**Table 1**: Heritable genetic variation among families and populations

*Model: Trait ~ (1 | Population/Family) + Block*

* Table 1 in individual trait word docs
* Values for last year included (e.g. relative growth rate measured 2019-2021; 2021 values are below)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Genetic variation within/among ALL populations** | | | | | |
| Population | | | Family | | |
| χ² | p | PVE | χ² | p | PVE |
| ***Growth traits*** | | | | | | |
| Height before flowering | 0.427 | 0.257 | 1.186 | 9.561 | **0.001** | 9.227 |
| Height after flowering | 0.776 | 0.189 | 1.442 | 5.626 | **0.009** | 6.616 |
| LDMC | 0 | 0.3805 | 0.407 | 0 | 0.5 | 0 |
| Mortality\* | 0.795 | 0.186 | 1.410 | 0.778 | 0.189 | 2.746 |
| Ramets before flowering\* | 0.032 | 0.429 | 0 | 68.887 | **<0.001** | 6.927 |
| Ramets after flowering\* | 0.121 | 0.364 | 0.324 | 27.65 | **<0.001** | 5.643 |
| Relative growth rate | 0 | 0.5 | 0 | 0.073 | 0.394 | 1.051 |
| SLA | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| ***Herbivore community*** | | | | | | |
| *D. plexippus* abundance\* | 0.004 | 0.4765 | 0 | 0 | 0.5 | 0 |
| *L. clivicollis* abundance\* | 0.389 | 0.2665 | 0.299 | 0 | 0.5 | 0 |
| *L. asclepiadis* abundance\* | 1.317 | 0.1255 | 1.280 | 3.062 | **0.0395** | 2.727 |
| ***Defense traits*** | | | | | | |
| Herbivory before flowering (binary)\* | 0 | 0.5 | 0 | 0.001 | 0.49 | 0.317 |
| Herbivory before flowering (quantitative) | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| Herbivory after flowering (binary)\* | 0 | 0.4955 | 0 | 7.092 | **0.004** | 1.948 |
| Herbivory after flowering (quantitative) | 0 | 0.5 | 0 | 0.413 | 0.2605 | 2.163 |
| Latex exudation | 4.536 | **0.0165** | 4.045 | 2.033 | 0.077 | 4.748 |
| Weevil damage (binary)\* | 0 | 0.4995 | 0 | 3.501 | **0.0305** | 5.624 |
| Weevil damage (quantitative) | 1.208 | 0.136 | 2.112 | 1.189 | 0.138 | 4.006 |
| ***Reproductive traits*** | | | | | | |
| Date of first flower\* | 0 | 0.5 | 0 | 0 | 0.5 | 9.564 |
| Date of first follicle\* | 0 | 0.5 | 0 | 47.484 | **<0.001** | 0 |
| Flower size | 1.223 | 0.1345 | 7.189 | 0.11 | 0.37 | 4.096 |
| Flowering duration\* | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| Flowering success\* | 4.855 | **0.014** | 3.420 | 0.267 | 0.3025 | 1.443 |
| Follicles\* | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| Inflorescences\* | 3.285 | **0.035** | 7.409 | 0 | 0.4965 | 0 |
| Flowers per inflorescence\* | 0.833 | 0.1805 | 8.369 | 0 | 0.5 | 0 |
| Pollinaria removed | 0.017 | 0.449 | 1.003 | 3.304 | 0.0345 | 27.192 |

*PVE = percent variance explained*

\*Variables were analyzed with generalized linear mixed models. PVE was calculated as: random effect variance/(random effect variance + residual variance) with the *get\_variance()* function from the *insight* R package. Remaining variables were analyzed with general linear mixed models and PVE was calculated as: random effect variance/(random effect variance + residual variance) with the *VarCorr()* function from the *lme4* R package.

