 6.29%                           | 0.27%                       | 1      | 6.002  | 1.557  | 0.259                   |
| Non-Fungal Mosquitoes | Corynebacteriaceae  | 0.01%                           | 3.32%                       | 1      | 6.481  | 15.479 | <b>0.007</b>            |
| Non-Fungal Mosquitoes | Enterobacteriaceae  | 0.99%                           | 6.53%                       | 1      | 6.481  | 1.18   | 0.316                   |
| Non-Fungal Mosquitoes | Family_XI           | 0.01%                           | 2.29%                       | 1      | 6.167  | 6.579  | <b>0.042</b>            |
| Non-Fungal Mosquitoes | Microbacteriaceae   | 49.47%                          | 0.30%                       | 1      | 6.004  | 29.788 | <b>0.002</b>            |
| Non-Fungal Mosquitoes | Moraxellaceae       | 0.22%                           | 1.25%                       | 1      | 6.254  | 12.322 | <b>0.012</b>            |
| Non-Fungal Mosquitoes | Pseudomonadaceae    | 2.68%                           | 8.69%                       | 1      | 6.021  | 1.59   | 0.254                   |
| Non-Fungal Mosquitoes | Rhizobiaceae        | 10.26%                          | 1.28%                       | 1      | 6.004  | 11.496 | <b>0.015</b>            |
| Non-Fungal Mosquitoes | Rhodobacteraceae    | 0.41%                           | 1.06%                       | 1      | 6.269  | 2.142  | 0.192                   |
| Non-Fungal Mosquitoes | Sphingobacteriaceae | 8.79%                           | 0.11%                       | 1      | 6.003  | 3.392  | 0.115                   |
| Non-Fungal Mosquitoes | Sphingomonadaceae   | 0.64%                           | 1.27%                       | 1      | 6.028  | 1.078  | 0.339                   |
| Non-Fungal Mosquitoes | Staphylococcaceae   | 0.02%                           | 7.15%                       | 1      | 6.072  | 6.428  | <b>0.044</b>            |
| Non-Fungal Mosquitoes | Weeksellaceae       | 12.66%                          | 0.42%                       | 1      | 6.011  | 3.682  | 0.103                   |
| Fungal Mosquitoes     | Bacillaceae         | 9.09%                           | 0.64%                       | 1      | 5.993  | 0.889  | 0.382                   |
| Fungal Mosquitoes     | Burkholderiaceae    | 9.57%                           | 5.59%                       | 1      | 5.664  | 0.491  | 0.511                   |
| Fungal Mosquitoes     | Corynebacteriaceae  | 0.02%                           | 12.05%                      | 1      | 4.982  | 36.659 | <b>0.002</b>            |
| Fungal Mosquitoes     | Enterobacteriaceae  | 1.34%                           | 1.48%                       | 1      | 5.816  | 0.229  | 0.635                   |
| Fungal Mosquitoes     | Family_XI           | 0.01%                           | 5.05%                       | 1      | 4.982  | 40.031 | <b>0.001</b>            |
| Fungal Mosquitoes     | Flavobacteriaceae   | 4.33%                           | 0.14%                       | 1      | 5.98   | 0.925  | 0.374                   |
| Fungal Mosquitoes     | Microbacteriaceae   | 31.26%                          | 3.32%                       | 1      | 5.439  | 13.311 | <b>0.013</b>            |
| Fungal Mosquitoes     | Micrococcaceae      | 0.00%                           | 4.98%                       | 1      | 5.008  | 4.026  | 0.101                   |
| Fungal Mosquitoes     | Moraxellaceae       | 0.26%                           | 4.44%                       | 1      | 5.375  | 15.217 | <b>0.01</b>             |
| Fungal Mosquitoes     | Pseudomonadaceae    | 5.35%                           | 5.06%                       | 1      | 4.982  | 0.006  | 0.941                   |
| Fungal Mosquitoes     | Rhizobiaceae        | 8.23%                           | 1.61%                       | 1      | 5.732  | 12.556 | <b>0.013</b>            |
| Fungal Mosquitoes     | Sphingobacteriaceae | 9.91%                           | 0.18%                       | 1      | 4.992  | 19.617 | <b>0.007</b>            |
| Fungal Mosquitoes     | Sphingomonadaceae   | 1.28%                           | 2.31%                       | 1      | 4.982  | 4.123  | 0.098                   |
| Fungal Mosquitoes     | Staphylococcaceae   | 0.07%                           | 18.49%                      | 1      | 4.982  | 29.759 | <b>0.003</b>            |
| Fungal Mosquitoes     | Weeksellaceae       | 8.67%                           | 0.12%                       | 1      | 5.565  | 2.788  | 0.15                    |

**Table S1.** Mean relative abundances of the 15 most abundant families identified in each dataset and results from linear mixed models testing the main effect (treatment or developmental stage).

