

Figure S1

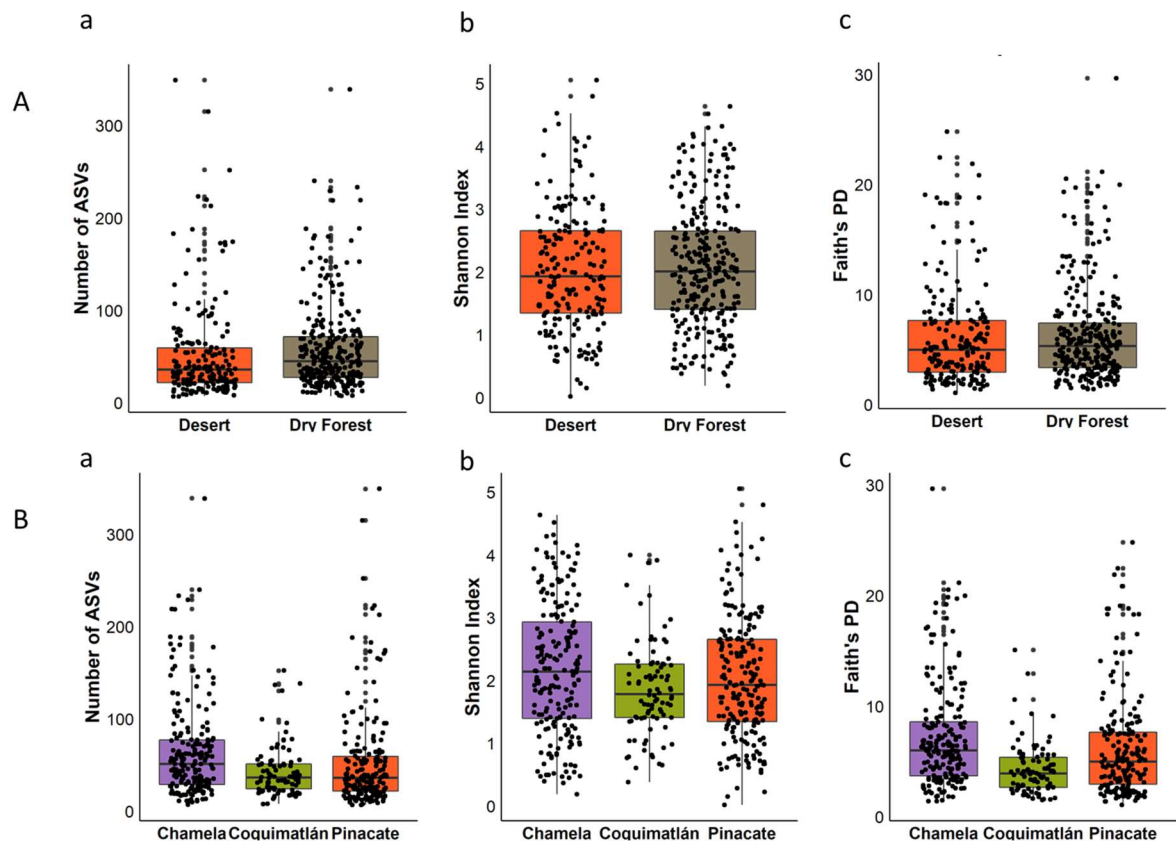


Figure S1. Gut microbial alpha diversity measures of female bats between 2015-2017. A) Grouped by biome, B) Grouped by locality. (a) number of ASVs, (b) Shannon Index, (c) Faith's PD.

S. Table 1. Geographical coordinates, and extra information for all sampling sites.

| <b>Biome</b>      | <b>Locality</b> | <b>Other names</b>                  | <b>Municipality</b> | <b>Lat</b> | <b>Long</b> | <b>Ecosystem</b>                     | <b>Foraging area</b> | <b>Other species</b> |
|-------------------|-----------------|-------------------------------------|---------------------|------------|-------------|--------------------------------------|----------------------|----------------------|
| <b>Dry Forest</b> | Chamela         | Isla San Panchito, Isla San Agustín | La Huerta, Jalisco  | 19.534395  | -105.088262 | Island cave off the coast of Xametla | autumn and winter    | Pteronotus spp.      |
|                   | Coquimatlan     | La Fábrica                          | Coquimatlán, Colima | 19.151177  | -103.834796 | Cave with guano collection activity  | year-long?           | Pteronotus spp.      |
| <b>Desert</b>     | Pinacate        | Cueva del Pinacate                  | Sonoyta, Sonora     | 31.647611  | -113.480889 | Collapse lava tunnel, Sonoran Desert | May to August        | none                 |