**Table 2**: Heritable genetic variation associated with urbanization

*Model: Trait ~ (1 | Population/Family) + Block + Urbanization*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Genetic variation within/among ALL** **populations** | | | | | | | | | | | |
| Urbanization = Distance to City Center | | | | | | Urbanization = Urbanization Score | | | | | |
| Population | | | Family | | | Population | | | Family | | |
| χ² | *p* | PVE | χ² | *p* | PVE | χ² | *p* | PVE | χ² | *p* | PVE |
| ***Growth traits*** | | | | | | | | | | | | |
| Height before flowering | 0.266 | 0.303 | 0.937 | 9.628 | **0.001** | 9.283 | 0.461 | 0.2485 | 1.242 | 9.578 | **0.001** | 9.225 |
| Height after flowering | 0.68 | 0.205 | 1.349 | 5.698 | **0.0085** | 6.666 | 0.873 | 0.175 | 1.547 | 5.642 | **0.009** | 6.618 |
| LDMC | 0 | 0.424 | 0.254 | 0 | 0.5 | 0 | 0.157 | 0.346 | 0.537 | 0 | 0.5 | 0 |
| Mortality\* | 0.804 | 0.185 | 1.571 | 0.781 | 0.1885 | 2.738 | 0.82 | 0.1825 | 1.586 | 0.758 | 0.192 | 2.701 |
| Ramets before flowering\* | 0.001 | 0.485 | 0 | 68.905 | **<0.001** | 6.877 | 0.034 | 0.427 | 0 | 68.829 | **<0.001** | 7.049 |
| Ramets after flowering\* | 0.025 | 0.437 | 0.248 | 27.856 | **<0.001** | 5.669 | 0.114 | 0.368 | 0.446 | 27.672 | **<0.001** | 5.65 |
| Relative growth rate | 0 | 0.5 | 0 | 0.098 | 0.377 | 1.229 | 0 | 0.5 | 0 | 0.101 | 0.3755 | 1.243 |
| SLA | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| ***Herbivore community*** | | | | | | | | | | | | |
| *D. plexippus* abundance\* | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| *L. clivicollis* abundance\* | 0.374 | 0.2705 | 0.347 | 0 | 0.5 | 0 | 0.358 | 0.2745 | 0.326 | 0 | 0.5 | 0 |
| *L. asclepiadis* abundance\* | 1.275 | 0.1295 | 1.367 | 3.15 | **0.038** | 2.727 | 1.056 | 0.152 | 1.306 | 3.204 | **0.0365** | 2.727 |
| ***Defense traits*** | | | | | | | | | | | | |
| Herbivory before flowering (binary)\* | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0.331 |
| Herbivory before flowering (quantitative) | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| Herbivory after flowering (binary)\* | 0 | 0.4945 | 0 | 5.815 | **0.008** | 1.937 | 0.001 | 0.4865 | 0 | 5.699 | **0.0085** | 1.894 |
| Herbivory after flowering (quantitative) | 0 | 0.5 | 0 | 0.495 | 0.241 | 2.37 | 0 | 0.5 | 0 | 0.482 | 0.244 | 2.348 |
| Latex exudation | 4.628 | **0.0155** | 4.141 | 2.052 | 0.076 | 4.77 | 3.01 | **0.0415** | 3.217 | 1.907 | 0.0835 | 4.631 |
| Weevil damage (binary)\* | 0 | 0.5 | 0 | 3.429 | **0.032** | 5.637 | 0 | 0.5 | 0 | 3.499 | **0.0305** | 5.751 |
| Weevil damage (quantitative) | 1.232 | 0.1335 | 2.128 | 1.049 | 0.153 | 3.755 | 1.392 | 0.119 | 2.291 | 1.095 | 0.1475 | 3.839 |
| ***Reproductive traits*** | | | | | | | | | | | | |
| Date of first flower\* | 0 | 0.5 | 0 | 0 | 0.5 | 10.098 | 0 | 0.5 | 0 | 0 | 0.5 | 9.954 |
| Date of first follicle\* | 0.003 | 0.4765 | 0 | 45.814 | **<0.001** | 0 | 0 | 0.5 | 0 | 47.014 | **<0.001** | 0 |
| Flower size | 1.159 | 0.141 | 7.233 | 0.103 | 0.374 | 3.994 | 0.833 | 0.181 | 6.365 | 0.132 | 0.358 | 4.603 |
| Flowering duration\* | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 | 0 | 0.5 | 0 |
| Flowering success\* | 4.766 | **0.0145** | 3.593 | 0.268 | 0.3025 | 1.439 | 4.695 | **0.015** | 3.569 | 0.274 | 0.3005 | 1.453 |
| Follicles\* | 0 | 0.5 | 0.743 | 0 | 0.5 | 0 | 0 | 0.5 | 0.813 | 0 | 0.5 | 0 |
| Inflorescences\* | 3.283 | **0.035** | 8.156 | 0 | 0.5 | 0 | 3.07 | **0.04** | 7.853 | 0 | 0.5 | 0 |
| Flowers per inflorescence\* | 0.203 | 0.326 | 6.489 | 0 | 0.5 | 1.507 | 0.06 | 0.403 | 6.237 | 0 | 0.5 | 0.838 |
| Pollinaria removed | 0.103 | 0.3745 | 2.328 | 0.088 | 0.3835 | 2.174 | 2.918 | **0.044** | 25.028 | 22.722 | **0.0495** | 24.373 |