**Supporting Information**. Drees, T.H. and K. Shea, 2023. *Elevated temperatures shift flower head height distributions and seed dispersal patterns in two invasive thistle species*. Ecology.

**Appendix S1.** Alternative representation of Figure 1 with superimposed data, and tables for select statistics from dispersal simulations comparing warmed/unwarmed treatments as well as flower head height maximum/distribution.



**Figure S1.** Distribution of flower head heights for *C. nutans* and *C. acanthoides* under the control and warming treatments. Solid lines indicate bootstrapped mean probability density for a given height, and bars indicate observed frequencies of flower head heights.

**Table S1**. Dispersal statistics from the first set of simulations comparing warmed/unwarmed outcomes for *C. nutans* (CN) and *C. acanthoides* (CA), with values given for the mean and lower/upper values of the 95% bootstrap interval (BI).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | **95% BI Lower** | **Mean** | **95% BI Upper** |
| **Mean dispersal distance (m)** | |  |  |  |
| CN | Unwarmed | 2.84 | 3.05 | 3.28 |
|  | Warmed | 3.44 | 3.69 | 3.94 |
| CA | Unwarmed | 2.29 | 2.47 | 2.63 |
|  | Warmed | 3.18 | 3.39 | 3.60 |
|  | | | | |
| **95th percentile dispersal distance (m)** | |  |  |  |
| CN | Unwarmed | 9.75 | 10.53 | 11.35 |
|  | Warmed | 11.79 | 12.75 | 13.75 |
| CA | Unwarmed | 7.83 | 8.49 | 9.14 |
|  | Warmed | 10.88 | 11.68 | 12.47 |
|  | | | | |
| **99th percentile dispersal distance (m)** | |  |  |  |
| CN | Unwarmed | 22.36 | 24.98 | 27.77 |
|  | Warmed | 27.13 | 30.35 | 33.97 |
| CA | Unwarmed | 18.06 | 20.00 | 22.30 |
|  | Warmed | 24.87 | 27.55 | 30.74 |
|  | | | | |
| **10-m warmed/unwarmed risk ratio** | |  |  |  |
| CN |  | 1.15 | 1.36 | 1.59 |
| CA |  | 1.40 | 1.70 | 2.04 |
|  | | | | |
| **50-m warmed/unwarmed risk ratio** | |  |  |  |
| CN |  | 0.88 | 1.66 | 2.88 |
| CA |  | 1.14 | 2.44 | 4.68 |

**Table S2**. Dispersal statistics from the second set of simulations comparing warmed/unwarmed outcomes and maximum/distributed flower head heights for *C. nutans* (CN) and *C. acanthoides* (CA), with values given for the mean and lower/upper values of the 95% bootstrap interval (BI).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | **95% BI Lower** | **Mean** | **95% BI Upper** |
| **Mean dispersal distance (m)** | | |  |  |  |
| CN | Height Dist. | Unwarmed | 2.84 | 3.05 | 3.26 |
|  |  | Warmed | 3.46 | 3.70 | 3.97 |
|  | Max. Height | Unwarmed | 3.22 | 3.44 | 3.66 |
|  |  | Warmed | 3.87 | 4.12 | 4.37 |
| CA | Height Dist. | Unwarmed | 2.31 | 2.47 | 2.63 |
|  |  | Warmed | 3.18 | 3.39 | 3.62 |
|  | Max. Height | Unwarmed | 2.48 | 2.67 | 2.89 |
|  |  | Warmed | 3.91 | 4.12 | 4.35 |
|  | | | | | |
| **95th percentile dispersal distance (m)** | | |  |  |  |
| CN | Height Dist. | Unwarmed | 9.75 | 10.54 | 11.39 |
|  |  | Warmed | 11.87 | 12.75 | 13.86 |
|  | Max. Height | Unwarmed | 11.03 | 11.86 | 12.74 |
|  |  | Warmed | 13.19 | 14.17 | 15.17 |
| CA | Height Dist. | Unwarmed | 7.84 | 8.50 | 9.16 |
|  |  | Warmed | 10.85 | 11.67 | 12.56 |
|  | Max. Height | Unwarmed | 8.56 | 9.26 | 9.96 |
|  |  | Warmed | 13.17 | 14.07 | 15.05 |
|  | | | | | |
| **99th percentile dispersal distance (m)** | | |  |  |  |
| CN | Height Dist. | Unwarmed | 22.55 | 25.04 | 27.89 |
|  |  | Warmed | 27.45 | 30.36 | 33.77 |
|  | Max. Height | Unwarmed | 25.30 | 28.14 | 31.38 |
|  |  | Warmed | 30.34 | 33.70 | 37.56 |
| CA | Height Dist. | Unwarmed | 17.97 | 20.04 | 22.48 |
|  |  | Warmed | 24.82 | 27.60 | 30.76 |
|  | Max. Height | Unwarmed | 19.59 | 21.91 | 24.38 |
|  |  | Warmed | 29.57 | 33.06 | 36.84 |
|  | | | | | |
| **10-m maximum/distribution risk ratio** | | |  |  |  |
| CN |  | Unwarmed | 1.00 | 1.18 | 1.37 |
|  |  | Warmed | 1.02 | 1.22 | 1.45 |
| CA |  | Unwarmed | 1.16 | 1.35 | 1.55 |
|  |  | Warmed | 0.94 | 1.16 | 1.40 |
|  | | | | | |
| **50-m maximum/distribution risk ratio** | | | | | |
| CN |  | Unwarmed | 0.78 | 1.31 | 2.14 |
|  |  | Warmed | 0.73 | 1.38 | 2.46 |
| CA |  | Unwarmed | 0.91 | 1.57 | 2.60 |
|  |  | Warmed | 0.58 | 1.38 | 2.92 |