Table 1: Main model set - all observations (with group interactions)

| Model | Local velocity of isotherm shifts | Potential dispersal rate | Parameter | Estimate | Std.Error | Conditional R2 | Marginal R2 | DF | t-value | p-value | n | K | LL | AICc | ΔAICc | AIC weight | Rank |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Median | Intercept | 2.33 | 0.42 | 0.39 | 0.16 | 249 | 5.6 | 0 | 421 | 7 | -1077.12 | 2168.51 | 0 | 0.16 | 1 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Median | Potential dispersal rate | -0.01 | 0 | 0.39 | 0.16 | 249 | -1.84 | 0.07 | 421 | 7 | -1077.12 | 2168.51 | 0 | 0.16 | 1 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Median | Minimum rate | -2.34 | 0.47 | 0.39 | 0.16 | 249 | -4.94 | 0 | 421 | 7 | -1077.12 | 2168.51 | 0 | 0.16 | 1 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Median | Velocity of isotherm shift | 0.16 | 0.09 | 0.39 | 0.16 | 167 | 1.84 | 0.07 | 421 | 7 | -1077.12 | 2168.51 | 0 | 0.16 | 1 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Median | Potential dispersal rate:velocity of isotherm shift | 0.03 | 0.16 | 0.39 | 0.16 | 249 | 0.16 | 0.87 | 421 | 7 | -1077.12 | 2168.51 | 0 | 0.16 | 1 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Median | Intercept | 2.32 | 0.45 | 0.39 | 0.16 | 249 | 5.18 | 0 | 421 | 7 | -1077.4 | 2169.08 | 0.57 | 0.12 | 2 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Median | Potential dispersal rate | 0 | 0 | 0.39 | 0.16 | 249 | -1.77 | 0.08 | 421 | 7 | -1077.4 | 2169.08 | 0.57 | 0.12 | 2 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Median | Minimum rate | -2.37 | 0.49 | 0.39 | 0.16 | 249 | -4.87 | 0 | 421 | 7 | -1077.4 | 2169.08 | 0.57 | 0.12 | 2 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Median | Velocity of isotherm shift | 0.12 | 0.07 | 0.39 | 0.16 | 167 | 1.68 | 0.09 | 421 | 7 | -1077.4 | 2169.08 | 0.57 | 0.12 | 2 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | 0.02 | 0.16 | 0.39 | 0.16 | 249 | 0.16 | 0.87 | 421 | 7 | -1077.4 | 2169.08 | 0.57 | 0.12 | 2 |
| Minimum rate | 3rd quartile | Maximum | Intercept | 1.97 | 0.41 | 0.37 | 0.15 | 251 | 4.75 | 0 | 421 | 6 | -1078.55 | 2169.31 | 0.8 | 0.11 | 3 |
| Minimum rate | 3rd quartile | Maximum | Minimum rate | 0.16 | 0.07 | 0.37 | 0.15 | 166 | 2.11 | 0.04 | 421 | 6 | -1078.55 | 2169.31 | 0.8 | 0.11 | 3 |
| Minimum rate | 3rd quartile | Maximum | Minimum rate | -1.95 | 0.49 | 0.37 | 0.15 | 251 | -4 | 0 | 421 | 6 | -1078.55 | 2169.31 | 0.8 | 0.11 | 3 |
| Minimum rate | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | -0.23 | 1 | 0.37 | 0.15 | 166 | -0.23 | 0.82 | 421 | 6 | -1078.55 | 2169.31 | 0.8 | 0.11 | 3 |
| Minimum rate | Mean | Maximum | Intercept | 2.04 | 0.39 | 0.37 | 0.15 | 251 | 5.26 | 0 | 421 | 6 | -1078.62 | 2169.44 | 0.93 | 0.1 | 4 |
| Minimum rate | Mean | Maximum | Minimum rate | 0.19 | 0.09 | 0.37 | 0.15 | 166 | 2.08 | 0.04 | 421 | 6 | -1078.62 | 2169.44 | 0.93 | 0.1 | 4 |
| Minimum rate | Mean | Maximum | Minimum rate | -2.04 | 0.46 | 0.37 | 0.15 | 251 | -4.41 | 0 | 421 | 6 | -1078.62 | 2169.44 | 0.93 | 0.1 | 4 |
| Minimum rate | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.11 | 2.28 | 0.37 | 0.15 | 166 | 0.05 | 0.96 | 421 | 6 | -1078.62 | 2169.44 | 0.93 | 0.1 | 4 |
