Relationships between abiotic environment, plant functional traits, and animal body size at Mount Kilimanjaro, Tanzania

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S4 Table. Coefficients, P-values, generalized $R^2$ values, and model probability of the structural equation models. The relationships between the abiotic environment (precipitation, disturbance), total plant biomass, and leaf economics were the same for all models and coefficients and P-values are given only once. All variables were standardized prior to analyses. Unstandardized coefficients were obtained by multiplying standardized coefficients with the ratio of the standard deviations of response and predictor. For each taxonomic group or guild, data is presented for initial models ("hypothesis") and improved models dropping non-significant paths ("significant "). Stars indicate P-values smaller than 0.05, 0.01 and 0.001, respectively.

| Model       | Response                        | Predictor                      | Standardized Coefficient | Unstandardized Coefficient | P-value | Marginal $R^2$ | Conditional $R^2$ | Model probability |
|-------------|---------------------------------|--------------------------------|--------------------------|----------------------------|---------|---------------|------------------|-------------------|
| All         | Precipitation                   |                                |                          |                            | 0       | 0.73          |                  |                   |
|             | Temperature                     |                                |                          |                            | 0       | 0.96          |                  |                   |
| Disturbance | (Intercept)                     |                                | -0.15                    | -4.76E-02                  | 0.38    | 0.91          |                  |                   |
| Disturbance | Temperature                     |                                | 0.49                     | 2.40E-02                   | 3.54E-04 *** |          |                  |                   |
| Leaf economics | (Intercept)               |                                | -0.09                    | -1.84E-01                  | 0.52    | 0.77          |                  |                   |
| Leaf economics | Disturbance                  |                                | 0.43                     | 2.76E+00                   | 0.01 ** |              |                  |                   |
| Leaf economics | Precipitation                 |                                | 0.43                     | 1.25E-03                   | 2.85E-06 *** |          |                  |                   |
| Total plant biomass | (Intercept)         |                                | 0.00                     | 0.00                       |         | 0.32          | 0.72             |                   |
| Total plant biomass | Disturbance              |                                | -0.30                    | -1.54E+02                  | 0.04 * |              |                  |                   |
| Total plant biomass | Precipitation            |                                | 0.37                     | 8.73E-02                   | 1.00E-03 ** |          |                  |                   |
| Moths hypothesis | Insect-pollinated plants CWM | (Intercept)                 | 0.05                     | 1.37E-02                   | 0.47    | 0.71          | 0.55             |                   |
| Moths significant | Insect-pollinated plants CWM | Leaf economics             | 0.62                     | 9.02E-02                   | 9.16E-06 *** |          |                  |                   |
| Moths CWM | Total plant biomass            |                                | 0.24                     | 4.30E-04                   | 0.04 * |              |                  |                   |
| Moths CWM | Insect-pollinated plants CWM   | (Intercept)                 | 0.11                     | 3.31E-01                   | 0.49    | 0.51          |                  |                   |
| Moths CWM | Leaf economics                 |                                | -0.08                    | -8.32E-01                  | 0.61    |              |                  |                   |
| Moths CWM | Temperature                    |                                | -0.15                    | -2.40E-01                  | 0.35    |              |                  |                   |
| Moths CWM | Total plant biomass            |                                | -0.59                    | -2.87E-01                  | 2.00E-04 *** |          |                  |                   |