S. Table 2. Provenance of collected samples

| Biome      | Locality    | 2015 |        | 2016 |        | 2017 |        | total      |
|------------|-------------|------|--------|------|--------|------|--------|------------|
|            |             | Male | Female | Male | Female | Male | Female |            |
| Dry Forest | Chamela     | -    | -      | 51   | 69     | 30   | 65     | <b>307</b> |
|            | Coquimatlan | -    | -      | -    | -      | 60   | 32     |            |
| Desert     | Pinacate    | 0    | 50     | 0    | 82     | 0    | 81     | <b>213</b> |

S. Table 3. Linear models for Alpha diversity measurements by locality and biome.

**Log(FPD) by Biome**

| Coefficients    | Estimate | Std. Error | t value | Pr(> t ) |     |
|-----------------|----------|------------|---------|----------|-----|
| (Intercept)     | 187.153  | 0.08969    | 20.866  | < 2e-16  | *** |
| year2016        | -0.18719 | 0.10875    | -1.721  | 0.086114 | .   |
| year2017        | -0.54347 | 0.10814    | -5.026  | 8.08e-07 | *** |
| BiomeDry Forest | 0.25217  | 0.07018    | 3.593   | 0.000374 | *** |

| Model     | Df  | Sum Sq  | Mean Sq | F value | Pr(>F)    |     |
|-----------|-----|---------|---------|---------|-----------|-----|
| year      | 2   | 10.998  | 54.990  | 14.859  | 0,000645  | *** |
| Biome     | 1   | 4.779   | 47.787  | 12.913  | 0.0003739 | *** |
| Residuals | 345 | 127.677 | 0.3701  |         |           |     |

**Log(ASV) by Biome**

| Coefficients    | Estimate | Std. Error | t value | Pr(> t ) |     |
|-----------------|----------|------------|---------|----------|-----|
| (Intercept)     | 54.761   | 7.282      | 7520    | 4.78e-13 | *** |
| year2016        | 8.792    | 8.829      | 0.996   | 0.3200   |     |
| year2017        | -13.610  | 8780       | -1550   | 0.1220   |     |
| BiomeDry Forest | 11.440   | 5.697      | 2008    | 0.0454   | *   |

| Model     | Df  | Sum Sq | Mean Sq | F value | Pr(>F)   |    |
|-----------|-----|--------|---------|---------|----------|----|
| year      | 2   | 34343  | 17171.7 | 70.397  | 0.001008 | ** |
| Biome     | 1   | 9836   | 9835.6  | 40.322  | 0.045419 | *  |
| Residuals | 345 | 841549 | 2439.3  |         |          |    |

**Sqrt(SW) by Biome**

| Coefficients    | Estimate | Std. Error | t value | Pr(> t ) |     |
|-----------------|----------|------------|---------|----------|-----|
| (Intercept)     | 137.686  | 0.05049    | 27.272  | <2e-16   | *** |
| year2016        | 0.05031  | 0.06121    | 0.822   | 0.412    |     |
| year2017        | -0.04395 | 0.06087    | -0.722  | 0.471    |     |
| BiomeDry Forest | 0.06229  | 0.03950    | 1577    | 0.116    |     |

| Model     | Df  | Sum Sq | Mean Sq | F value | Pr(>F)  |   |
|-----------|-----|--------|---------|---------|---------|---|
| year      | 2   | 0.622  | 0.31104 | 26.529  | 0.07188 | . |
| Biome     | 1   | 0.292  | 0.29156 | 24.867  | 0.11573 |   |
| Residuals | 345 | 40.450 | 0.11725 |         |         |   |