| Velocity of isotherm shift | Mean | - | Intercept | 2.06 | 0.39 | 0.36 | 0.15 | 251 | 5.25 | 0 | 421 | 6 | -1078.79 | 2169.78 | 1.27 | 0.08 | 5 |
| Velocity of isotherm shift | Mean | - | Velocity of isotherm shift | 0.18 | 0.09 | 0.36 | 0.15 | 166 | 2 | 0.05 | 421 | 6 | -1078.79 | 2169.78 | 1.27 | 0.08 | 5 |
| Velocity of isotherm shift | Mean | - | Minimum rate | -2.05 | 0.48 | 0.36 | 0.15 | 251 | -4.28 | 0 | 421 | 6 | -1078.79 | 2169.78 | 1.27 | 0.08 | 5 |
| Velocity of isotherm shift | Mean | - | Potential dispersal rate:velocity of isotherm shift | -0.12 | 0.92 | 0.36 | 0.15 | 166 | -0.13 | 0.9 | 421 | 6 | -1078.79 | 2169.78 | 1.27 | 0.08 | 5 |
| Velocity of isotherm shift | 3rd quartile | - | Intercept | 2 | 0.42 | 0.37 | 0.15 | 251 | 4.74 | 0 | 421 | 6 | -1078.8 | 2169.79 | 1.29 | 0.08 | 6 |
| Velocity of isotherm shift | 3rd quartile | - | Velocity of isotherm shift | 0.15 | 0.07 | 0.37 | 0.15 | 166 | 1.98 | 0.05 | 421 | 6 | -1078.8 | 2169.79 | 1.29 | 0.08 | 6 |
| Velocity of isotherm shift | 3rd quartile | - | Minimum rate | -1.91 | 0.54 | 0.37 | 0.15 | 251 | -3.52 | 0 | 421 | 6 | -1078.8 | 2169.79 | 1.29 | 0.08 | 6 |
| Velocity of isotherm shift | 3rd quartile | - | Potential dispersal rate:velocity of isotherm shift | -0.28 | 0.49 | 0.37 | 0.15 | 166 | -0.58 | 0.56 | 421 | 6 | -1078.8 | 2169.79 | 1.29 | 0.08 | 6 |
| Potential dispersal rate | - | Median | Intercept | 2.91 | 0.28 | 0.4 | 0.15 | 249 | 10.25 | 0 | 421 | 6 | -1078.84 | 2169.89 | 1.38 | 0.08 | 7 |
| Potential dispersal rate | - | Median | Potential dispersal rate | -0.01 | 0 | 0.4 | 0.15 | 249 | -1.98 | 0.05 | 421 | 6 | -1078.84 | 2169.89 | 1.38 | 0.08 | 7 |
| Potential dispersal rate | - | Median | Minimum rate | -2.9 | 0.38 | 0.4 | 0.15 | 249 | -7.69 | 0 | 421 | 6 | -1078.84 | 2169.89 | 1.38 | 0.08 | 7 |
| Potential dispersal rate | - | Median | Potential dispersal rate:velocity of isotherm shift | 0.03 | 0.16 | 0.4 | 0.15 | 249 | 0.16 | 0.87 | 421 | 6 | -1078.84 | 2169.89 | 1.38 | 0.08 | 7 |
| Minimum rate | 3rd quartile | Median | Intercept | 2.06 | 0.41 | 0.38 | 0.15 | 251 | 4.98 | 0 | 421 | 6 | -1079.08 | 2170.36 | 1.85 | 0.06 | 8 |
| Minimum rate | 3rd quartile | Median | Minimum rate | 0.17 | 0.09 | 0.38 | 0.15 | 166 | 1.84 | 0.07 | 421 | 6 | -1079.08 | 2170.36 | 1.85 | 0.06 | 8 |
| Minimum rate | 3rd quartile | Median | Minimum rate | -2.04 | 0.49 | 0.38 | 0.15 | 251 | -4.21 | 0 | 421 | 6 | -1079.08 | 2170.36 | 1.85 | 0.06 | 8 |
| Minimum rate | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | -0.2 | 1.48 | 0.38 | 0.15 | 166 | -0.14 | 0.89 | 421 | 6 | -1079.08 | 2170.36 | 1.85 | 0.06 | 8 |
| Minimum rate | Mean | Median | Intercept | 2.13 | 0.39 | 0.37 | 0.15 | 251 | 5.5 | 0 | 421 | 6 | -1079.11 | 2170.42 | 1.91 | 0.06 | 9 |
| Minimum rate | Mean | Median | Minimum rate | 0.19 | 0.1 | 0.37 | 0.15 | 166 | 1.83 | 0.07 | 421 | 6 | -1079.11 | 2170.42 | 1.91 | 0.06 | 9 |
| Minimum rate | Mean | Median | Minimum rate | -2.11 | 0.46 | 0.37 | 0.15 | 251 | -4.57 | 0 | 421 | 6 | -1079.11 | 2170.42 | 1.91 | 0.06 | 9 |