| Family             | Genus                   | Larval Abundance | Adult Abundance | Log2 Fold Change | Treatment  | > 1% Abundance |
|--------------------|-------------------------|------------------|-----------------|------------------|------------|----------------|
| Burkholderiaceae   | Achromobacter           | 0.54%            | 0.05%           | -3.35            | Non-Fungal | FALSE          |
| Burkholderiaceae   | Acidovorax              | 0.57%            | 13.41%          | 4.56             | Non-Fungal | TRUE           |
| Burkholderiaceae   | Aquabacterium           | 0.00%            | 0.05%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Comamonas               | 0.31%            | 0.16%           | -1.01            | Non-Fungal | FALSE          |
| Burkholderiaceae   | Cupriavidus             | 0.00%            | 0.04%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Delftia                 | 0.78%            | 25.33%          | 5.02             | Non-Fungal | TRUE           |
| Burkholderiaceae   | Diaphorobacter          | 0.00%            | 0.02%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Inhella                 | 0.00%            | 0.03%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Lautropia               | 0.00%            | 0.02%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Limnobacter             | 0.00%            | 0.31%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Massilia                | 0.03%            | 1.67%           | 5.87             | Non-Fungal | TRUE           |
| Burkholderiaceae   | Paucibacter             | 0.00%            | 0.06%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Pelomonas               | 0.00%            | 0.38%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Pseudorhodoferrax       | 0.00%            | 0.12%           | 6.08             | Non-Fungal | FALSE          |
| Burkholderiaceae   | Rhodoferrax             | 0.00%            | 0.03%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Roseateles              | 0.00%            | 0.02%           | Inf              | Non-Fungal | FALSE          |
| Burkholderiaceae   | Achromobacter           | 1.54%            | 0.00%           | -Inf             | Fungal     | TRUE           |
| Burkholderiaceae   | Acidovorax              | 1.38%            | 0.00%           | -Inf             | Fungal     | TRUE           |
| Burkholderiaceae   | Aquabacterium           | 0.07%            | 0.11%           | 0.56             | Fungal     | FALSE          |
| Burkholderiaceae   | Comamonas               | 0.03%            | 0.02%           | -0.53            | Fungal     | FALSE          |
| Burkholderiaceae   | Delftia                 | 6.42%            | 3.13%           | -1.04            | Fungal     | TRUE           |
| Burkholderiaceae   | Duganella               | 0.00%            | 0.02%           | Inf              | Fungal     | FALSE          |
| Burkholderiaceae   | Massilia                | 0.12%            | 1.77%           | 3.88             | Fungal     | TRUE           |
| Burkholderiaceae   | Noviherbaspirillum      | 0.00%            | 0.06%           | Inf              | Fungal     | FALSE          |
| Burkholderiaceae   | Pelomonas               | 0.00%            | 0.26%           | Inf              | Fungal     | FALSE          |
| Burkholderiaceae   | Ralstonia               | 0.00%            | 0.05%           | Inf              | Fungal     | FALSE          |
| Burkholderiaceae   | Ramlibacter             | 0.00%            | 0.12%           | Inf              | Fungal     | FALSE          |
| Burkholderiaceae   | Rhizobacter             | 0.00%            | 0.04%           | Inf              | Fungal     | FALSE          |
| Corynebacteriaceae | Corynebacterium         | 0.00%            | 0.39%           | Inf              | Non-Fungal | FALSE          |
| Corynebacteriaceae | Corynebacterium_1       | 0.01%            | 2.85%           | 8.32             | Non-Fungal | TRUE           |
| Corynebacteriaceae | Lawsonella              | 0.00%            | 0.06%           | Inf              | Non-Fungal | FALSE          |
| Corynebacteriaceae | Turicella               | 0.00%            | 0.02%           | Inf              | Non-Fungal | FALSE          |
