**Supplementary materials**

|  |
| --- |
| **Table 1**. *Cirsium* species emergence in a common garden. St. Paul, MN. 2016 through 2019. Log-Rank Test for Equality of Survivor Functions.  |
| Species | Emergenceaevents observed | Emergencebevents expected |
| *C. arvense* | 172.0 | 333.4 |
| *C. discolor* | 135.0 | 94.2 |
| *C. flodmanii* | 107.0 | 68.3 |
| *C. pitcheri* | 17.0 | 19.5 |
| *C. muticum* | 52.0 | 34.8 |
| *C. altissimum*  | 115.0 | 63.7 |
| *C. undulatum* | 23.0 | 7.2 |
| Total | 621.0 | 621.0 |
| Chi2(6) = | 311.8 |  |
| Pr>Chi2 = | 0 |  |

aEmergence of perennial shoots or initiation of leaves in biennial *Cirsium* species.

bThe Log-Rank Test rejected the null hypothesis of equivalence among species’

survival curves at a 1% level of significance (P=<0.001). A significant difference was

found among survival curves.

**Figure 1.** Shoot emergence/initiation in the spring in the *Cirsium* common garden. Percent maximum emergence of 1.0 is equivalent to 100% shoot emergence. Cumulative soil growing degree days were calculated using a base temperature of 0 C. St. Paul, MN 2016 - 2019.

a. *Cirsium arvense*, b. *Cirsium discolor*, c. *Cirsium altissimum*. d. *Cirsium flodmanii*, e. *Cirsium muticum,* f. *Cirsium undulatum*, g. *Cirsium pitcheri*

a