| Minimum rate | Mean | Median | Potential dispersal rate:velocity of isotherm shift | -0.09 | 4.87 | 0.37 | 0.15 | 166 | -0.02 | 0.98 | 421 | 6 | -1079.11 | 2170.42 | 1.91 | 0.06 | 9 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Maximum | Intercept | 2.19 | 0.4 | 0.37 | 0.15 | 249 | 5.4 | 0 | 421 | 7 | -1078.09 | 2170.45 | 1.94 | 0.06 | 10 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Maximum | Potential dispersal rate | 0 | 0 | 0.37 | 0.15 | 249 | -1.16 | 0.25 | 421 | 7 | -1078.09 | 2170.45 | 1.94 | 0.06 | 10 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Maximum | Minimum rate | -2.21 | 0.47 | 0.37 | 0.15 | 249 | -4.74 | 0 | 421 | 7 | -1078.09 | 2170.45 | 1.94 | 0.06 | 10 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Maximum | Velocity of isotherm shift | 0.2 | 0.09 | 0.37 | 0.15 | 167 | 2.19 | 0.03 | 421 | 7 | -1078.09 | 2170.45 | 1.94 | 0.06 | 10 |
| Potential dispersal rate and velocity of isotherm shift (additive) | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.03 | 0.15 | 0.37 | 0.15 | 249 | 0.22 | 0.83 | 421 | 7 | -1078.09 | 2170.45 | 1.94 | 0.06 | 10 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Maximum | Intercept | 2.15 | 0.43 | 0.37 | 0.15 | 249 | 4.94 | 0 | 421 | 7 | -1078.43 | 2171.14 | 2.63 | 0.04 | 11 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Maximum | Potential dispersal rate | 0 | 0 | 0.37 | 0.15 | 249 | -1 | 0.32 | 421 | 7 | -1078.43 | 2171.14 | 2.63 | 0.04 | 11 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Maximum | Minimum rate | -2.22 | 0.48 | 0.37 | 0.15 | 249 | -4.64 | 0 | 421 | 7 | -1078.43 | 2171.14 | 2.63 | 0.04 | 11 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Maximum | Velocity of isotherm shift | 0.15 | 0.07 | 0.37 | 0.15 | 167 | 2.02 | 0.04 | 421 | 7 | -1078.43 | 2171.14 | 2.63 | 0.04 | 11 |
| Potential dispersal rate and velocity of isotherm shift (additive) | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.03 | 0.15 | 0.37 | 0.15 | 249 | 0.22 | 0.83 | 421 | 7 | -1078.43 | 2171.14 | 2.63 | 0.04 | 11 |
| Potential dispersal rate | - | Maximum | Intercept | 2.79 | 0.31 | 0.39 | 0.15 | 249 | 9.12 | 0 | 421 | 6 | -1080.5 | 2173.21 | 4.7 | 0.02 | 12 |
| Potential dispersal rate | - | Maximum | Potential dispersal rate | 0 | 0 | 0.39 | 0.15 | 249 | -0.73 | 0.47 | 421 | 6 | -1080.5 | 2173.21 | 4.7 | 0.02 | 12 |
| Potential dispersal rate | - | Maximum | Minimum rate | -2.79 | 0.4 | 0.39 | 0.15 | 249 | -7.03 | 0 | 421 | 6 | -1080.5 | 2173.21 | 4.7 | 0.02 | 12 |
| Potential dispersal rate | - | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.03 | 0.15 | 0.39 | 0.15 | 249 | 0.21 | 0.83 | 421 | 6 | -1080.5 | 2173.21 | 4.7 | 0.02 | 12 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Intercept | 2.3 | 0.43 | 0.38 | 0.16 | 249 | 5.37 | 0 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Potential dispersal rate | 0 | 0.01 | 0.38 | 0.16 | 249 | -0.66 | 0.51 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Velocity of isotherm shift | 0.18 | 0.1 | 0.38 | 0.16 | 164 | 1.83 | 0.07 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Minimum rate | -2.3 | 0.51 | 0.38 | 0.16 | 249 | -4.49 | 0 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Potential dispersal rate:velocity of isotherm shift | 0 | 0 | 0.38 | 0.16 | 164 | -0.33 | 0.74 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Potential dispersal rate:velocity of isotherm shift | 0.05 | 0.2 | 0.38 | 0.16 | 249 | 0.23 | 0.82 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Potential dispersal rate:velocity of isotherm shift | -0.1 | 0.93 | 0.38 | 