| Corynebacteriaceae | Corynebacterium         | 0.00%            | 1.51%           | Inf              | Fungal     | TRUE           |
| Corynebacteriaceae | Corynebacterium_1       | 0.02%            | 10.15%          | 8.82             | Fungal     | TRUE           |
| Corynebacteriaceae | Lawsonella              | 0.00%            | 0.38%           | Inf              | Fungal     | FALSE          |
| Family_XI          | Anaerococcus            | 0.00%            | 0.75%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Ezakiella               | 0.00%            | 0.43%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Finegoldia              | 0.01%            | 0.57%           | 6.33             | Non-Fungal | FALSE          |
| Family_XI          | Gemella                 | 0.00%            | 0.04%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Murdochiella            | 0.00%            | 0.04%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Parvimonas              | 0.00%            | 0.03%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Peptoniphilus           | 0.00%            | 0.43%           | Inf              | Non-Fungal | FALSE          |
| Family_XI          | Anaerococcus            | 0.00%            | 2.43%           | Inf              | Fungal     | TRUE           |
| Family_XI          | Ezakiella               | 0.00%            | 0.36%           | Inf              | Fungal     | FALSE          |
| Family_XI          | Finegoldia              | 0.01%            | 1.10%           | 6.20             | Fungal     | TRUE           |
| Family_XI          | Peptoniphilus           | 0.00%            | 1.03%           | Inf              | Fungal     | TRUE           |
| Family_XI          | Tissierella             | 0.00%            | 0.09%           | Inf              | Fungal     | FALSE          |
| Family_XI          | W5053                   | 0.00%            | 0.04%           | Inf              | Fungal     | FALSE          |
| Moraxellaceae      | Acinetobacter           | 0.22%            | 0.89%           | 2.01             | Non-Fungal | FALSE          |
| Moraxellaceae      | Alkanindiges            | 0.00%            | 0.09%           | Inf              | Non-Fungal | FALSE          |
| Moraxellaceae      | Enhydrobacter           | 0.00%            | 0.18%           | Inf              | Non-Fungal | FALSE          |
| Moraxellaceae      | Psychrobacter           | 0.00%            | 0.09%           | Inf              | Non-Fungal | FALSE          |
| Moraxellaceae      | Acinetobacter           | 0.25%            | 3.46%           | 3.80             | Fungal     | TRUE           |
| Moraxellaceae      | Alkanindiges            | 0.00%            | 0.08%           | Inf              | Fungal     | FALSE          |
| Moraxellaceae      | Enhydrobacter           | 0.01%            | 0.79%           | 6.72             | Fungal     | FALSE          |
| Moraxellaceae      | Psychrobacter           | 0.00%            | 0.11%           | Inf              | Fungal     | FALSE          |
| Staphylococcaceae  | Nosocomiicoccus         | 0.00%            | 0.05%           | Inf              | Non-Fungal | FALSE          |
| Staphylococcaceae  | Salinicoccus            | 0.00%            | 0.13%           | Inf              | Non-Fungal | FALSE          |
| Staphylococcaceae  | Staphylococcus          | 0.02%            | 6.97%           | 8.62             | Non-Fungal | TRUE           |
| Staphylococcaceae  | Allicoccus              | 0.00%            | 0.17%           | Inf              | Fungal     | FALSE          |
| Staphylococcaceae  | Nosocomiicoccus         | 0.00%            | 0.17%           | Inf              | Fungal     | FALSE          |
| Staphylococcaceae  | S31                     | 0.00%            | 0.03%           | Inf              | Fungal     | FALSE          |
| Staphylococcaceae  | Salinicoccus            | 0.00%            | 0.09%           | Inf              | Fungal     | FALSE          |
| Staphylococcaceae  | Staphylococcus          | 0.07%            | 18.04%          | 8.01             | Fungal     | TRUE           |
| Microbacteriaceae  | Agromyces               | 17.17%           | 0.00%           | -Inf             | Non-Fungal | TRUE           |