| Moths CWM | (Intercept)                    |                                | 0.11                     | 2.11E-03                   | 0.39    |              |                  |                   |
| Moths CWM | Insect-pollinated plants CWM   | (Intercept)                 | 0.05                     | 1.37E-02                   | 0.47    | 0.71          | 0.76             |                   |
| Moths CWM | Leaf economics                 |                                | 0.62                     | 9.02E-02                   | 9.16E-06 *** |          |                  |                   |
| Moths CWM | Total plant biomass            |                                | 0.24                     | 4.30E-04                   | 0.04 * |              |                  |                   |
| Moths CWM | Temperature                    |                                | 0.14                     | 4.53E-01                   | 0.49    | 0.51          |                  |                   |
| Moths CWM | Total plant biomass            |                                | -0.76                    | -3.70E-01                  | 2.52E-06 *** |          |                  |                   |
| Bees hypothesis | Bee CWM                        | (Intercept)                 | 0.02                     | 1.10E-01                   | 0.53    | 0.53          | 0.27             |                   |
| Bees hypothesis | Disturbance                  |                                | 0.40                     | 6.56E+00                   | 0.03 * |              |                  |                   |
| Bees hypothesis | Insect-pollinated plants CWM | (Intercept)     | -0.11                    | -1.97E+00                  | 0.37    |              |                  |                   |
| Bees hypothesis | Temperature                  |                                | 0.38                     | 3.00E-01                   | 0.02 * |              |                  |                   |
| Bees hypothesis | Total plant biomass           |                                | 0.52                     | 1.63E-02                   | 4.42E-04 *** |          |                  |                   |
|                          | Insect-pollinated plants CWM |             |             |             |             |             |             |             |
|--------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| (Intercept)              | 0.05                        | 1.37E-02    | 0.47        | 0.71        |             |             |             |             |
| Insect-pollinated plants CWM | Leaf economics             | 0.62        | 9.02E-02    | 9.16E-06    | ***         |             |             |             |
| Insect-pollinated plants CWM | Total plant biomass        | 0.24        | 4.30E-04    | 0.04        | *           |             |             |             |
| **Bees significant**     | Bee CWM (Intercept)        | 0.01        | 7.50E-02    | 0.58        | 0.66        | 0.41        |             |             |
|                          | Bee CWM Disturbance        | 0.32        | 5.27E+00    | 0.04        | *           |             |             |             |
|                          | Bee CWM Temperature        | 0.49        | 3.88E-01    | 1.10E-03    | **          |             |             |             |
|                          | Bee CWM Total plant biomass| 0.50        | 1.57E-02    | 0.01        | *           |             |             |             |
|                          | Insect-pollinated plants CWM (Intercept) | 0.05        | 1.37E-02    | 0.47        | 0.71        |             |             |             |
|                          | Insect-pollinated plants CWM | Leaf economics | 0.62        | 9.02E-02    | 9.16E-06    | ***         |             |             |
|                          | Insect-pollinated plants CWM | Total plant biomass | 0.24        | 4.30E-04    | 0.04        | *           |             |             |
| **Frugivorous birds hypothesis** | Bird-dispersed fruit CWM (Intercept) | 0.01        | 2.37E+03    | 0.17        | 0.89        | 0.36        |             |             |
|                          | Bird-dispersed fruit CWM   | -0.26       | -4.29E+04   | 0.34        |             |             |             |             |
|                          | Frugivorous bird CWM Total plant biomass | 0.14        | 2.83E+02    | 0.05        | *           |             |             |             |
|                          | Frugivorous bird CWM (Intercept) | 0.03        | 2.95E+00    | 0.35        | 0.41        |             |             |             |
|                          | Frugivorous bird CWM Bird-dispersed fruit CWM | 0.49        | 1.42E-04    | 0.18        |             |             |             |             |