0.16 | 164 | -0.11 | 0.92 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Median | Potential dispersal rate:velocity of isotherm shift | -0.12 | 0.68 | 0.38 | 0.16 | 164 | -0.18 | 0.86 | 421 | 10 | -1077.04 | 2174.62 | 6.11 | 0.01 | 13 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Intercept | 2.32 | 0.46 | 0.39 | 0.16 | 249 | 5.02 | 0 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Potential dispersal rate | -0.01 | 0.01 | 0.39 | 0.16 | 249 | -1.06 | 0.29 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Velocity of isotherm shift | 0.12 | 0.08 | 0.39 | 0.16 | 164 | 1.47 | 0.14 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Minimum rate | -2.24 | 0.58 | 0.39 | 0.16 | 249 | -3.87 | 0 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | 0 | 0 | 0.39 | 0.16 | 164 | 0.36 | 0.72 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | 0.04 | 0.22 | 0.39 | 0.16 | 249 | 0.18 | 0.86 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | -0.25 | 0.49 | 0.39 | 0.16 | 164 | -0.51 | 0.61 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Median | Potential dispersal rate:velocity of isotherm shift | -0.02 | 0.25 | 0.39 | 0.16 | 164 | -0.07 | 0.94 | 421 | 10 | -1077.18 | 2174.9 | 6.39 | 0.01 | 14 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Intercept | 2.15 | 0.46 | 0.37 | 0.15 | 249 | 4.65 | 0 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Potential dispersal rate | 0 | 0 | 0.37 | 0.15 | 249 | -0.53 | 0.59 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Velocity of isotherm shift | 0.21 | 0.11 | 0.37 | 0.15 | 164 | 1.9 | 0.06 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Minimum rate | -2.17 | 0.54 | 0.37 | 0.15 | 249 | -3.98 | 0 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | 0 | 0 | 0.37 | 0.15 | 164 | -0.13 | 0.89 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.05 | 0.19 | 0.37 | 0.15 | 249 | 0.29 | 0.77 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | -0.11 | 0.95 | 0.37 | 0.15 | 164 | -0.11 | 0.91 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | Mean | Maximum | Potential dispersal rate:velocity of isotherm shift | -0.13 | 0.66 | 0.37 | 0.15 | 164 | -0.19 | 0.85 | 421 | 10 | -1078.05 | 2176.64 | 8.13 | 0 | 15 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Intercept | 2.14 | 0.5 | 0.37 | 0.15 | 249 | 4.3 | 0 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Potential dispersal rate | 0 | 0 | 0.37 | 0.15 | 249 | -0.61 | 0.54 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Velocity of isotherm shift | 0.15 | 0.09 | 0.37 | 0.15 | 164 | 1.72 | 0.09 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Minimum rate | -2.07 | 0.61 | 0.37 | 0.15 | 249 | -3.39 | 0 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | 0 | 0 | 0.37 | 0.15 | 164 | 0.09 | 0.93 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | 0.05 | 0.2 | 0.37 | 0.15 | 249 | 0.24 | 0.81 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | -0.27 | 0.51 | 0.37 | 0.15 | 164 | -0.54 | 0.59 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |
| Potential dispersal rate and velocity of isotherm shift (interactive) | 3rd quartile | Maximum | Potential dispersal rate:velocity of isotherm shift | -0.03 | 0.24 | 0.37 | 0.15 | 164 | -0.12 | 0.91 | 421 | 10 | -1078.24 | 2177.01 | 8.51 | 0 | 16 |