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: 2020 | Family | NA | NA | 0 | 1 | 0.5 |
| Monarch butterfly: 2020 | Population | NA | NA | 0 | 1 | 0.5 |

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: 2020 | Family | NA | NA | 0 | 1 | 0.5 |
| Monarch butterfly: 2020 | Population | NA | NA | 0 | 1 | 0.5 |

Table 3: Quantify variance explained by urbanization

| Variable | Predictor | χ2 | p |
| --- | --- | --- | --- |
| Monarch butterfly: 2020 | Block | 7.550 | 0.056 |
| Distance to City Center | 0.232 | 0.63 |

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: 2020 | Family | NA | NA | 0 | 1 | 0.5 |
| Monarch butterfly: 2020 | Population | NA | NA | 0 | 1 | 0.5 |

Table 5: Quantify variance explained by urbanization

| Variable | Predictor | χ2 | p |
| --- | --- | --- | --- |
| Monarch butterfly: 2020 | Block | 7.489 | 0.058 |
| Urbanization Score | 0.464 | 0.496 |