|                          | Frugivorous bird CWM Temperature | -0.21       | -3.18E+00   | 0.54        |             |             |             |             |
|                          | Frugivorous bird CWM Total plant biomass | -0.05       | -3.27E-02   | 0.82        |             |             |             |             |
| **Frugivorous birds significant** | Bird-dispersed fruit CWM (Intercept) | 0.01        | 2.37E+03    | 0.17        | 0.89        | 0.7         |             |             |
|                          | Bird-dispersed fruit CWM   | -0.26       | -4.29E+04   | 0.34        |             |             |             |             |
|                          | Frugivorous bird CWM Total plant biomass | 0.14        | 2.83E+02    | 0.05        | *           |             |             |             |
|                          | Frugivorous bird CWM (Intercept) | 0.12        | 1.18E+01    | 0.16        | 0.16        |             |             |             |
|                          | Frugivorous bird CWM Temperature | -0.44       | -6.64E+00   | 0.05        | *           |             |             |             |
| **Insectivorous birds hypothesis** | Insect-pollinated plants CWM (Intercept) | 0.05        | 1.37E-02    | 0.47        | 0.71        | 0.25        |             |             |
|                          | Insect-pollinated plants CWM | Leaf economics | 0.62        | 9.02E-02    | 9.16E-06    | ***         |             |             |
|                          | Insect-pollinated plants CWM | Total plant biomass | 0.24        | 4.30E-04    | 0.04        | *           |             |             |
|                          | Insectivorous bird CWM (Intercept) | -0.01       | -1.01E-01   | 0.33        | 0.33        |             |             |             |
|                          | Insectivorous bird CWM Temperature | 0.46        | 7.65E-01    | 9.41E-04    | ***         |             |             |             |
|                          | Insectivorous bird CWM Total bee biomass | 0.01        | 4.48E-05    | 0.96        |             |             |             |             |
|                          | Insectivorous bird CWM Total moth biomass | -0.02       | -5.49E-04   | 0.85        |             |             |             |             |
|                          | Insectivorous bird CWM Total plant biomass | -0.26       | -1.70E-02   | 0.05        | *           |             |             |             |
|                          | Total bee biomass (Intercept) | 0.00        | 0.00        | 0.31        | 0.31        |             |             |             |
|                          | Total bee biomass Disturbance | -0.17       | -9.20E+02   | 0.39        |             |             |             |             |
|                          | Total bee biomass Insect-pollinated plants CWM | 0.06        | 3.56E+02    | 0.61        |             |             |             |             |
|                          | Total bee biomass Temperature | -0.14       | -3.68E+01   | 0.41        |             |             |             |             |
|                          | Total bee biomass Total plant biomass | -0.62       | -6.34E+00   | 3.06E-05    | ***         |             |             |             |
|                          | Total moth biomass (Intercept) | 0.00        | 0.00        | 0.27        | 0.27        |             |             |             |
|                          | Total moth biomass Insect-pollinated plants CWM | 0.22        | 3.40E+02    | 0.16        |             |             |             |             |
|                          | Total moth biomass Leaf economics | -0.37       | -8.56E+01   | 0.04        | *           |             |             |             |
| Total moth biomass | Temperature | 0.65 | 4.58E+01 | 4.06E-05 | *** |
|--------------------|-------------|------|----------|----------|------|
| Total moth biomass | Total plant biomass | 0.01 | 4.21E-02 | 0.90 |      |
| Insectivorous birds significant | Insect-pollinated plants CWM (Intercept) | 0.05 | 1.37E-02 | 0.47 | 0.71 | 0.81 |
| Insectivorous birds significant | Insect-pollinated plants CWM Leaf economics | 0.62 | 9.02E-02 | 9.16E-06 | *** |
| Insectivorous birds significant | Insect-pollinated plants CWM Total plant biomass | 0.24 | 4.30E-04 | 0.04 | * |
| Insectivorous bird CWM (Intercept) | -0.01 | -1.03E-01 | 0.33 | 0.33 |      |
| Insectivorous bird CWM Temperature | 0.45 | 7.45E-01 | 3.07E-04 | *** |
| Insectivorous bird CWM Total plant biomass | -0.26 | -1.73E-02 | 0.02 | * |
| Total bee biomass (Intercept) | -0.05 | -8.72E+01 | 0.23 | 0.3 |      |
| Total bee biomass Total plant biomass | -0.45 | -4.64E+00 | 8.75E-04 | *** |
| Total moth biomass (Intercept) | -0.01 | -5.08E+00 | 0.22 | 0.24 |      |
| Total moth biomass Temperature | 0.44 | 3.12E+01 | 2.49E-03 | ** |      |