**Log(FPD) by Locality**

| Coefficients        | Estimate | Std. Error | t value | Pr(> t ) |     |
|---------------------|----------|------------|---------|----------|-----|
| (Intercept)         | 2.17777  | 0.11366    | 19.161  | < 2e-16  | *** |
| LocalityCoquimatlan | -0.32232 | 0.08689    | -3.710  | 0.000232 | *** |
| LocalityPinacate    | -0.30624 | 0.07107    | -4.309  | 1.99e-05 | *** |
| sexM                | -0.06689 | 0.07279    | -0.919  | 0.358534 |     |
| year2016            | -0.26505 | 0.10669    | -2.484  | 0.013319 | *   |
| year2017            | -0.46966 | 0.10616    | -4.424  | 1.20e-05 | *** |

| Model     | Df  | Sum Sq  | Mean Sq | F value | Pr(>F)   |     |
|-----------|-----|---------|---------|---------|----------|-----|
| Locality  | 2   | 13.275  | 66.373  | 18.341  | 2,11E-05 | *** |
| sex       | 1   | 0.157   | 0.1571  | 0.434   | 0.5103   |     |
| year      | 2   | 8.441   | 42.207  | 11.663  | 1,13E-02 | *** |
| Residuals | 481 | 174.063 | 0.3619  |         |          |     |

**Log (ASV) by Locality**

| Coefficients        | Estimate | SE    | t value | Pr(> t ) |     |
|---------------------|----------|-------|---------|----------|-----|
| (Intercept)         | 68.290   | 9.288 | 7.352   | 8.44e-13 | *** |
| LocalityCoquimatlan | -13.499  | 7.101 | -1.901  | 0.0579   | .   |
| LocalityPinacate    | -13.529  | 5.808 | -2.329  | 0.0202   | *   |
| sexM                | -2.705   | 5.948 | -0.455  | 0.6494   |     |
| year2016            | 4.508    | 8.719 | 0.517   | 0.6054   |     |
| year2017            | -9.548   | 8.676 | -1.101  | 0.2717   |     |

| Model     | Df  | Sum Sq  | Mean Sq | F value | Pr(>F)    |     |
|-----------|-----|---------|---------|---------|-----------|-----|
| Locality  | 2   | 34305   | 17152.4 | 70.973  | 0.0009168 | *** |
| sex       | 1   | 133     | 133.4   | 0.0552  | 0.8143290 |     |
| year      | 2   | 17340   | 8670.2  | 35.876  | 0.0284087 | *   |
| Residuals | 481 | 1162451 | 2416.7  |         |           |     |

**Sqrt(SW) by Locality**

| Coefficients        | Estimate | Std. Error | t value | Pr(> t ) |     |
|---------------------|----------|------------|---------|----------|-----|
| (Intercept)         | 1.44667  | 0.06705    | 21.576  | <2e-16   | *** |
| LocalityCoquimatlan | -0.06507 | 0.05126    | -1.269  | 0.2049   |     |
| LocalityPinacate    | -0.06981 | 0.04193    | -1.665  | 0.0965   | .   |
| sexM                | -0.05493 | 0.04294    | -1.279  | 0.2014   |     |
| year2016            | 0.01480  | 0.06294    | 0.235   | 0.8141   |     |
| year2017            | -0.01029 | 0.06263    | -0.164  | 0.8695   |     |

| Model     | Df  | Sum Sq | Mean Sq  | F value | Pr(>F)  |   |
|-----------|-----|--------|----------|---------|---------|---|
| Locality  | 2   | 0.587  | 0.293645 | 23.317  | 0.09823 | . |
| sex       | 1   | 0.190  | 0.190224 | 15.105  | 0.21967 |   |
| year      | 2   | 0.055  | 0.027298 | 0.2168  | 0.80520 |   |
| Residuals | 481 | 60.575 | 0.125936 |         |         |   |

S Table 4. Permanova model and coefficients for Unweighted and Weighted Unifrac.