| Microbacteriaceae  | Amnibacterium           | 0.00%            | 0.13%           | Inf              | Non-Fungal | FALSE          |
| Microbacteriaceae  | Curtobacterium          | 0.00%            | 0.02%           | Inf              | Non-Fungal | FALSE          |
| Microbacteriaceae  | Frigoribacterium        | 0.00%            | 0.05%           | Inf              | Non-Fungal | FALSE          |
| Microbacteriaceae  | Leucobacter             | 31.14%           | 0.00%           | -Inf             | Non-Fungal | TRUE           |
| Microbacteriaceae  | Microbacterium          | 1.16%            | 0.00%           | -Inf             | Non-Fungal | TRUE           |
| Microbacteriaceae  | Pseudoclavibacter       | 0.00%            | 0.07%           | Inf              | Non-Fungal | FALSE          |
| Microbacteriaceae  | Agromyces               | 9.99%            | 0.02%           | -8.69            | Fungal     | TRUE           |
| Microbacteriaceae  | Curtobacterium          | 0.00%            | 0.03%           | Inf              | Fungal     | FALSE          |
| Microbacteriaceae  | Frondihabitans          | 0.00%            | 0.02%           | Inf              | Fungal     | FALSE          |
| Microbacteriaceae  | Leucobacter             | 19.90%           | 3.04%           | -2.71            | Fungal     | TRUE           |
| Microbacteriaceae  | Microbacterium          | 1.37%            | 0.00%           | -Inf             | Fungal     | TRUE           |
| Microbacteriaceae  | Parafrigoribacterium    | 0.00%            | 0.15%           | Inf              | Fungal     | FALSE          |
| Rhizobiaceae       | Allo-Neo-Para-Rhizobium | 0.26%            | 0.68%           | 1.41             | Non-Fungal | FALSE          |
| Rhizobiaceae       | Aminobacter             | 2.37%            | 0.00%           | -Inf             | Non-Fungal | TRUE           |
| Rhizobiaceae       | Aureimonas              | 0.00%            | 0.42%           | Inf              | Non-Fungal | FALSE          |
| Rhizobiaceae       | Pseudochrobactrum       | 1.73%            | 0.15%           | -3.58            | Non-Fungal | TRUE           |
| Rhizobiaceae       | Shinella                | 5.59%            | 0.04%           | -7.16            | Non-Fungal | TRUE           |
| Rhizobiaceae       | Allo-Neo-Para-Rhizobium | 0.72%            | 0.23%           | -1.65            | Fungal     | FALSE          |
| Rhizobiaceae       | Aureimonas              | 0.00%            | 0.86%           | Inf              | Fungal     | FALSE          |
| Rhizobiaceae       | Pseudochrobactrum       | 1.67%            | 0.52%           | -1.67            | Fungal     | TRUE           |
| Rhizobiaceae       | Shinella                | 5.28%            | 0.00%           | -Inf             | Fungal     | TRUE           |

**Table S2.** Mean relative abundances and log<sub>2</sub> fold change values of genera from families identified to significantly change in mean relative abundance across developmental stages.



| Sample ID | Treatment  | Developmental Stage | Total Reads | <i>S.ruber</i> Reads | Conversion Factor | Calibrated Reads |
|-----------|------------|---------------------|-------------|----------------------|-------------------|------------------|
| A1ia16S   | Non-Fungal | Larvae              | 5222        | 4256                 | 2.248             | 11741            |
| A1iia16S  | Non-Fungal | Larvae              | 11276       | 9511                 | 1.006             | 11345            |
| A2ia16S   | Non-Fungal | Larvae              | 28200       | 24148                | 0.396             | 11175            |
| A2iia16S  | Non-Fungal | Larvae              | 4448        | 3370                 | 2.839             | 12630            |
| A3ia16S   | Non-Fungal | Larvae              | 3567        | 3176                 | 3.013             | 10747            |
| A3iia16S  | Non-Fungal | Larvae              | 6440        | 6184                 | 1.547             | 9965             |
| A4ia16S   | Non-Fungal | Larvae              | 17793       | 15974                | 0.599             | 10659            |
| A4iia16S  | Non-Fungal | Larvae              | 5807        | 4439                 | 2.156             | 12518            |
