Table 1: Test for variance among families and populations

Model: Monarch\_Quantity\_Observed ~ Block + (1 | Population) + (1 | Population:Fam\_uniq)

| Variable | Group | Variance | PVE | χ2 | df | p |
| --- | --- | --- | --- | --- | --- | --- |
| Monarch butterfly: 2021 | Family | 0.038 | 3.063 | 4.088 | 1 | **0.0215** |
| Monarch butterfly: 2021 | Population | 0.111 | 8.285 | 0.070 | 1 | 0.396 |

Table 2: Assess how much variance is explained by urbanization

Urbanization = Distance to the City Center

Model: Monarch\_Quantity\_Observed ~ Block + (1 | Population) + (1 | Population:Fam\_uniq) + City\_dist

| Variable | Group | Variance | PVE | χ2 | df | p |
| --- | --- | --- | --- | --- | --- | --- |
| Monarch butterfly: 2021 | Family | 0.031 | 2.554 | 4.198 | 1 | **0.02** |
| Monarch butterfly: 2021 | Population | 0.107 | 8.000 | 0.004 | 1 | 0.4765 |

Table 3: Quantify variance explained by urbanization

| Variable | Predictor | χ2 | p |
| --- | --- | --- | --- |
| Monarch butterfly: 2021 | Block | 31.945 | **<0.001\*\*\*** |
| Distance to City Center | 1.519 | 0.218 |

Table 4: Assess how much variance is explained by urbanization

Urbanization = Urbanization Score

Model: Monarch\_Quantity\_Observed ~ Block + (1 | Population) + (1 | Population:Fam\_uniq) + Urb\_score

| Variable | Group | Variance | PVE | χ2 | df | p |
| --- | --- | --- | --- | --- | --- | --- |
| Monarch butterfly: 2021 | Family | 0.028 | 2.284 | 4.317 | 1 | **0.019** |
| Monarch butterfly: 2021 | Population | 0.105 | 7.846 | -0.001 | 1 | 0.5 |

Table 5: Quantify variance explained by urbanization

| Variable | Predictor | χ2 | p |
| --- | --- | --- | --- |
| Monarch butterfly: 2021 | Block | 90,295.651 | **<0.001\*\*\*** |
| Urbanization Score | 317.593 | **<0.001\*\*\*** |