**a. Model for UnWeighted UniFrac**

|               | Df  | SumsOfSqs | MeanSqs | F.Model | R2      | Pr(>F)   |
|---------------|-----|-----------|---------|---------|---------|----------|
| Locality      | 2   | 13.654    | 68.272  | 42.035  | 0.14405 | 1,00E-04 |
| year          | 2   | 1.956     | 0.9778  | 6.020   | 0.02063 | 1,00E-04 |
| Locality:year | 1   | 1055      | 10553   | 6.498   | 0.01113 | 1,00E-04 |
| Residuals     | 481 | 78.123    | 0.1624  |         | 0.82418 |          |

**b. Model for Weighted UniFrac**

|               | Df  | SumsOfSqs | MeanSqs | F.Model | R2      | Pr(>F)   |
|---------------|-----|-----------|---------|---------|---------|----------|
| Locality      | 2   | 11.191    | 55.954  | 226.009 | 0.08309 | 1,00E-04 |
| year          | 2   | 2.549     | 12.746  | 51.483  | 0.01893 | 1,00E-04 |
| Locality:year | 1   | 1.855     | 18.551  | 74.933  | 0.01377 | 1,00E-04 |
| Residuals     | 481 | 119.083   | 0.2476  |         | 0.88420 |          |

S Table 5. Pairwise comparisons between year-site categories for Weighted and UnWeighted UniFrac.

**a. Paiwise comparisons for Weighted UniFrac**

| Pair                               | difference         | lower              | upper             | p adj            |
|------------------------------------|--------------------|--------------------|-------------------|------------------|
| Chamela 2017-Chamela 2016          | -0.005007231       | -0.057956917       | 0.04794245        | 0.9989988        |
| Pinacate 2015-Chamela 2016         | -0.031592825       | -0.088459692       | 0.02527404        | 0.5474154        |
| Pinacate 2016-Chamela 2016         | -0.037382074       | -0.087899044       | 0.01313490        | 0.2539131        |
| Pinacate 2017-Chamela 2016         | 0.042740444        | -0.007175640       | 0.09265653        | 0.1323581        |
| Pinacate 2015-Chamela 2017         | -0.026585594       | -0.083655826       | 0.03048464        | 0.7048539        |
| Pinacate 2016-Chamela 2017         | -0.032374842       | -0.083120631       | 0.01837095        | 0.4046624        |
| Pinacate 2017-Chamela 2017         | 0.047747676        | -0.002399969       | 0.09789532        | 0.0705282        |
| Pinacate 2016-Pinacate 2015        | -0.005789248       | -0.060609924       | 0.04903143        | 0.9984551        |
| <b>Pinacate 2017-Pinacate 2015</b> | <b>0.074333269</b> | <b>0.020065806</b> | <b>0.12860073</b> | <b>0.0018965</b> |
| <b>Pinacate 2017-Pinacate 2016</b> | <b>0.080122518</b> | <b>0.032550663</b> | <b>0.12769437</b> | <b>0.0000547</b> |

**b. Paiwise comparisons for UnWeighted UniFrac**

| Pair                               | difference         | lower              | upper              | p adj            |
|------------------------------------|--------------------|--------------------|--------------------|------------------|
| Chamela 2017-Chamela 2016          | -0.038606718       | -0.080495409       | 0.003281973        | 0.0869155        |
| Pinacate 2015-Chamela 2016         | -0.027397521       | -0.072385108       | 0.017590066        | 0.4534721        |
| Pinacate 2016-Chamela 2016         | 0.019436876        | -0.020527285       | 0.059401037        | 0.6698908        |
| Pinacate 2017-Chamela 2016         | 0.026749907        | -0.012738890       | 0.066238705        | 0.3420290        |
| Pinacate 2015-Chamela 2017         | 0.011209197        | -0.033939273       | 0.056357667        | 0.9604130        |
| <b>Pinacate 2016-Chamela 2017</b>  | <b>0.058043594</b> | <b>0.017898414</b> | <b>0.098188774</b> | <b>0.0008540</b> |
| <b>Pinacate 2017-Chamela 2017</b>  | <b>0.065356626</b> | <b>0.025684640</b> | <b>0.105028612</b> | <b>0.0000856</b> |
| <b>Pinacate 2016-Pinacate 2015</b> | <b>0.046834397</b> | <b>0.003465559</b> | <b>0.090203234</b> | <b>0.0269789</b> |
| <b>Pinacate 2017-Pinacate 2015</b> | <b>0.054147429</b> | <b>0.011216239</b> | <b>0.097078618</b> | <b>0.0055135</b> |
| Pinacate 2017-Pinacate 2016        | 0.007313032        | -0.030321237       | 0.044947301        | 0.9838670        |