| C1ia16S   | Non-Fungal | Adults              | 24213       | 24213                | 0.395             | 9569             |
| C1iia16S  | Non-Fungal | Adults              | 7709        | 7697                 | 1.243             | 9584             |
| C2ia16S   | Non-Fungal | Adults              | 5422        | 5334                 | 1.794             | 9727             |
| C2iia16S  | Non-Fungal | Adults              | 6430        | 5184                 | 1.846             | 11869            |
| C3ia16S   | Non-Fungal | Adults              | 10893       | 10893                | 0.878             | 9569             |
| C3iia16S  | Non-Fungal | Adults              | 8030        | 7993                 | 1.197             | 9613             |
| C4ia16S   | Non-Fungal | Adults              | 11560       | 11452                | 0.836             | 9659             |
| C4iia16S  | Non-Fungal | Adults              | 9349        | 9280                 | 1.031             | 9640             |
| B1ia16S   | Fungal     | Larvae              | 12983       | 11945                | 0.645             | 8379             |
| B1iia16S  | Fungal     | Larvae              | 18064       | 17338                | 0.445             | 8032             |
| B1iia16S  | Fungal     | Larvae              | 8394        | 7927                 | 0.972             | 8163             |
| B1Va16S   | Fungal     | Larvae              | 7200        | 4836                 | 1.594             | 11477            |
| B1Vlla16S | Fungal     | Larvae              | 8227        | 6913                 | 1.115             | 9174             |
| B1Xla16S  | Fungal     | Larvae              | 6695        | 5564                 | 1.385             | 9276             |
| B2iia16S  | Fungal     | Larvae              | 3856        | 3175                 | 2.428             | 9362             |
| B2Va16S   | Fungal     | Larvae              | 5809        | 4380                 | 1.760             | 10224            |
| B2Vlla16S | Fungal     | Larvae              | 7672        | 6790                 | 1.135             | 8710             |
| B2Vlla16S | Fungal     | Larvae              | 9433        | 7824                 | 0.985             | 9294             |
| B2Xlla16S | Fungal     | Larvae              | 5613        | 4244                 | 1.816             | 10196            |
| B3iia16S  | Fungal     | Larvae              | 7313        | 3859                 | 1.998             | 14609            |
| B3IVa16S  | Fungal     | Larvae              | 8145        | 4129                 | 1.867             | 15207            |
| B3Va16S   | Fungal     | Larvae              | 5386        | 3434                 | 2.245             | 12091            |
| B3Vla16S  | Fungal     | Larvae              | 8272        | 4104                 | 1.878             | 15538            |
| B3Vlla16S | Fungal     | Larvae              | 3985        | 2268                 | 3.399             | 13545            |
| B4ia16S   | Fungal     | Larvae              | 7003        | 4371                 | 1.764             | 12351            |
| B4Xa16S   | Fungal     | Larvae              | 10999       | 8427                 | 0.915             | 10062            |
| D1ia16S   | Fungal     | Adults              | 8676        | 8673                 | 0.889             | 7712             |
| D1iia16S  | Fungal     | Adults              | 7279        | 7272                 | 1.060             | 7716             |
| D2ia16S   | Fungal     | Adults              | 9693        | 9670                 | 0.797             | 7727             |
| D2iia16S  | Fungal     | Adults              | 6342        | 6301                 | 1.223             | 7759             |
| D3ia16S   | Fungal     | Adults              | 9653        | 9638                 | 0.800             | 7721             |
| D3iia16S  | Fungal     | Adults              | 9221        | 9174                 | 0.840             | 7748             |
| D4ia16S   | Fungal     | Adults              | 18649       | 18642                | 0.414             | 7712             |
| D4iia16S  | Fungal     | Adults              | 19574       | 19532                | 0.395             | 7725             |

**Table S3.** Read count calibrations using SCML.

| Sample ID | Treatment  | Replicate | Container | Developmental Stage | Simpson  | Shannon  |
|-----------|------------|-----------|-----------|---------------------|----------|----------|
| A1i16S    | Non-Fungal | A1        | A1        | Larvae              | 0.781128 | 1.956754 |
| A1ii16S   | Non-Fungal | A1        | A1        | Larvae              | 0.779389 | 2.02514  |
| A1iii16S  | Non-Fungal | A1        | A1        | Larvae              | 0.678007 | 1.520236 |
| A1IV16S   | Non-Fungal | A1        | A1        | Larvae              | 0.687772 | 1.674663 |
| A1V16S    | Non-Fungal | A1        | A1        | Larvae              | 0.77094  | 2.014543 |
| A1VI16S   | Non-Fungal | A1        | A1        | Larvae              | 0.680458 | 1.580235 |
| A2i16S    | Non-Fungal | A2        | A2        | Larvae              | 0.851609 | 2.225244 |
| A2ii16S   | Non-Fungal | A2        | A2        | Larvae              | 0.886082 | 2.522891 |
| A2iii16S  | Non-Fungal | A2        | A2        | Larvae              | 0.81043  | 2.355978 |
| A2IV16S   | Non-Fungal | A2        | A2        | Larvae              | 0.890221 | 2.63648  |
| A2V16S    | Non-Fungal | A2        | A2        | Larvae              | 0.905292 | 2.780928 |
| A3i16S    | Non-Fungal | A3        | A3        | Larvae              | 0.885743 | 2.697553 |
| A3ii16S   | Non-Fungal | A3        | A3        | Larvae              | 0.819832 | 2.418824 |
| A3iii16S  | Non-Fungal | A3        | A3        | Larvae              | 0.866997 | 2.513849 |
| A3IV16S   | Non-Fungal | A3        | A3        | Larvae              | 0.852846 | 2.454045 |
| A3V16S    | Non-Fungal | A3        | A3        | Larvae              | 0.752841 | 1.718715 |
| A3VI16S   | Non-Fungal | A3        | A3        | Larvae              | 0.890834 | 2.719709 |
| A4i16S    | Non-Fungal | A4        | A4        | Larvae              | 0.847038 | 2.401726 |
| A4ii16S   | Non-Fungal | A4        | A4        | Larvae              | 0.872741 | 2.449929 |
| A4iii16S  | Non-Fungal | A4        | A4        | Larvae              | 0.766364 | 2.043451 |
| A4IV16S   | Non-Fungal | A4        | A4        | Larvae              | 0.764262 | 1.870419 |
| A4V16S    | Non-Fungal | A4        | A4        | Larvae              | 0.872513 | 2.53752  |
| A4VI16S   | Non-Fungal | A4        | A4        | Larvae              | 0.920935 | 2.794907 |
| C1i16S    | Non-Fungal | C1        | C1        | Adults              | 0.968876 | 3.720222 |
| C1ii16S   | Non-Fungal | C1        | C1        | Adults              | 0.922925 | 3.203402 |
| C1iii16S  | Non-Fungal | C1        | C1        | Adults              | 0.904213 | 3.365645 |
| C1IV16S   | Non-Fungal | C1        | C1        | Adults              | 0.943673 | 3.320118 |
| C1V16S    | Non-Fungal | C1        | C1        | Adults              | 0.960321 | 3.527454 |
| C1VI16S   | Non-Fungal | C1        | C1        | Adults              | 0.969793 | 3.979806 |
| C2i16S    | Non-Fungal | C2        | C2        | Adults              | 0.708612 | 2.2669   |
| C2ii16S   | Non-Fungal | C2        | C2        | Adults              | 0.601116 | 1.246548 |
| C2iii16S  | Non-Fungal | C2        | C2        | Adults              | 0.554997 | 1.189143 |
| C2IV16S   | Non-Fungal | C2        | C2        | Adults              | 0.803737 | 2.564652 |
| C2V16S    | Non-Fungal | C2        | C2        | Adults              | 0.373885 | 0.934566 |
| C3i16S    | Non-Fungal | C3        | C3        | Adults              | 0.968222 | 3.717295 |
| C3ii16S   | Non-Fungal | C3        | C3        | Adults              | 0.924117 | 3.457068 |
| C3iii16S  | Non-Fungal | C3        | C3        | Adults              | 0.710328 | 1.418898 |
| C3IV16S   | Non-Fungal | C3        | C3        | Adults              | 0.740909 | 1.901431 |
| C3V16S    | Non-Fungal | C3        | C3        | Adults              | 0.340691 | 0.784692 |
| C4i16S    | Non-Fungal | C4        | C4        | Adults              | 0.423778 | 1.272545 |
| C4ii16S   | Non-Fungal | C4        | C4        | Adults              | 0.093646 | 0.305203 |
| C4iii16S  | Non-Fungal | C4        | C4        | Adults              | 0.23925  | 0.731402 |
| C4IV16S   | Non-Fungal | C4        | C4        | Adults              | 0.948717 | 3.645982 |
| C4V16S    | Non-Fungal | C4        | C4        | Adults              | 0.315397 | 0.812035 |
| C4VI16S   | Non-Fungal | C4        | C4        | Adults              | 0.637728 | 1.610947 |
| C4VII16S  | Non-Fungal | C4        | C4        | Adults              | 0.82806  | 2.051137 |
| B1i16S    | Fungal     | B1        | B1        | Larvae              | 0.761521 | 2.122773 |
| B1ii16S   | Fungal     | B1        | B1        | Larvae              | 0.907585 | 2.800314 |
| B1iii16S  | Fungal     | B1        | B1        | Larvae              | 0.887671 | 2.637845 |
| B1V16S    | Fungal     | B1        | B1        | Larvae              | 0.915259 | 2.905605 |
| B1VI16S   | Fungal     | B1        | B1        | Larvae              | 0.863437 | 2.430622 |
| B1XI16S   | Fungal     | B1        | B1        | Larvae              | 0.914302 | 2.920976 |
| B2i16S    | Fungal     | B2        | B2        | Larvae              | 0.807872 | 2.129747 |
| B2V16S    | Fungal     | B2        | B2        | Larvae              | 0.837616 | 2.228043 |
| B2VI16S   | Fungal     | B2        | B2        | Larvae              | 0.927971 | 3.085282 |
| B2VII16S  | Fungal     | B2        | B2        | Larvae              | 0.80035  | 2.364109 |
| B2XII16S  | Fungal     | B2        | B2        | Larvae              | 0.925112 | 2.988223 |
| B3iii16S  | Fungal     | B3        | B3        | Larvae              | 0.843677 | 2.607272 |
| B3IV16S   | Fungal     | B3        | B3        | Larvae              | 0.859852 | 2.46647  |
| B3V16S    | Fungal     | B3        | B3        | Larvae              | 0.858246 | 2.577592 |
| B3VI16S   | Fungal     | B3        | B3        | Larvae              | 0.861829 | 2.510171 |
| B3VIII16S | Fungal     | B3        | B3        | Larvae              | 0.877955 | 2.625997 |
| B4i16S    | Fungal     | B4        | B4        | Larvae              | 0.827402 | 2.257331 |
| B4X16S    | Fungal     | B4        | B4        | Larvae              | 0.772096 | 2.228847 |
| D1i16S    | Fungal     | D1        | D1        | Adults              | 0.923404 | 3.042112 |
| D1ii16S   | Fungal     | D1        | D1        | Adults              | 0.854673 | 2.629304 |
| D1iii16S  | Fungal     | D1        | D1        | Adults              | 0.851202 | 2.495198 |
| D1IV16S   | Fungal     | D1        | D1        | Adults              | 0.922617 | 3.601914 |
| D2i16S    | Fungal     | D2        | D2        | Adults              | 0.917711 | 3.209512 |
| D2ii16S   | Fungal     | D2        | D2        | Adults              | 0.648893 | 1.85114  |
| D2iii16S  | Fungal     | D2        | D2        | Adults              | 0.944312 | 3.423215 |
| D2IV16S   | Fungal     | D2        | D2        | Adults              | 0.942458 | 3.479433 |
| D2V16S    | Fungal     | D2        | D2        | Adults              | 0.96793  | 4.021107 |
| D2VI16S   | Fungal     | D2        | D2        | Adults              | 0.770054 | 2.071509 |
| D3i16S    | Fungal     | D3        | D3        | Adults              | 0.914995 | 3.398632 |
| D3ii16S   | Fungal     | D3        | D3        | Adults              | 0.886131 | 2.845975 |
| D3iii16S  | Fungal     | D3        | D3        | Adults              | 0.96134  | 3.671425 |
| D3IV16S   | Fungal     | D3        | D3        | Adults              | 0.957095 | 3.594255 |
| D3V16S    | Fungal     | D3        | D3        | Adults              | 0.957512 | 3.637832 |
| D3VI16S   | Fungal     | D3        | D3        | Adults              | 0.860474 | 2.391519 |
| D4i16S    | Fungal     | D4        | D4        | Adults              | 0.957758 | 3.463117 |
| D4ii16S   | Fungal     | D4        | D4        | Adults              | 0.930848 | 3.066869 |
| D4iii16S  | Fungal     | D4        | D4        | Adults              | 0.820395 | 2.959045 |
| D4IV16S   | Fungal     | D4        | D4        | Adults              | 0.938435 | 3.582275 |
| D4V16S    | Fungal     | D4        | D4        | Adults              | 0.940732 | 3.157166 |
| D4VI16S   | Fungal     | D4        | D4        | Adults              | 0.827975 | 2.770696 |
| D4VII16S  | Fungal     | D4        | D4        | Adults              | 0.914789 | 2.840339 |

**Table S4.** Alpha diversity measures (Simpson and Shannon diversity indices) for experimental sample microbiomes.